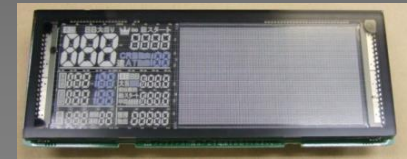


# Futaba Display Overview

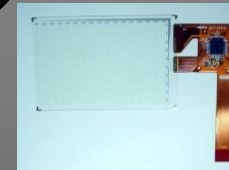
## Vacuum Fluorescent Displays (VFD)



## VFD, TFT & LCD Modules



Futaba Electronic Components Div.



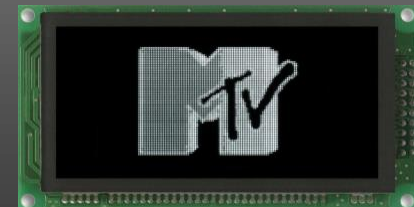
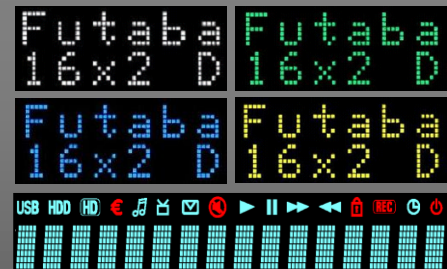
## OLED Displays

## Touch Panel & Touch VFD

# Futaba VFD Displays

## VFD Technology Advantages

- wide distance recognition / viewing angle
- wide operating temperature
- multicolor capability by filter & phosphor
- grey scale / digital dimming



GP1212A02A



GP1225A02A



GP1273A01A



Part No.	GP1212A02A	GP1225A02A	GP1273A01A
Mechanical Dimension (W x H x T)	159 x 51 mm	183 x 75 mm	183 x 88 mm
Character	ANK, Japanese, Korean, Traditional, Chinese, Simplified Chinese	ANK, Japanese, Korean, Traditional, Chinese, Simplified Chinese	ANK, Japanese, Korean, Traditional, Chinese, Simplified Chinese
Pattern Area (W x H)	115 x 29 mm	122 x 51 mm	123 x 61 mm
Resolution	256 x 64	245 x 102	256 x 128
Brightness	1,000 cd/m <sup>2</sup>	1,000 cd/m <sup>2</sup>	700 cd/m <sup>2</sup>
Oper. Temp.	-40 to +85 deg.	-40 to +85 deg.	-40 to +85 deg. *
Power Consumption	9.6 W	9.6 W	11 W
Interface	USB, RS232, I2C	8 bit Parallel	8 bit Parallel
Features	RTC	16x grey scale for Font & BMP	16x grey scale for Font

GP1229AI  
128x32 pixel



GP1237AI  
320x32 pixel



GP1212AI / TW002GINK  
256x64 pixel  
(Touch Optional)



TW003GINK (Touch)  
128x32 pixel  
(incl. Touch Option)



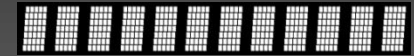
8MD006INKM

8x1 digit



12BD003INK

12x1 digit



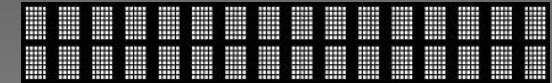
16BD011INK

16x1 digit



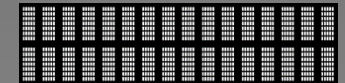
162SD013INK

16x2 digit



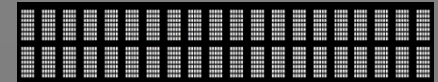
162SD053GINK

16x2 digit



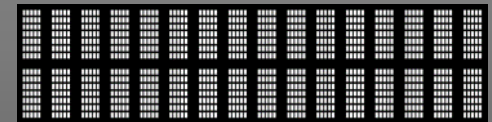
202SD022GINK

20x2 digit



162MD0006GINK

16x2 digit



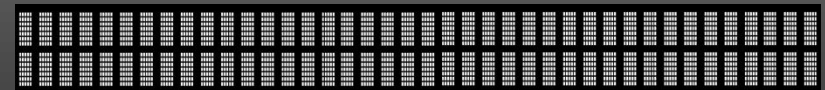
202MD032GINK

20x2 digit

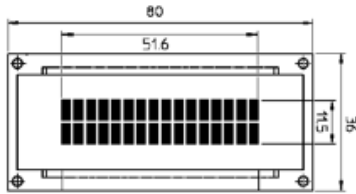


402SD062GINK

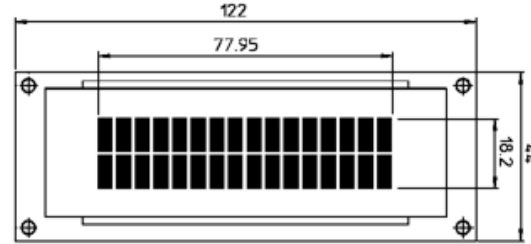
40x2 digit



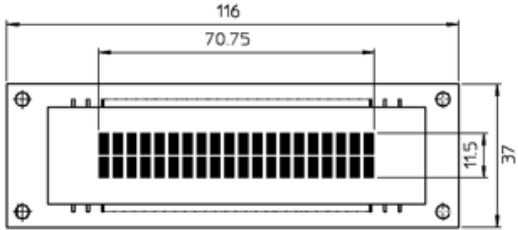
**M162SD53/54AA**  
16x2 Dot Matrix  
5,3 x 2,1 mm char. height



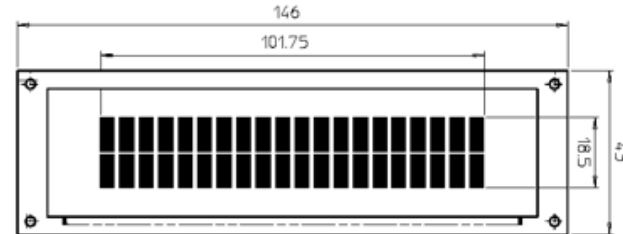
**M162MD06/07AA**  
16x2 Dot Matrix  
8,5 x 3,7 mm char. height



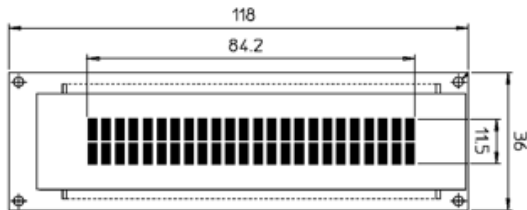
**M202SD22/23AA**  
20x2 Dot Matrix  
5,3 x 2,4 mm char. height



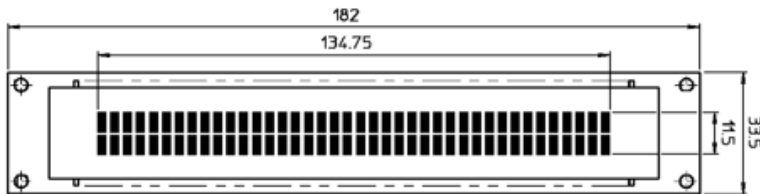
**M202MD32/33AA**  
20x2 Dot Matrix  
8,9 x 3,9 mm char. height



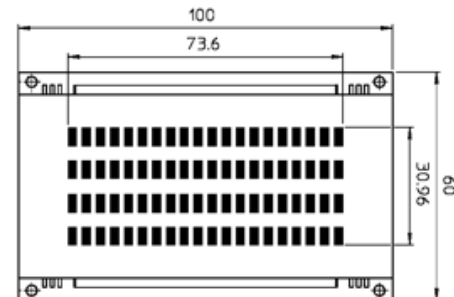
**M242SD06/07AA**  
24x2 Dot Matrix  
5,3 x 2,2 mm char. height



**M402SD62/63AA**  
40x2 Dot Matrix  
5,3 x 2,2 mm char. height



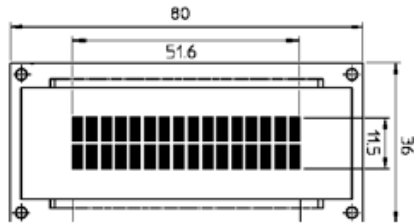
**M204SD08/09AA**  
20x4 Dot Matrix  
4,8 x 2,4 mm char. height



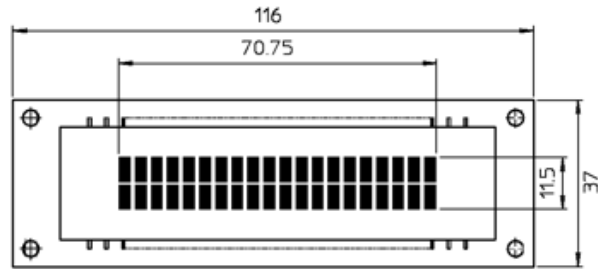


# Futaba Graphic VFD Modules (compatible to Dot Matrix LCD Emulator)

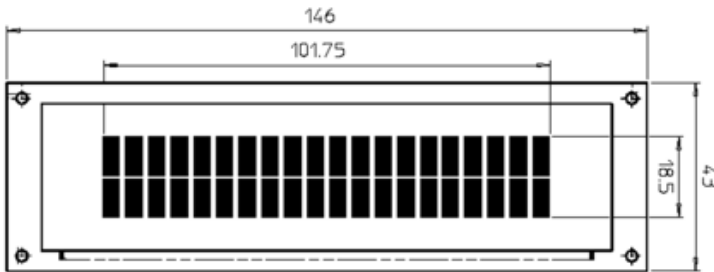
**M162SD53/54AA**  
16x2 lines



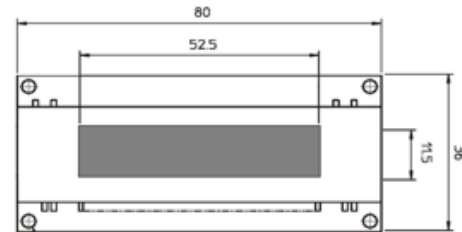
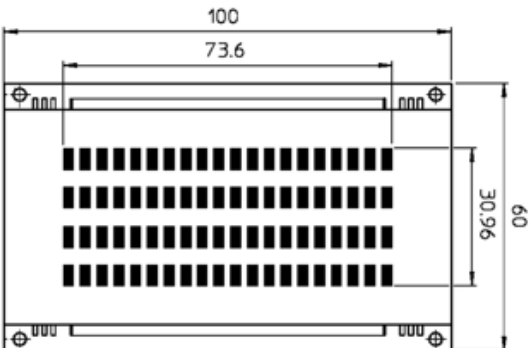
**M202SD22/23AA**  
20x2 lines



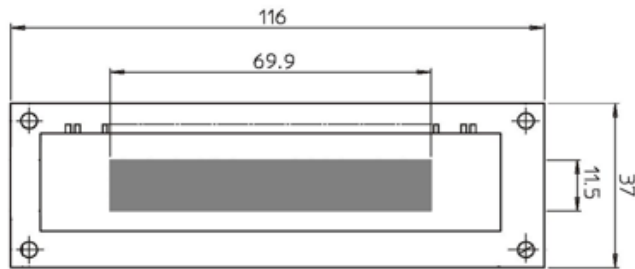
**M202MD32/33AA**  
20x2 lines



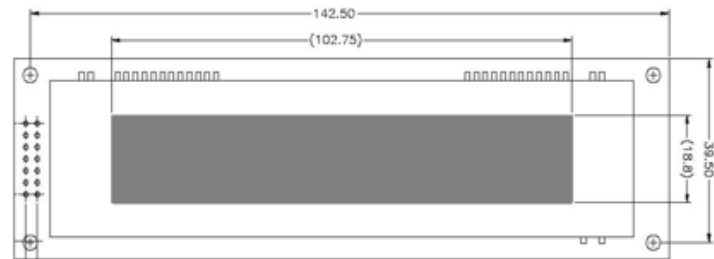
**M204SD08AA/09A**  
20x4 lines



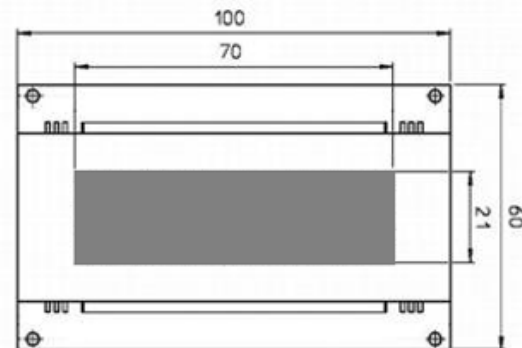
**GP1183A01**  
112x16 pixel



**GP1184A01**  
140x16 pixel



**NAGP1235AB**  
140x16 pixel



**NAGP1250AB**  
140x32 pixel

**Futaba**

# Futaba OLED Displays

## Medical / Health

Pulse - Blood Pressure - Diabetes - Insulin Pen - etc.



## Consumer

Smart Band



Hybrid Watch



Smart Watch



Head-Set & MP3



IC Recorder



WiFi Router



## Home Appliance / Lifestyle

Home Appliance



E-Cigarette



Shaver



## Automotive

Dashboard



Climate Control



Board Computer



Car Audio (After Market)



## Standard Products List

### Mono-Color Glass Type I

Part number		ELW0501AB	ELW0703BA	ELW0801AC	ELW0804AA	ELW0901AA	ELW1004AA	ELW1101AA
Image								
Diagonal	Inch	0,5	0,7	0,8	0,8	0,9	1,0	1,1
Color-type	-	Mono White	Mono White	Mono White	Mono White	Mono White	Mono White	Mono White
Resolution (W×H)	-	60 x 32	96 x 24	96 x 39	128 x 64	128 x 36	128 x 64	128 x 128
Glass Size	mm	15.3 x 10.2	22.30 x 9.00	22.00 x 11.83	25.45 x 18.30	25.28 x 9.9	15 x 28	25.64 x 27.85
Active Area	mm	11.25 x 5.99	18.024 x 4.56	18.02 x 7.30	18.53 x 9.26	21.73 x 6.10	10.856 x 21.736	20.20 x 20.20
Pixel Pitch	mm	0.19 x 0.19	0.19 x 0.19	0.19 x 0.19	0.145 x 0.145	0.17 x 0.17	0.17 x 0.17	0.16 x 0.16
Thickness (typical)	mm	1,09	0,98	0,94	2,40	0,94	1,19	1,53
Weight	g	0,6	0,46	0,7	1,6	0,64	1,05	2,4
Luminance	cd/m <sup>2</sup>	250	450	300	350	500	150	100
Circular Polarizer	-	yes	yes	yes	yes	no	yes	yes
I/F	-	SPI / I <sup>2</sup> C	SPI	SPI	SPI	SPI	SPI / I <sup>2</sup> C / Parallel	SPI / I <sup>2</sup> C / Parallel
Panel Drive Voltage	V	13,0	15,0	15,5	VHA17.0/VHC12.5	13,0	13,0	16,5
Logic Power Voltage	V	2,8	1,8	1,8	5	1,8	3	2,0
Power Consumption @Lighting Rate 30%	mW	18,7	40,5	24,6	81,6	28,5	39,8	89,1
FPC (pin No)	-	11	11	11	22	11	22	35
Accommodated connector	-	KYOCERA 04 6296 011 93X 846+	Panasonic Electric Works AYE331165	Panasonic Electric Works AYE331135	Iriso Electronics Series 9692 20 pins	KYOCERA 04 6296 011 93X 846+	None Solder	KYOCERA 04 6293 635 005 829+
Operating Temperature	°C	-20~+75	-20~+75	-20~+70	-40~+85	-20~+75	-20~+75	-20~+75
Storage Temperature	°C	-40~+85	-30~+80	-30~+80	-40~+105	-40~+85	-40~+85	-40~+85
Gray Scale	-	2	2	2	16	2	2	16
Storage Life Time (Lighting area of pixel 50%)	years	5,5	4,2	6,0	12,5	4,1	3,0	7,3

All specifications are subject to change without notice.

VDD : Logic power supply voltage, VDDIO : Interface power supply voltage

Storage life time is the expectation from estimated values at our company, not the values for guaranteeing.

### Standard Products List

#### Mono-Color Glass Type II

Part number		ELW1301AA1	ELW1501AA	ELW1502AAG	ELW2101AC	ELW2106AA	ELW2701AA	ELW3501AA
Image								
Diagonal	Inch	1,3	1,5	1,5	2,1	2,1	2,7	3,5
Color-type	-	Mono White	Mono White	Mono White	Mono White	Mono White	Mono White	Mono White
Resolution (WxH)	-	128 x 40	128 x 128	120 Segment	256 x 64	256 x 64	176 x 52	228 x 168
Glass Size	mm	36.74 x 14.00	31.55 x 33.77	35,0 x 39,8	62.5 x 20.6	60.60 x 17.50	75.80 x 31.44	89.82 x 68.22
Active Area	mm	31.84 x 8.65	26.09 x 26.09	26,2 x 26,63	51.18 x 12.78	50.66 x 12.39	65.79 x 19.68	70.65 x 52.06
Pixel Pitch	mm	0.25 x 0.22	0.20 x 0.20	-	0.20 x 0.20	0.20 x 0.20	0.38 x 0.38	0.31 x 0.31
Thickness (typical)	mm	1,03	1,3	2,4	1,62	1,34	2,01	2,4
Weight	g	1,43	3,5	6,0	5,6	2,7	10,3	23,6
Luminance	cd/m <sup>2</sup>	350	200	500	180	250	120	250
Circular Polarizer	-	no	no	yes	yes	yes	yes	yes
I/F	-	SPI / I <sup>2</sup> C	SPI	SPI	SPI	SPI	SPI	Paralel
Panel Drive Voltage	V	12,0	17,0	VHA12.0/VHC12.0	12,0	16,5	16,0	VHA16.5/VHC12.9
Logic Power Voltage	V	3,3	2,8	5	3,0	3	3,3	5,0
Power Consumption @Lighting Rate 30%	mW	33,5	153,0	180,0	104,4	188,1	240,0	990,0
FPC (pin No)	-	11	19	24	14	14	18	80 (40x2)
Accommodated connector	-	KYOCERA 04 6296 011 93X 846+	HIROSE ELECTRIC FH35C-19S- 0.3SHW	IRISO ELECTRONICS Series 9692 24 pins	OMRON XF3M-1415-1B	Molex 503480	IRISO ELECTRONICS 9637 Series 18pin	IRISO ELECTRONICS SERIES 12001 40 pins
Operating Temperature	°C	-20~+75	-20~+75	-40~+85	-20~+75	-20~+75	-20~+75	-40~+85
Storage Temperature	°C	-40~+85	-40~+85	-40~+105	-40~+85	-40~+85	-40~+85	-40~+105
Gray Scale	-	2	16	-	16	16	16	16
Storage Life Time (Lighting area of pixel 50%)	years	9,5	6,6	12,5	7,7	10,0	7,3	12,5

All specifications are subject to change without notice.

VDD : Logic power supply voltage, VDDIO : Interface power supply voltage

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## Standard Products List

Color Glass Type

Part number		ELB1001AA	ELF0701AA	ELF1001AC	ELF1101AA	ELF1301AA	ELF1308BA	ELF1308BAT
Image								
Diagonal	Inch	1,0	0,7	1,0	1,1	1,3	1,3	← incl. capacitive touch panel (3x3)
Color-type	-	Mono Blue	Full color	Full color	Full color	Full color	Full color	←
Resolution (WxH)	-	128 x 64	84 x RGB x 84	96 x RGB x 39	96 x RGB x 96	128 x RGB x 96	128 x RGB x 128	←
Glass Size	mm	24,7 x 16,6	18.4 x 18.1	27.07 x 16.0	25.8 x 27.1	33.0 x 28.4	28.4 x 29.6	←
Active Area	mm	21,74 x 11,175	11.4 x 12.8	22.4 x 9.1	20.1 x 20.1	26.3 x 19.7	23.4 x 23.4	←
Pixel Pitch	mm	0,17 x 0,17	0.14 x 0.15	0.23 x 0.23	0.21 x 0.21	0.21 x 0.21	0.18 x 0.18	←
Thickness (typical)	mm	1,14	1,12	1,02	1,2	1,19	1,19	←
Weight	g	TBD	t.b.a.	1,14	2,3	2,8	2,9	←
Luminance	cd/m <sup>2</sup>	100	120	220	120	100	120	←
Circular Polarizer	-	yes	no	no	no	no	no	←
I/F	-	SPI	SPI	SPI	Parallel	Parallel	SPI	←
Panel Drive Voltage	V	12,5	15,0	16,5	17,0	17,0	15,0	←
Logic Power Voltage	V	-	3,0	2,7	2,7	2,7	1,8	←
Power Consumption @Lighting Rate 30%	mW	22,5	56,7	81,7	122,4	137,7	132,2	←
FPC (pin No)	-	15	15	17	33	33	18	←
Accommodated connector	-	None Solder	Taiwan Suncagey Industrial BL310-15G31-TAHO	DDK Ltd. FF12-17A-R11B-C1	HIROSE ELECTRIC FH35-33S-0.3SHW	HIROSE ELECTRIC FH35-33S-0.3SHW	OMRON XF2U-1815-3A	←
Operating Temperature	°C	-40~+70	-30~+70	-20~+75	-20~+75	-20~+75	-20~+75	←
Storage Temperature	°C	-40~+85	-40~+85	-40~+85	-40~+85	-40~+85	-40~+85	←
Gray Scale	-	2	65k color	65k color	65k color	65k color	65k color	←
Storage Life Time (Lighting area of pixel 50%)	years	3,0	5,8	2,9	5,4	4,0	3,6	←

All specifications are subject to change without notice.

VDD : Logic power supply voltage、VDDIO : Interface power supply voltage

Storage life time is the expectation from estimated values at our company, not the values for guaranteeing.

## Standard Products List

Flex OLED

Part number		EPW0702AB	EPW1002AB	EPW1405BB	EPW1802BA	EPF1402BA
Image						
Diagonal	Inch	0,7	1,0	1,4	1,8	1,4
Color-type	-	Mono White	Mono White	Mono White	Mono White	262k color
Resolution ( W×H )	-	128 x 80	128 x 36	128 x 16	160 x 32	128 x 16 (RGB)
Film Size	mm	25.80 x 15.00	34.02 x 11.00	45.60 x 9.03	55.30 x 14.94	45.60 x 9.03
Active Area	mm	15.074 x 9.41	23.528 x 5.298	34.408 x 3.448	45.096 x 9.000	34.408 x 3.432
Pixel Pitch	mm	0.118 x 0.118	0.184 x 0.148	0.269 x 0.217	0.282 x 0.282	0.269 x (0.072 x 3)
Thickness (typical)	mm	0.3mm (except driver IC )				
Weight	g	0,2	0,1	0,1	0,5	0,1
Luminance	cd/m <sup>2</sup>	700	600	800	600	420
Circular Polarizer	-	No	No	No	No	No
I/F	-	SPI, I2C	SPI, I2C	SPI, I2C	SPI, I2C	SPI, I2C
Panel Drive Voltage	V	14,0	13,0	12,5	12,0	T.B.D
Logic Power Voltage	V	1,8	2,8	1,8	1,8	1,8
Power Consumption @Lighting Rate 30%	mW	47,5	23,8	26,3	82,8	31,2
FPC (pin No)	-	15	13	11	13	17
Accommodated connector	-	HIROSE ELECTRIC FH26-15S-0.3SHW	HIROSE ELECTRIC FH35C-13S-0.3SHW	KYOCERA 04 6296 611 231 846+	HIROSE ELECTRIC FH26-13S-0.3SHW	KYOCERA 04 6293 617 005 829+
Operating Temperature	°C	-20 ~ +60°C				
Storage Temperature	°C	-30 ~ +60°C				
Gray Scale	-	2	2	2	16	64
Notes	-	R40 10times Bendable				

All specifications are subject to change without notice.

VDD : Logic power supply voltage, VDDIO : Interface power supply voltage

Storage life time is the expectation from estimated values at our company, not the values for guaranteeing.

**Futaba**

# Futaba TFT LCD Modules

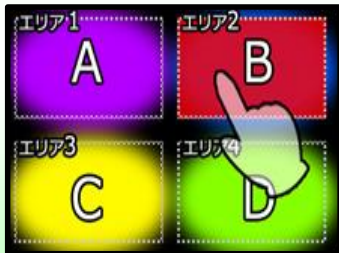




- Full Color TFT-LCD Module
- Available with Touch Panel
- Power Supply Voltage: 5V
- Built-in
  - Power supply for LCD drive
  - Memory for Font & image
- I/F [USB & RS-232C]
- Function control by Easy Command from Host MCU

### Function Examples

Key in by  
Touch panel



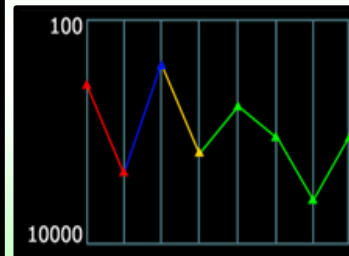
Scroll Text

からずかレイ	¥128	2点	¥256
無野原えのき	¥98	1点	¥98
舞ロースうすざり	¥930	6点	¥5,580
缶ビール(6缶パック)	¥618	5点	¥3,090
【数量】岩盤もも肉のからあげ	¥210	4点	¥840
エコバッグ割引			-¥30
エコバッグ割引			-30
小計			10,420
点数	27点	金額	10,420円
っております☆☆ 本日はご来店いただきまことにあ			

Built in  
font Table



Graphing

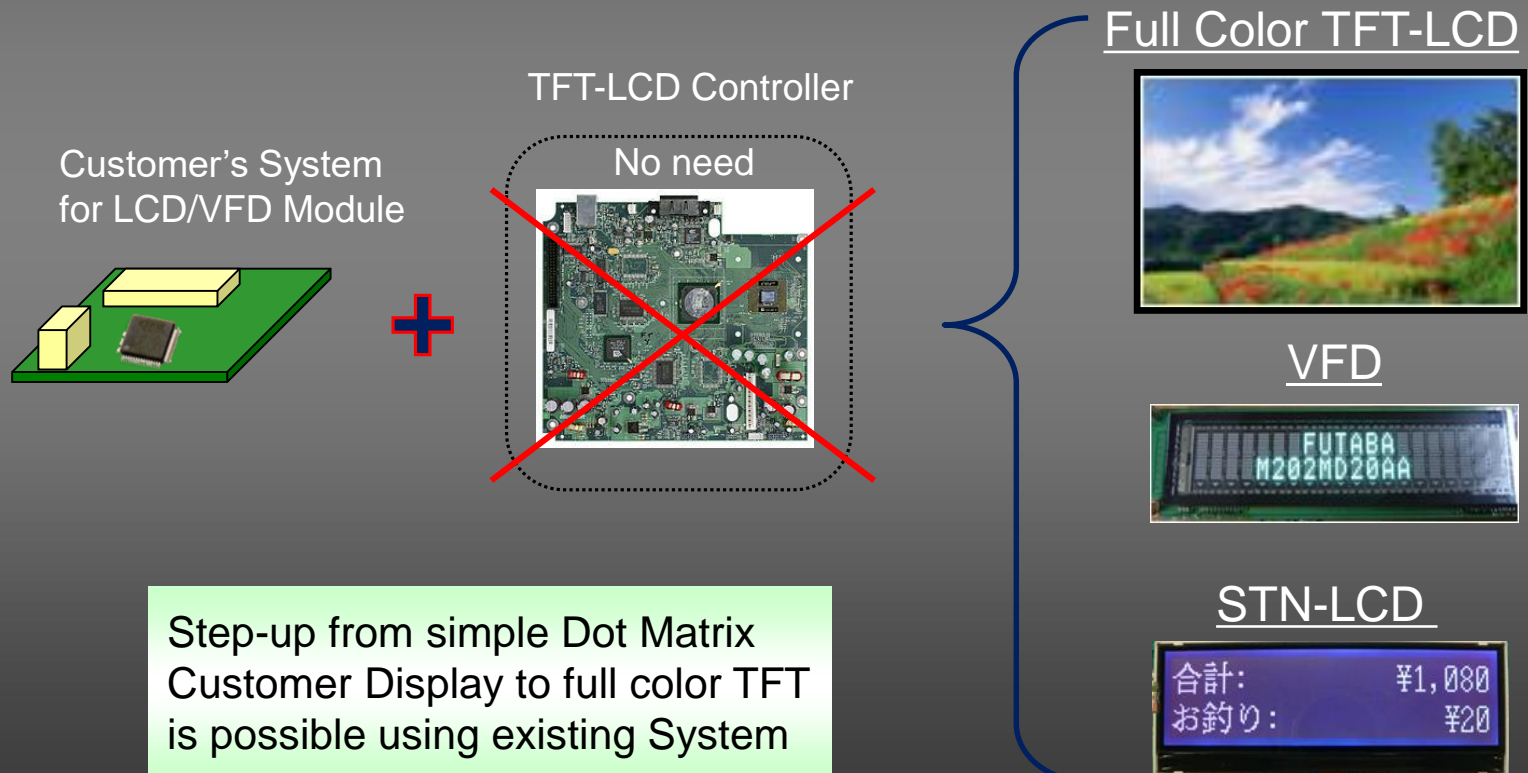


Jpeg Image



## Benefit of Intelligent TFT Modules

- Possible to display with full color by using 8bit MCU
- Possible to control TFT-LCD by using system of controlling existing STN-LCD/VFD
- Only easy command reduces software's development period and cost of customers
- Built in TFT-LCD power supply circuit reduces hardware's development period and cost
- High-speed start (within 1 second)
- There is no worry of the viral infection because of the OS non-deployment





# Standard TFT Module Line up

TFT	3.5 "	4.3 "	7 "		10.1 "
Series	LC011A* ES: Available MP: May 2016	LC013B* ES: Jun. 2016 MP: Aug. 2016	AH151C* ES: Aug. 2016 MP: Oct. 2016	LC012B* ES: Jul. 2016 MP: Sep. 2016	LC010A* ES: Jun. 2016 MP: Sep. 2016
Pixel	QVGA 320 × 240	WQVGA 480 × 272	WVGA 800 × 480		WXGA 1280 × 800
Viewing Area[mm]	72.1 × 54.6	96.5 × 55.3	156.1 × 87.9		220.8 × 139.0
Active Area [mm]	70.1 × 62.6	95.0 × 53.85	154.1 × 85.9		217.0 × 135.6
Operating Temperature Range[°C]	-10 ~ +60	-10 ~ +60	0 ~ +40	-10 ~ +60	-10 ~ +60
Luminance [cd/m <sup>2</sup> ]	320 (TP w/) 400 (TP w/o)	740 (TP w/) 1000 (TP w/o)	450 (TP w/) 550 (TP w/o)		220 (TP w/) 350 (TP w/o)
Outer Dimension [mm]	PCB W92 × H67 × D14.0	PCB W120 × H70 × D13.7	Case W190 × H122 × D21.0	PCB W150 × H80 × D8.1	PCB W150 × H80 × D8.3
Power Supply Voltage	5V/0.4A (Typ.)	5V/0.5A (Typ.)	5V/0.7A (Typ.)		5V/1.0A (Typ.)
Interface	• USB2.0 Full speed (HID class) , • RS-232C (115.2kbps Max)				
Touch Panel	Resistive (Optional) / Capacitive (t.b.d.)				

Easy control

### 【Construction】

- Full Color TFT-LCD Panel
- Resistive Touch Panel
- Power supply for LCD drive
- Memory [Font & image]
- I/F[USB & RS-232C]
- Supply Voltage: 5V

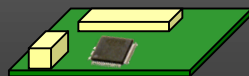


◆ Easy control of various function by command

Mono STN/VFD etc.



Customer's System



Switching from mono to full color is possible by using customer's existing System

Full Color TFT-LCD



◆ Shorten system development period

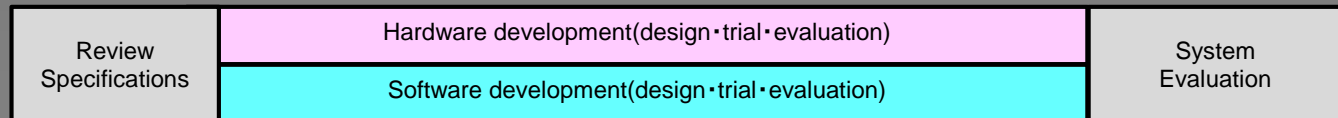
- Easy command for TFT-LCD control reduces software development period and cost
- Built in TFT-LCD power supply circuit reduces hardware development period and cost

## ◆ Suitable for embedded use

- Generic Interfaces(USB/RS-232C)
- High-speed start(within 1 second)
- The OS non-deployment avoids the risk of viral infection
- Possible to control TFT-LCD in serial communication
- Possible to display with full color by using 8bit MCU
- Possible to control TFT-LCD by using system of controlling existing STN-LCD/VFD



System development period of a general TFT-LCD module



System development period of our command type LCD module



## ◆ Flexible custom development

We are glad to respond flexibly to the customer's request of Hardware, Software, Case etc.