UNIVERSAL-SOLDER® Everset® ES100-MOD WWVB-BPSK Receiver Module V1.1

ES100-MOD is a receiver module for the phase-modulated time signal broadcasted by the NIST radio station WWVB near Fort Collins, Colorado, and is based on Everset® Technology's fully self-contained receiver-demodulator-decoder Chip ES100. With a size of just 12 x 16 mm and it's direct-PCB-mount design, it can be integrated in new or current applications when exact time keeping is necessary but the legacy WWVB AM signal is to weak and GPS not available (e.g. in-house).
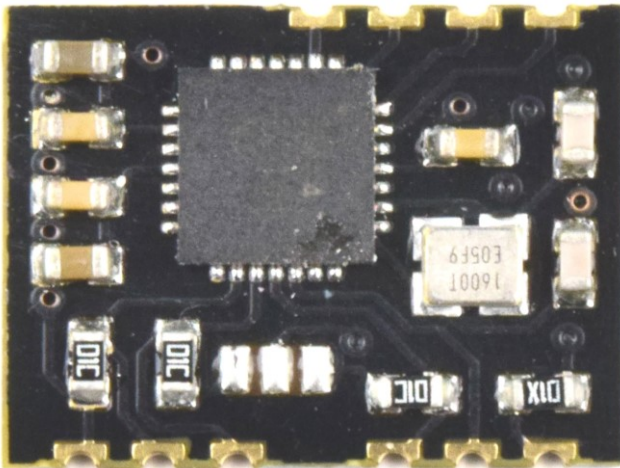
- Receives new phase modulated WWVB signal
- Significantly outperforms all other WWVB receivers
- Low power dissipation
- 2-wire serial interface
- Two antenna inputs
- 3.3V (2.0-3.6V max.) supply and logic level
- Max. current consumption 28mA (processing)
- Min. current consumption <0.1mA (standby)
- Full-Frame reception time 134 seconds
- Tracking Mode reception time 24.5 seconds
- I2C Pull-Up Resistors on-board (selectable)

INTRODUCTION

Everset® ES100 is a fully self-contained phase modulation time code receiver that receives and decodes the 60 kHz time signal from the National Institute of Standards and Technology's WWVB transmitter located near Fort Collins, Colorado, USA. It contains a digital correlation receiver to extract the time code information from the received signal. It also has a simple serial interface to transfer the date, time, and DST information to a host microcontroller. The ES100 is compatible with existing WWVB receiver antennas and offers significantly improved performance in low signal-to-noise and low signal-to-interference scenarios when compared to amplitude modulation receivers. The ES100 chip is only available as bare die. ES100-MOD is designed for any application where the bare die can not be used.

UNIVERSAL-SOLDER® Everset® ES100-MOD adds the minimal necessary periphery to the ES100 chip, which is a high precision 16MHz crystal as time base for the microcontroller, several capacitors and resistors for stable operation, and pull-up resistors for the 2-wire serial interface (I2C). The latter can be activated or deactivated by closing or opening 2 solder bridges (jumpers) on the module.

SPECIFICATIONS

ABSOLUTE MAXIMUM RATINGS

Parameter	Rating
Supply Voltage (AVDD, DVDD)	3.6V (2.0-3.6V recommended)
Storage Temperature Range	-40°C to +125°C
Analog Inputs (ANT1P, ANT1N, ANT2P, ANT2N)	(GND – 0.3V) to (VDD + 0.3V)
Digital Inputs	(GND – 0.3V) to (VDD + 0.3V)
Junction Temperature	125°C

Stresses above those listed may cause permanent damage to the device.

CHARACTERISTICS

VDD = 2.0 to 3.6V and over specified ambient temperature unless otherwise specified.

VDD = 3.3V and Ta = 25°C for typical values

| Parameter	Rating
Antenna Signal Voltage	0.04-0.1 µVrms
Antenna Input Resistance Differential	Min. 0.5 MΩ
Antenna Input Capacitance	10 pF
Digital Input LOW @ 2 mA	Max. 0.3 x VDD
Digital Input HIGH @ 2 mA	Min. 0.7 x VDD
Digital Output LOW	Max. 0.2 x VDD
Digital Output HIGH	Min. 0.8 x VDD
Crystal Specifications	16 MHz +/- 10 ppm (-20 to 75 °C)
Serial Interface (I2C)	Max. 400 kHz
Current Consumption Receiving	Typ. 8 mA
Current Consumption Processing	Typ. 28 mA
Idle Current	Typ. 2.5 mA
Shutdown Current	Typ. 0.0001 mA
Wakeup Time	Typ. 1.0 ms
Full Frame Reception	Typ. 134 s
Tracking Reception	Typ. 24.5 ms
IRQ Delay	+/- 100 ms

For full specifications please see Everset® ES100 datasheet. (link to website)

PIN DESCRIPTION

Pin Name	Function	Note
GND	Ground Level	For Supply Voltage and Digital I/O
EN	Enable Pin	EN = LOW for Shutdown Mode
SDA	Serial Bus Data Line	On-Board 10 kΩ Pull-Up Resistor available*
SCL	Serial Bus Clock Line	On-Board 10 kΩ Pull-Up Resistor available*
VDD	Supply Voltage	3.3V recommended (2.0-3.6V max.)
ANT1-	Antenna 1 Negative Input	
ANT1+	Antenna 1 Positive Input	
ANT2-	Antenna 2 Negative Input	
ANT2+	Antenna 2 Positive Input	

*Pull-Up Resistors are not active by default. To activate them, connect all 3 pads of the solder jumper.

Close both solder jumpers to activate the I2C Pull-Up resistors (10k)

16 mm

12 mm
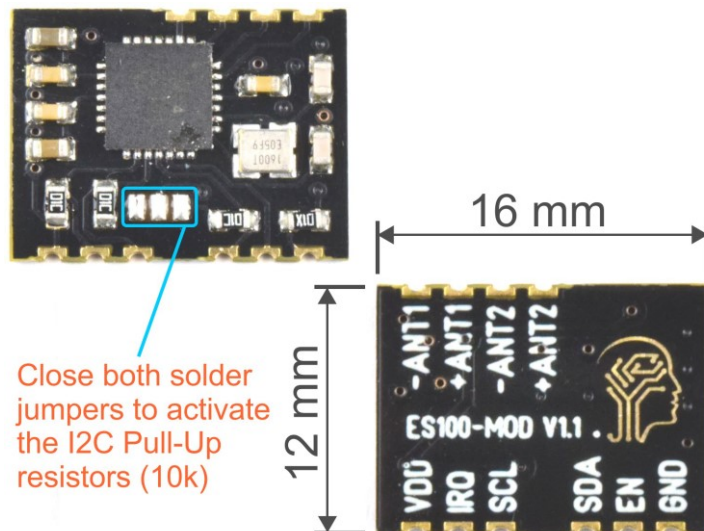
DEVELOPMENT TOOLS

Carrier Board DIY Kit for ES100-MOD

Use the Carrier Board to convert ES100-MOD into a Breadboard-Friendly Module for easier prototyping. The Kit contains of a PCB for direct solder connection to the ES100-MOD, a 6-pin male standard header strip and screw terminal connections for the Antenna wires.

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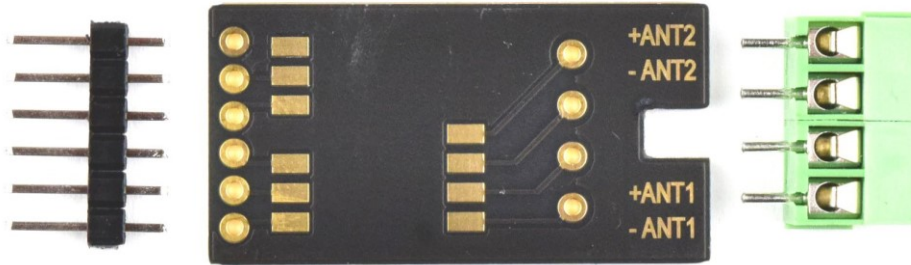
Application Development DIY Kit
for Everset ES100 (ES100-MOD)

Based on ATmega328P and compatible with Arduino IDE. The included MCU is pre-loaded with a Demo Code, showing Time, Date, DST and reception conditions.

The DIY Soldering Kit includes:
1 x PCB and Parts for the ADK
1 x ES100-MOD
1 x Carrier Board for ES100-MOD
2 x Antenna 60kHz

EAN 4260474035229 (link to website)