# EA DEMOPACK-WiFiBT



#### Software documentation ESP32



Figure shows EA 97998-E with optional RJ45 connector

## **FEATURES**

- WIFI TO ACCESS NETWORK
- WIFI ACCESSPOINT
- WIRED LAN SUPPORT (-LAN)
- BLUETOOTH DIRECT SERIAL PORT
- BLUETOOTH AS KEYBOARD
- GENERAL BLUETOOTH CONNECTION
- UPDATE DISPLAY CONTENT OVER THE AIR
- UPDATE DISPLAY USER PROGRAMM
- ESP32-WROOM-32 INCLUDED WITH INTERFACE TO EA UNITFTS-SERIES

## **ORDERING CODES**

- EA uniTFTs028-ATC, EA 97998-E without RJ45, FPC-cable, USB-cable
- Same as above but with RJ45 lan cable connector
- ADAPTOR BOARD ONLY

## ACCESSORIES

- RJ45 CONNECTOR WITH MAGNETICS
- ZIF-CONNECTOR 40 POS 0.5 MM PITCH
- FPC-CABLE 40 POS, 0.5 MM PITCH
- USB CABLE TYPE A -> MINI-USB 1M

EA DEMOPACK-WIFIBT EA DEMOPACK-LAN EA 97998-E

EA EA WF050-40S EA KF050-40 EA KUSB-MINI

DISPLAY VISIONS GmbH Zeppelinstraße 19 D-82205 Gilching Germany Fon: +49 (0)8105-7780 90 Fax: +49 (0)8105-7780 99 e-Mail: info@lcd-module.de Web: www.lcd-module.de

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## GENERAL

The EA uniTFTs-Serie is connected via the fpc flat cable to the demoboard EA 97998-E. That board is equipped with an ESP32-WROOM-32. It's a low-cost, low-power system with integrated Wi-Fi and Bluetooth. The ESP32 has many additional features like serial interfaces, timer and pwm functions or general I/Os. This project focuses on Wi-Fi, Bluetooth and LAN to integrate the EA uniTFTs-Series in your network. The source for ESP32 is free of charge, user may adopt to their needs. Per default the ESP32 communicates with the uniTFTs-Display with the Hardware Serial 2 at a baudrate of 921600. Please make sure to change accordingly in your uniTFTDesigner project.

## SOFTWARE DESCRIPTION



**FLOWCHART** 

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#### AVAILABLE COMMANDS FOR ESP32

A command from EA uniTFT to ESP32 always starts with ESC (0x1B) followed by '?' (0x3F) and two more letters.

The ESP32 sends it's firmware version automatically to Register 199. It's a float value.

#### General commands

Descritpion	Command	Parameter
Connect to Wi-Fi	ESC ? W C	"SSID" 0x00 "Password" 0x00
Reset Wi-Fi and ESP32	ESC ? W R	none
Network list Wi-Fi	ESC ? W N	None
Network strength indicator	ESC ? W S	None
Bluetooth serial connection	ESC ? B C	2 "DeviceName" 0x00 "ManufacturerName" 0x00. This command needs port 0 to be low. If set to high, bluetooth direct serial connection will be disconnected.

Note: Command "Network list" needs some objects and pictures in the uniTFT-Project. You need a SpinBox (Object-ID: 15) and 4 different icons representing network strength with name "wifi1" to "wifi4" in the picture folder of the module. If the user selects an entry, the Macro "SelectWiFi" is automatically called. The status of the actual Wi-Fi is updating text labels with Obj-ID 116 to 119.

The command "Network strength indicator" uses the same pictures and places the indicator as a picture (Object-ID: 70) in the upper area of the EA uniTFTs-Module. If ethernet is connected. The indicator needs one additional picture: "ethernet"

Application specific commands: Wi-Fi weather

Descritpion Command		Parameter				
Weather location	ESC ? W L	1 "Location" 0x00 "Language" 0x00 unit(byte) "APP-ID" 0x00				
Weather GPS location	ESC ? W L	2 "Latitude" 0x00 "Longitude" 0x00 unit(byte) "APP-ID" 0x00				

The commands for getting weather do always include the forecast as well. The weather information is based on <u>https://openweathermap.org/</u>. Please find the example project visualizing the weather in our example in the <u>uniTFTDesigner</u>.

NOTE: Please create your own account and change the APP-ID to your personal ID.

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#### Application specific commands: Bluetooth keyboard

Descritpion	Command	Parameter
Keyboard connect	ESC ? B C	1 "DeviceName" 0x00 "ManufacturerName" 0x00
Keyboard press	ESC ? B P	lowByte highByte MediaKey (all bytes)
Keyboard release	ESC ? B R	lowByte highByte MediaKey (all bytes)
Keyboard write key	ESC ? B W	lowByte highByte MediaKey (all bytes)

The keyboard key commands always receive 3 bytes, using the standard key reports. The media key byte only indicates, if ESP needs to interpret the parameter "lowByte" and "highByte" as MediaKey (0x01) or not (0x00).

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# **EA DEMOPACK-WiFiBT/-LAN Software**



## **ARDUINO IDE INSTALL GUIDE**

- 1. Download Arduino IDE and install: https://www.arduino.cc/en/software
- 2. Install ESP32 Support for Arduino IDE



Stable release link (Espressif):

https://raw.githubusercontent.com/espressif/arduino-esp32/gh-pages/package\_esp32\_index.json

3. Open Board manager and install ESP32 boards by Espressif Systems

:h	Tools	Help		
Ē		Auto Format	Ctrl+T	
		Archive Sketch		
ΈT		Fix Encoding & Reload		TDesigner_BT.h weather.cpp weather.h
		Manage Libraries	Ctrl+Shift+I	
yr		Serial Monitor	Ctrl+Shift+M	
t		Serial Plotter	Ctrl+Shift+L	
po		WiFi101 / WiFiNINA Firmware Updater		d Bluetooth
3		Board: "ESP32 Dev Module"	3	Boards Manager
th		Upload Speed: "921600"	3	Arduino ARM (32-bits) Boards >
11		CPU Frequency: "240MHz (WiFi/BT)"	;	Arduino AVR Boards
		Flash Frequency: "80MHz"	;	ESP32 Arduino
e		Flash Mode: "QIO"	>	
e		Flash Size: "4MB (32Mb)"	💿 Boards Manager	×
e		Partition Scheme: "Minimal SPIFFS (1.9MB APP with OTA/19	Turne All	school .
e		Core Debug Level: "None"	Type Mi V	
		PSRAM: "Disabled"	esp32	
W		Arduino Runs On: "Core 1"	Boards included in this	package:
oa		Events Run On: "Core 1"	ESP32 Dev Board, ESP33 More Info	2-S2 Dev Board, ESP32-C3 Dev Board.
co		Port: "COM9"	Colorium	
		Get Board Info	Jelect version V	Ориане Кешиле
rB		Programmer		
		Burn Bootloader		
St	ecup			
		alizes project: Debug, uniTFT connection, Weat		
		*/		

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# **EA DEMOPACK-WiFiBT/-LAN Software**



4. Install ArduinoJson package by Benoit Blanchon to desirialize weather data. Open Library Manager and install

ESP32	2_uniTFT   Ardu	uino 1.8.13	
File Edit	t Sketch Tool	ls Help	
		Auto Format	Ctrl+T
		Archive Sketch	
ESP3	2_uniTFT	Fix Encoding & Reload	TDesigner_BT.h weather.cpp weather.h
1 /*		Manage Libraries	Ctrl+Shift+I
2	* Copyr	Serial Monitor	C Library Manager
4	* App t	Serial Plotter	
5	* Suppo *	WiFi101 / WiFiNINA Firmware Updater	Type All V Topic All V JSON
7 8 9 10	* This * it un * or th * publi	Board: "ESP32 Dev Module" Upload Speed: "921600" CPU Frequency: "240MHz (WiFi/BT)"	ArduinoJson by Benoit Blanchon, Version 6.18.2 INSTALLED A simple and efficient JSON library for embedded C++. ArduinoJson supports 🗸 serialization, 🗸 deserialization, 🗸
11 */ 12 13 #1 14 #1	nclude nclude	Flash Frequency: "80MHz" Flash Mode: "QIO" Flash Size: "4MB (32Mb)"	MessagePack, ✓ fixed allocation, ✓ zero-copy, ✓ streams, ✓ filtering, and more. It is the most popular Arduino library on GitHub ♥♥♥♥♥. Check out arduinojson.org for a comprehensive documentation. More info
15 #1 16 #1 17 #1 18 19 We	nclude nclude nclude ather w	Partition Scheme: "Minimal SPIFFS (1.9MB APP with OTA/19 Core Debug Leve: "None" PSRAM: "Disabled" Arduino Runs On: "Core 1"	Bifrost library for HC-SR04 by Jareamy Lindsay @jareamylindsayni> A library for the HC-SR04 Ultrasonic distance sensor. This returns data in millimeters, and also writes to a JSON formatted users liefs in the Bifrost protocol to serial output.
20 BT 21 22 VO	Keyboa	Events Run On: "Core 1" Port: "COM9"	
23		Get Board Info	CayenneLPPdec
24 ch 25	ar strB	Programmer	by German Martin CayenneLPP data decoder Library to decode CayenneLPP encoded data to a JSON array. It is useful when you want to use this
26 /*	Funct	Burn Bootloader	filora
28		alizes project: Debug, uniTFT connection, Weat	unt actioners

- 5. Restart Arduino IDE and open the ino-projectfile
- 6. Set the correct board:

ſ	Тоо	s Help						
ľ		Auto Format	Ctrl+T					
ľ		Archive Sketch						
=		Fix Encoding & Reload		TDesigner BT.h			eather.h	
		Manage Libraries	Ctrl+Shift+I					
v		Serial Monitor	Ctrl+Shift+M					
		Serial Plotter	Ctrl+Shift+L					
P		WiFi101 / WiFiNINA Firmware Updater		Fi and Bluetoot	th	_		
		Board: "ESP32 Dev Module"	>	Boards Manag	er		Δ	
5		Upload Speed: "921600"	>	Arduino ARM (	32-bits) Boards >		ESP32C3 Dev Module	
ta F		CPU Frequency: "240MHz (WiFi/BT)"	>	Arduino AVR B	oards >		ESP32S2 Dev Module	
1		Flash Frequency: "80MHz"	>	ESP32 Arduino	>	٠	ESP32 Dev Module	
		Flash Mode: "QIO"	>				ESP32 Wrover Module	
		ELLECT HAND CODATION					ESD22 DICO DA	

7. Select the port the ESP32 is connected to. If you have multiple entries, please have a look into the Windows device manager and search Silcon Labs CP210x virtual com port.

.00	incip		
	Auto Format	Ctrl+T	
	Archive Sketch		
	Fix Encoding & Reload		TDesigner BT.h
	Manage Libraries	Ctrl+Shift+I	
	Serial Monitor	Ctrl+Shift+M	
	Serial Plotter	Ctrl+Shift+L	
	WiFi101 / WiFiNINA Firmware Updater		Pi and Bluetoot
	Board: "ESP32 Dev Module"	>	
	Upload Speed: "921600"	>	
	CPU Frequency: "240MHz (WiFi/BT)"	>	
	Flash Frequency: "80MHz"	>	
	Flash Mode: "QIO"	>	
	Flash Size: "4MB (32Mb)"	>	
	Partition Scheme: "Minimal SPIFFS (1.9MB APP with OTA/190KB SPIFFS)"	>	
	Core Debug Level: "None"	>	
	PSRAM: "Disabled"	>	
	Arduino Runs On: "Core 1"	>	
	Events Run On: "Core 1"	>	
	Port	>	Serial ports
	Get Board Info		COM16
	Programmer	>	COM17
	Burn Bootloader	-	COM20
	[64]: //leasl StringBuffer		COM5
Buf	<pre>[64]; //local StringBuffer</pre>	L	

If device manager does not show the virtual com port, you need to install the driver:

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# **EA DEMOPACK-WiFiBT/-LAN Software**



Please go to the official Silicon labs website (<u>https://www.silabs.com/developers/usb-to-uart-bridge-vcp-drivers</u>) and follow their install instructions.

8. Set the partition scheme, as the project is too large for default scheme

Auto Format	Ctrl+T			
Archive Sketch				
Fix Encoding & Reload		TDesigner BT h		weather h
Manage Libraries	Ctrl+Shift+I	TBoolgrior_Brin	troution.opp	Violationar
Serial Monitor	Ctrl+Shift+M			
Serial Plotter	Ctrl+Shift+L			
WiFi101 / WiFiNINA Firmware Updater		Fi and Bluetoot	th	
Board: "ESP32 Dev Module"	>			
Upload Speed: "921600"	>			
CPU Frequency: "240MHz (WiFi/BT)"	>			
Flash Frequency: "80MHz"	>			
Flash Mode: "QIO"	>			
Flash Size: "4MB (32Mb)"	>			
Partition Scheme: "Minimal SPIFFS (1.9MB APP with OTA/190KB SPIFFS)"	>	Default 4MB w	vith spiffs (1.2MB	APP/1.5MB SPIFFS)
Core Debug Level: "None"	>	Default 4MB w	vith ffat (1.2MB A	PP/1.5MB FATFS)
PSRAM: "Disabled"	>	8M Flash (3MB	APP/1.5MB FAT	l.
Arduino Runs On: "Core 1"	>	Minimal (1.3M	B APP/700KB SPI	FFS)
Events Run On: "Core 1"	>	No OTA (2MB	APP/2MB SPIFFS	)
Port	>	No OTA (1MB	APP/3MB SPIFFS	)
Get Board Info		No OTA (2MB	APP/2MB FATFS)	
D		No OTA (1MB	APP/3MB FATFS)	
Programmer	,	Huge APP (3M	B No OTA/1MB	SPIFFS)
		Minimal SPIFFS	5 (1.9MB APP wit	h OTA/190KB SPIFF
[64]; //local StringBuffer		16M Flash (2M	B APP/12.5MB F	AT)
		16M Flash (3M	B APP/9MB FATF	S)
n,		RainMaker		

## **ARDUINO IDE USEFUL TIPS**

- 1. Compiling slow: Often the antivirus software checks every compiled file. This slows the machine down. Create rule in your antivirus software not to check the folder %LocalAppData%\Arduino15.
- 2. Upload to device. Shortcut Ctrl + U
- 3. Open Terminal (Serial Monitor) to get Debug information through serial interface: Shortcut Ctrl + Shift + M. The baudrate is 115200.
- 4. Commend / Uncommend: Shortcut Ctrl + /

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