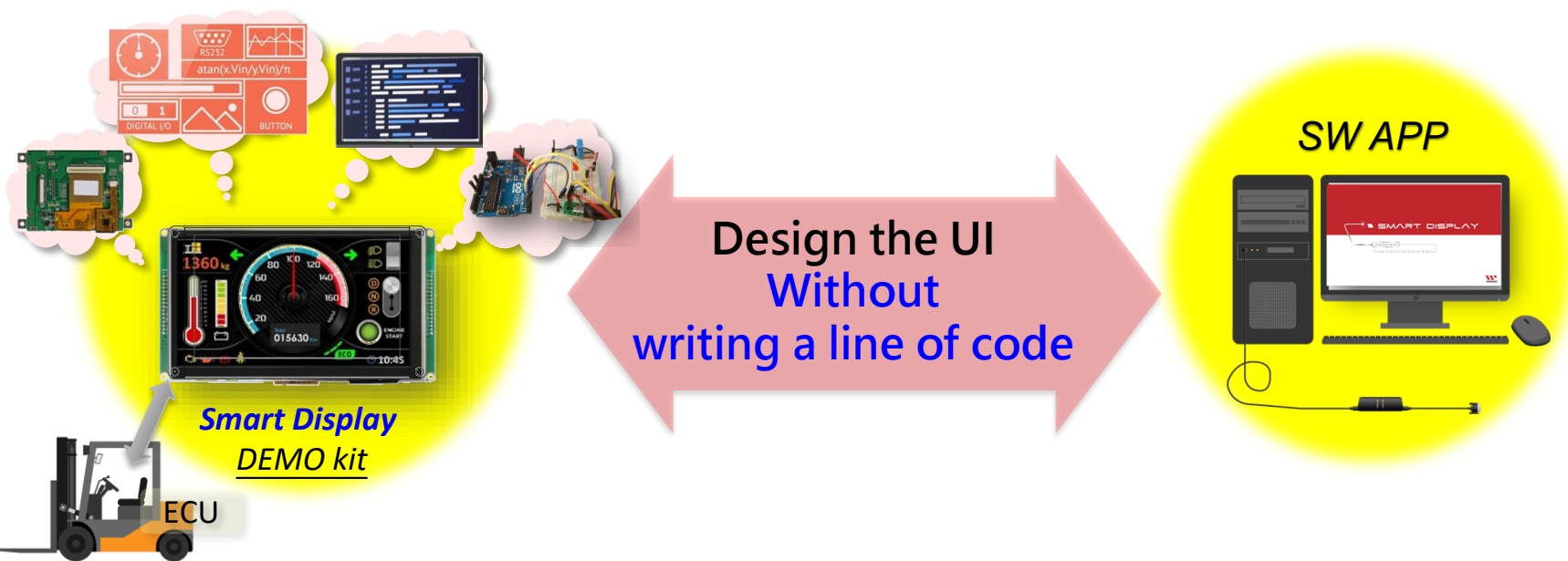# WINSTAR Display

Smart Display Introduction

2023.04

Agenda

- ➢ **Features of SmartDisplay**
- ➢ DEMO for GUIbuilder
- ➢ The SPEC / Roadmap of SmartDisplay
- ➢ Case Sharing

Winstar *Provide a Total solution*
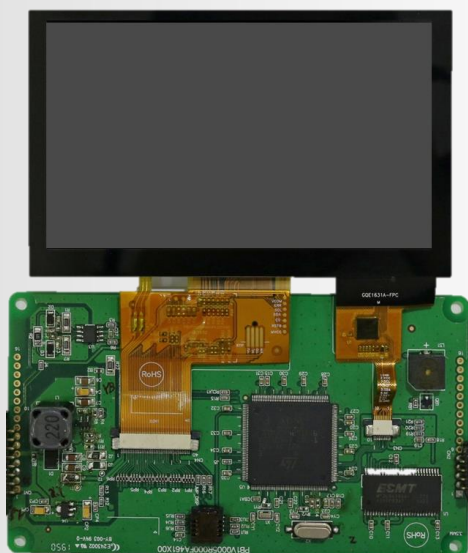## for customers from HW to SW design

Design the UI
Without
writing a line of code

SW APP

Smart Display
DEMO kit

ECU

Speed up your time to market !

Winstar Smart Display

Hardware Platform (Container)	Firmware (Data contents)	Software (Support tools)
Communication IF/ MCU/ Flash memory/ TFT Display	Splash screen/ UI with Application temp.	PC+AP / USB2IF Dongle To configure or update Smart Display contents.

Industry

Vehicle
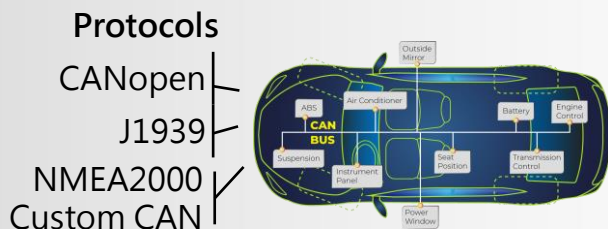
Medical

SW APP
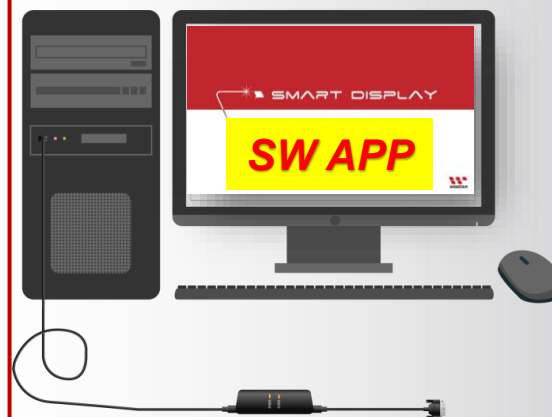
SMART DISPLAY

Winstar Smart Display

A series (CAN bus)

Controller Area Network communication interface

Developed by Bosch for the increasing number of electronic devices in new cars.

→ Mainly in *Vehicle*

Protocols

CANopen

J1939

NMEA2000

Custom CAN

Multi-master

Each device can send data in the network by 1 cable

D series (RS485)

RS485 (or EIA-485) communication interface

Define electrical characteristics of drivers and receivers for communication system.

→ Mainly in *Industry*

RS485 protocol

Modbus

Mature (Cost driven)

Universal control interface in Industry

F series (UART)

Universal Asynchronous Receiver-Transmitter

One of the most used device-to-device communication interface.

→ Mainly in *Industry*

UART 1   UART 2
Tx   Tx
Rx   Rx

✓ **Simple** - Network topology. Easy to connect

✓ **Robust** – Up to 100 feet of wiring distance

✓ **Anti-noise** – Differential transmission has strong anti-interference ability

Twisted Pair
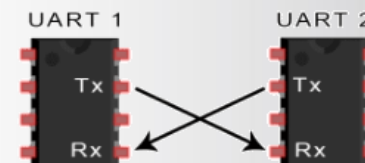
✓ **Flexible -** Full Duplex. Or Half-Duplex with TX / RX only by optimized hardware.

Comparison among UART, RS485 and CAN bus

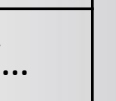|	UART	RS485	CAN Bus
Network type	Peer-to-peer	Daisy Chain with Single-Master	Daisy Chain with Multi-Master
Fault tolerance mechanism	Detection of Framing, Parity, and Overrun errors	Re-transmit when CRC error	Error detection mechanism
Communication Failure Rate	Low	High	Very low
Effect of node error	The whole network is Paralyzed	The whole network is Paralyzed	No impact
Communication Distance	<2m	<1.5Km	Up to 10Km (5kbps)
Protocol	Customize	Modbus	CAN open/J1939/...
Cost	Low	Middle	High
Compatibility	Mature & Popular Extendible	Mature & Popular	Mainly in vehicle

Winstar Smart Display
— Multi-HOST choice —

PC w/ USB to IF Dongle

Arduino

Raspberry Pi

Other Embedded device…

MCU Board
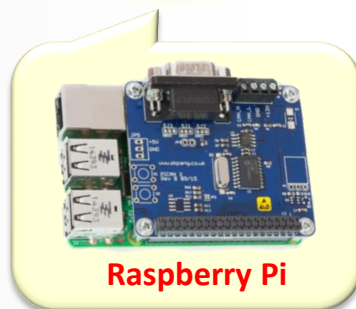
How to get start with the module
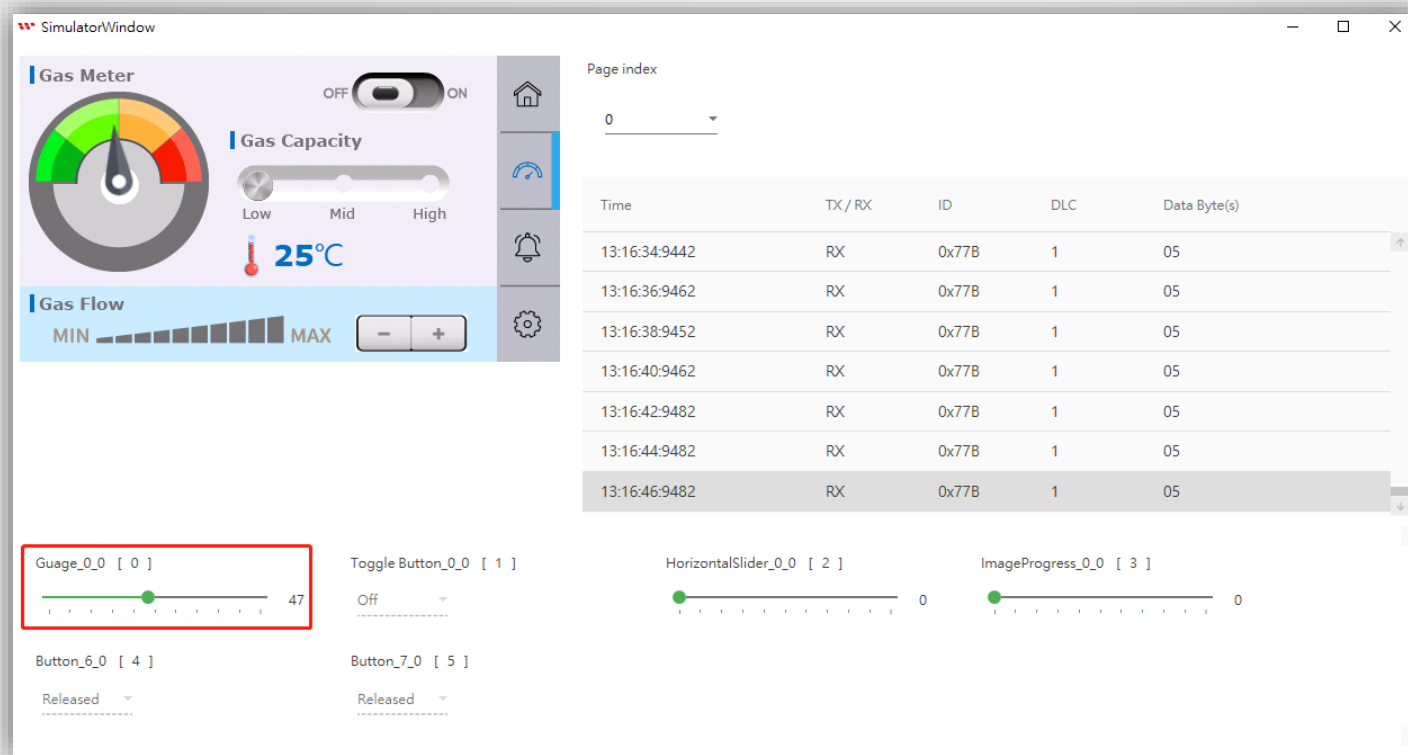
Power on
Press the preferred application and hold for 3 seconds

PC with USB to I/F Dongle

Agenda

- ➤ Features of SmartDisplay
- ➤ **DEMO for GUIbuilder**
- ➤ The SPEC / Roadmap of SmartDisplay
- ➤ Case Sharing

Winstar SmartDisplay GUI Builder

SMART DISPLAY

Engineering by
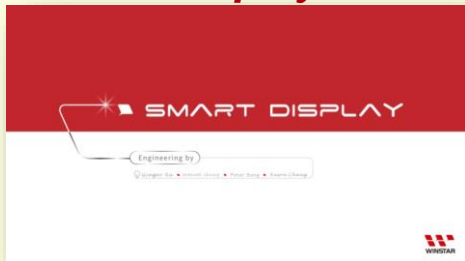
Try Before you buy!

Limitations that Winstar can help

1. Support Windows OS only
2. Support max to <u>64 objects in 1page</u>, and <u>max to 10 pages</u>
3. Most of the resolution are fixed and <u>png</u> format is preferred
4. Need to set the command to switch pages
5. Complex issue such as animation displayed needs customization

GUI Builder provides (as is)
1) Simple design functions for UI/UX
2) Data log to DEMO the protocol between HOST and display module

Winstar support
1) Complete Protocol build
2) For complex UI/UX should go full-customization. Customer must complete the UI/UX by themselves and provide them in figma or XD file.

Complete UI/UX design
- Figma
- Adobe XD (Win10)

HMI

98% | ⊟ 2560 kg | 🕐 10:13 am
Charging

65 Km/h
ECO | 0135680 Km/Total

ECU

Complete Protocol build
- CANopen
- Custom CAN
- J1939
- Others

Agenda

- ➢ Features of SmartDisplay
- ➢ DEMO for GUIbuilder
- ➢ **The SPEC / Roadmap of SmartDisplay**
- ➢ Case Sharing

WINSTAR

	SMART DISPLAY						
Panel Size	10.1"	7.0"	5.0"	4.3"	3.5"	3.9" Bar type	3.55"
Resolution	1024 x 600	1024 x 600	800 x 480	480 x 272	320x240	480 x 128	256 x 64
Aspect Ratio	16:9	16:9	16:9	16:9	4:3	Bar Type	Bar Type
Touch	CTP	CTP	CTP	CTP	CTP	CTP	CTP
View Direction	IPS	IPS	IPS	IPS	IPS	TN	PMOLED
Brightness(nit)	400 / 400	850 / 450 / 450	750 / 400 / 400	400 / 400	400 / 400	400	80
MCU Processor	STM32F7	STM32F7	STM32F7	STM32F7	STM32F7	STM32F7	STM32F7
ROM size	1M	1M	64K / 64K / 1M	64K	64K	64K	64K
Communication Interface	CAN BUS	CAN BUS	CAN BUS	CAN BUS	CAN BUS	CAN BUS	CAN BUS
Interface Protocol	CANopen / Custom CAN ID	CANopen / CANopen / Custom CAN ID	CANopen / CANopen / Custom CAN ID	CANopen / Custom CAN ID	CANopen / Custom CAN ID	CANopen	CANopen
Flash Memory	16M	16M	16M	16M	16M	16M	16M
Operating voltage	12V	12V	5V	5V	5V	5V	5V
Operating temp.	-20~70 / -20~70	-20~70 / -20~70 / -20~70	-30~80 / -20~70 / -20~70	-30~80 / -30~80	-20~70 / -20~70	-10~70	-20~70
SW Application	**GUI Builder** - Combined 3 apps into 1 in POST for 1 time selecti - Choose the app you want by 3-second long press - Use GUIbuilder to change the app						
Default Scenario support	Industrial Vehicle Medical						General
Build in Buzzer	YES						

SPEC of Smart Display_RS485 series

SMART DISPLAY				
Panel Size	**10.1"**	**7.0"**	**5.0"**	**4.3"**
Resolution	1024 x 600	1024 x 600	800 x 480	480 x 272
Aspect Ratio	16:9	16:9	16:9	16:9
Touch	CTP	CTP	CTP	CTP
View Direction	IPS	IPS	IPS	IPS
Brightness(nit)	400	450	400	400
MCU Processor	STM32F7	STM32F7	STM32F4	STM32F7
ROM size	1M	1M	1M	64K
Communication Interface	RS485	RS485	RS485	RS485
Interface Protocol	Modbus	Modbus	Modbus	Modbus
Flash Memory	16M	16M	16M	16M
Operating voltage	12V	12V	5V	5V
Operating temp.	-20~70	-20~70	-20~70	-30~80
SW Application	**GUI Builder** - Combined 3 apps into 1 in POST for 1 time selection - Choose the app you want by 3-second long press - Use GUIbuilder to change the app			
Default Scenario support	Industrial Vehicle Medical			
Build in Buzzer	YES			

SPEC & Comparison between Entry and M Series

Series	M Series	UART Entry		Smart Display	M Series	UART Entry	Smart Display
Panel Size	4.3"	4.3"		4.3"	3.5"	3.5"	3.5"
Resolution	480 x 272	480 x 272		480 x 272	320x240	320x240	320x240
Aspect Ratio	16:09	16:9		16:9	4:3	4:3	4:3
Touch	CTP/WO Touch	CTP	WO Touch	CTP	WO Touch	WO Touch	CTP
View Direction	TN	TN		IPS	TN	TN	IPS
Brightness(nit)	400	400		300	350	350	300
MCU Processor	PIC24	ITE9866		STM7 series	PIC24	ITE9866	STM7 series
ROM size	256K	N/A		64K	256K	N/A	64K
Communication Interface	UART, SPI	UART		CAN BUS / RS485	UART, SPI	UART	CAN BUS
Interface Protocol	Customize	Customize		CANopen / Modbus	Customize	Customize	CANopen
Flash Memory	4M	16M		16M	4M	16M	16M
Operating voltage	5V	5V	5V	5V / 5V	5V	5V	5V
Operating temp.	-20~70	-20~70		-30~80 / -30~80	-20~70	-20~70	-20~70
SW Application	Clever System User API	Clever System User API (Customized project can use)		GUI Builder (Customized project cannot use)	Clever System User API	Clever System User API (Customized project can use)	GUI Builder (Customized project cannot use)
Default Scenario support	NA	NA		Industrial Vehicle Medical	NA	NA	Industrial Vehicle Medical
Build in Buzzer	NA	NA		YES	NA	NA	YES

Winstar UART Entry (F) Series

Hardware Platform (Container)	Firmware code (Data contents)	Software Support tools
Physical Layer including MCU/16M Flash/IPS Display w/PCAP	Mental Layer including Splash /application/UI	**GUIbuilder** User Layer including PC+AP / Interface Dongle to configure or update Smart Display contents. USB to Interface Dongle
Physical Layer including MPU/16M Flash/TN Display 4.3" TN PCAP 4.3" TN No-Touch 3.5" TN No-Touch	~~Mental Layer including Splash /application/UI~~	**Clever System User API** which is compatible with M series. Interface Dongle bundles with **WWTFT-10#** as well.
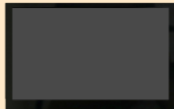
SmartDisplay Hi-End

UART Entry

Smart Display Product Roadmap

WINSTAR

2023 Q2	2023 Q3	2023 Q4

CAN bus
10.1
7.0 / 7.0HB
5.0 / 5.0HB
4.3 / 3.9
3.5 / OLED
CANopen

CAN bus

7.0
5.0
4.3
3.5
Custom CAN ID

RS485
10.1 / 7.0
5.0 / 4.3
Modbus

CAN bus + GPIO

10.1" TFT/IPS
Custom CAN ID

Air Purifier Bluetooth

1.77" TFT/TN
Customize
Landscape

Coffee Machine Bluetooth

128x64 OLED
Customize
Landscape

Multi-I/F for EV charger HMI

HB 7" TFT/ IPS/ CTP/ Hover Touch
HW: CAN + RS485 + LAN + Wi-Fi
Protocol: OCPP
Peripheral: NFC (optional)
Landscape

GUI builder_CANopen & RS485
GUI builder_Custom CAN ID

New features:
• Open more object design function
• Add/delete object style
• Upsize page number to max 30
• Page switch by touching the button

High-End series

UART
4.3" TN/Touch
Customize

UART
4.3" TN/N-Touch
Customize

UART
3.5" TN/No-touch
Customize

Entry series

Bluetooth	RS485	CAN bus	CAN bus	RS422	USB
0.96" TFT/IPS	12.3" , 8.8", 4.3", 2.4"	4.3" TFT/IPS	7.0" TFT/IPS	256x64 OLED	5.2" IPS
Bluetooth	Modbus	CAN open/Camera	J1939	Modbus	UART
Landscape	Landscape	Landscape/Portrait	Landscape	Landscape	Landscape
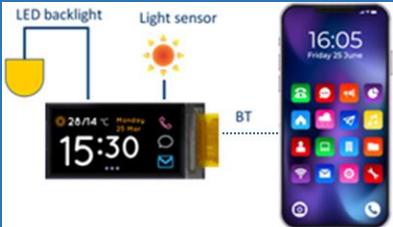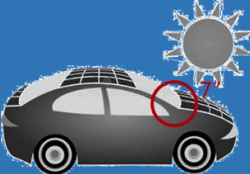
Launched	Developing	Customized

Agenda

➢ Features of SmartDisplay

➢ DEMO for GUIbuilder

➢ The SPEC / Roadmap of SmartDisplay

➢ **Case Sharing**

NO	1	2	3	4
Coverage	**Industrial Vehicle CherryPicker / Stacker**	**HUD wearable device**	**High-end residential lift**	**Satellite Communication at-sea**
Communication I/F & Protocol	CAN bus CANopen protocol	Blue tooth Custom protocol	RS485 Modbus protocol	RS422 HW ready+ Initial code
Features	• IPS panel with wide viewing angle • Impact resistance (IK08) • IP65 Water proof with the housing design • Keypad nameplate • Waterproof membrane • Video input for the Camera • Compounded indicator (Time, Speed, Battery, Temperature, Power consumption, PRND)	• Wireless connect between Smart Phone and the module to realize: - Direction indicate - Who's calling message - Weather report - Speedometer & Alert • Battery charging • Backlight adjustment automatically	• Slide to swap the page by touch • Video function for MP3 Music playing - Change music - On/off the music • Controls for Fan, Light, Backlight and music volume	• OLED panel with optical bonding • Capacitive Touch on cover glass • Silk printing on cover lens to replace the real plastic buttons • Schematic and initial code ready for customer

5	6	7	8	9
Electric Bus	**Solar Car**	**Hydrogen vehicle**	**Smart Home**	**UPS**
CAN bus J1939 protocol	CAN bus CANopen protocol	CAN bus Custom CAN ID	RS485 HW ready+ Initial code	RS485 HW ready+ Initial code

- Custom UI layout includes:
  - gauge
  - PRND
  - Turn signal
  - Odometer
  - BMS/Warning signal
  - Motor temperature
  - Engine status
- Conduct the CE/EN55011 Regulation test with EMI-pre scan

Smart Home
- Initial code and schematic provided
- Power on by RJ45 connector
- Design in thermal sensor
- Custom Cover Glass with touch
- Onboard battery support for RTC

UPS
- Initial code and schematic provided
- Power on by RJ45 connector
- 3x dual color LEDs to show machine status
- 4x physical switches of machine control

One-stop service

RFQ

Hardware
- Communication interface
- System diagram
- Operating SPEC
- Schematic design
- Support debug dongle

Panel

Firmware
- Pre-load object dictionary
- Pre-load I/F protocol
- Programming support

Mechanical
- Plastic Box
- Membrane Keypad
- Conformal coating

Module

Software
- GUIbuilder for UI design
- Custom PC app.

Quality Test
- Impact resistance
- Water Proof
- EMI pre-scan
- Reliability test

Solution

Production
- Test plan forming
- Material planning
- Cost control
- Source control (EOL/2nd/New)

End Product

After Service
- Warranty
- Technical support
- SW update
- New product planning

RFQ checklist

Specification			Customer's feedback (With STD product)
Final product application. Please take a brief discription if possible (Will be good if have a photo)			Application: Smart Home
Sub-item of specifications			
Hardware	Display	Size	4.3"
		Resolution	480x272
		Brightness	300nit
		Touch	CTP
		View direction	IPS
	System Interface		☐ CAN bus ☐ RS485 ☐ UART ☐ Bluetooth ☐ Other_____
	Operating Voltage Range		5V
		WLAN	
		Camera	
		Audio	
		Buzzer	Y
		Keypad	
		Battery	
		SD card	
		Flash memory size	
		Vibrator	
		Temperature sensor	
		Humidity sensor	
		Others	Please list if needed
Firmware	Featured functions		
	UI secenario		
	Interface protocol		☐ CANopen ☐ J1939 ☐ NMEA2000 ☐ Modbus ☐ Customized
	Defined Graphics		
	Animations		
ME design Request	Interface connectors		
	Housing		Please specify **Metal** or **Plastic**
	Impact resistant(IK level)		
	Water proof(IP level)		
	PCB Dimension		Please provide the drawing if required
	ME Dimension		Please provide the drawing if required
Quality Requirement	Standards		Please provide the drawing if required
	Operating Temperature		Please provide the drawing if required
	Storage Temperature		Please provide the drawing if required
Regulation Requirement	Safety		Please provide the drawing if required
	CE/FCC		Please provide the drawing if required
	others		Please provide the drawing if required

Summary

| Design without writing a line of code. Speed up the time to market | Wealthy and flexible application coverage | Winstar can help! |

Design without writing a line of code. Speed up the time to market

GUI Builder

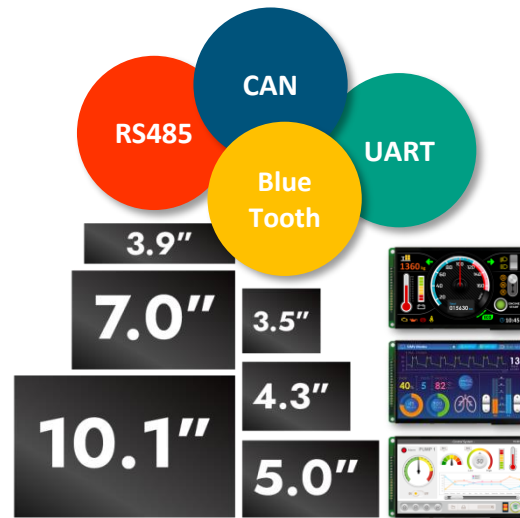Design the UI by Dragging Objects Instead of **CODING ALL DAY LONG**

Design for Multi-pages by your own

Simulate directly without HW device needed

Wealthy and flexible application coverage

- Multi-Display Size & Type
- Multi-**HOST** & **IF** choice
- 3 types of scenario with wealthy objects pre-loaded

CAN
RS485
Blue Tooth
UART

3.9"
7.0"
3.5"
10.1"
4.3"
5.0"

Winstar can help!

We can be your **Solution Partner** if the above doesn't meet your requirement

System Integrated Solution

Q & A

THANK YOU FOR LISTENING

THANK YOU FOR LISTENING

WINSTAR

Responsibility
on Environmental Protection

Winstar considered that our responsibility on environmental protection; our manufacturing process completely follows RoHS, SVHC of EU REACH and WEEE standard since 2006, as well as our relative supplier was asked to be cooperated with same regulation.

www.winstar.com.tw

System Comparison table

Display System Solution Comparison Table		
	4D/DWIN Smart LCM	**Winstar Smart Display**
Hardware platform	ASIC MCU (ASIC：Application Specific Integrated Circuit)	**Standard MCU**
Software platform	IDE bundle widget	free RTOS + TouchGFX + Object Dictionary
Control methodology	Drag & Drop widget + C programming	Multiple HOST + Object Dictionary + CANopen command
Advantages	All in One	**Flexibility**
	Build in widget.	Build in object dictionary.
	Drag & Drop	Drag & Drop
		UI can be changed with customization process.
		Non-specified programming language of coding.
		No C programming skill also can do a system design.
		Communication distance can be far away (up to hundred meter)

Comparison (PC as HOST)

Smart Display w/GUIbuilder app.

✓ Shorten the development time and speed up the time to market

Object oriented (Easy to Entry)

- The framework has been built up in advance
  - → Design the UI without writing a line of code
  - → Do the simulation without HW module
  - → **Protocols for selection**
- CAN bus/RS485 Interface

  (more I/Fs are coming)

- **WINSTAR TFT M SERIES**

Coding oriented

- Need to build the framework by customer's own
  - → Design the UI by programing on your own
  - → Do the real time displaying by programing
- SPI、UART Interface

Comparison (Embedded as HOST)

Smart Display

WINSTAR TFT M SERIES

✓ Shorten the development time and speed up the time to market

Object oriented

- The framework has been built up in advance
  - → No need to understand the graphic layer
  - → Send script command to control
- CAN bus/RS485 Interface (more I/Fs are coming)

Coding oriented

- Need to build the framework by customer's own
  - → Need to understand the graphic layer
  - → Send proprietary command to control
- SPI、UART Interface

Comparison—Shipping Content

Smart Display module (Unit)	Smart Display Demo Set.
1. Panel	1. Panel
2. PCBA **without** Connector	3. PCBA **with** Connector
	4. USB2IF Dongle
	5. Short Cable between USB2IF and Smart Display 7.0" Others
	6. USB to MicroUSB Cable (PC to Dongle)
	7. GUI Software Application bundled 8. User Guide

Appendix Comparison—Purpose

Smart Display module (Unit)	Smart Display Demo Set.
Mainly for mass production	1. Shorten the learning path, reducing development time 2. Easy start kit allowing customers to design the UI without writing a line of code! 3. Using the same GUI makes it easier to track the customers' testing status, and to provide after-sales service/ technical support.

7.0"

Or

Others