

HAMBUILDER

RADIOWORK



RTC02B

Radio Transceiver Controller
Si5351 on board

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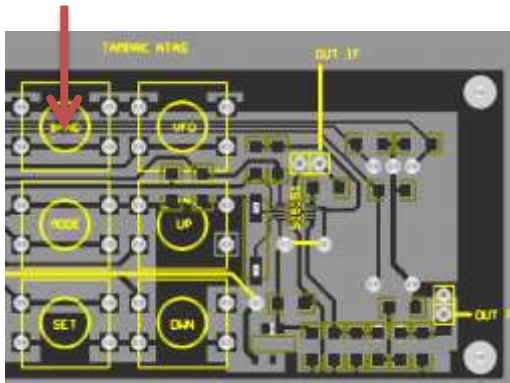
www.hambuilder.com

Specification

- Si5351 clock generator with 25/27 MHz Xtal
- HF All band controller
- BFO oscillator out
- USB/LSB/AM switch control pin
- IF bandwidth control pin
- AGC Fast/Low control pin
- NB control pin
- VFO A/B
- CB mode channel
- Voltage monitor, Temperature monitor, Forward and Reflected reading
- Alarm indicator and alarm driver
- 6 onboard button
- 1 rotary plus + push button
- Fout 4X freq operasi (SDR mode)

Operation

1. **BAND** button



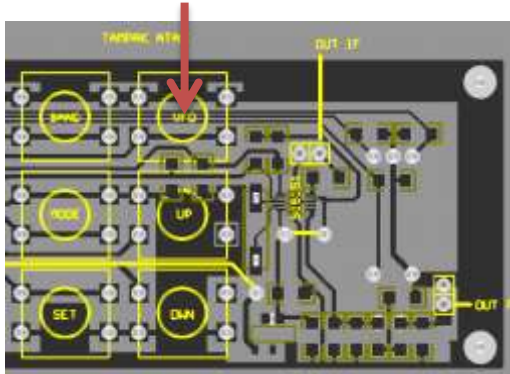
Band selection

• 160m	=	1.800 MHz	-	1.999 MHz
• 80m	=	3.500 MHz	-	3.999 MHz
• 40m	=	6.900 MHz	-	7.249 MHz
• 30m	=	10.100 MHz	-	10.149 MHz
• 20m	=	14.000 MHz	-	14.349 MHz
• 15m	=	21.000 MHz	-	21.449 MHz
• 10m	=	28.000 MHz	-	29.699 MHz
• 26m	=	11.400 MHz	-	11.499MHz
• CB	=	26.965 MHz	-	27.405 MHz
• ALL	=	500KHz	-	32.000 MHz

Each band have their own output control pin with active logic high 5V to pre-drive BPF dan LPF. Special for 26m the control band follow 30m band and CB will follow 10m band.

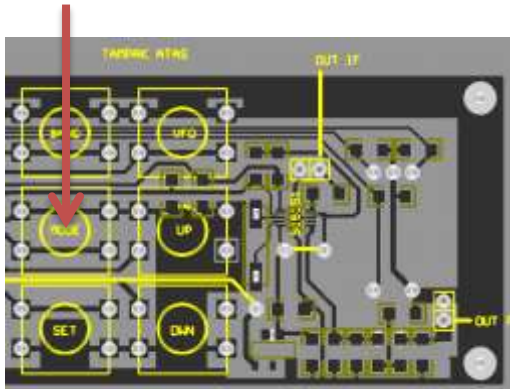
Selected active band will store into microcontroller EEPROM after a few second.

2. VFO A/B button



VFO A/B button used to choose active VFO A or B, each band have A/B sto selected VFO and will be store in microcontroller EEPROM after a few second.

3. MODE button

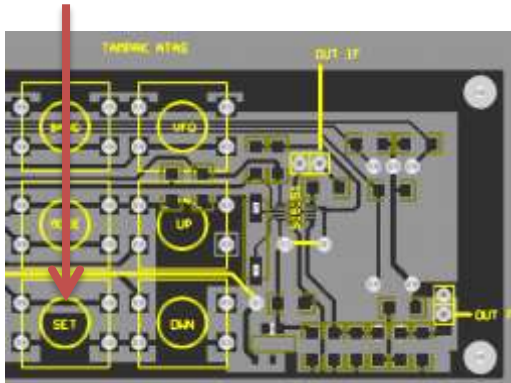


MODE Button used to choode modulation (LSB, USB, CW, AM and SDR). This button will drive output pin for selected modulation out pin and or drive BFO frequency out. This modulation pin out will have 5V high logic pin to drive external BFO for example.

SDR mode mean no IF offset and multiply by 4, such as for tayloe need 4 times LO. See Frequency out pin for more detail formula

Active mode will be store in microcontroller pin after a few second

4. **SETTING** button (activated alternate function button)



Setting button used to choose setting function combine with another button
Push SET button then push following button

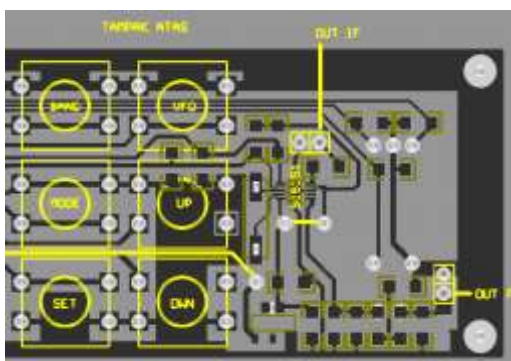
*. BAND, use to set Bandwith (BW) setting, if Band with (wide/narrow) , This will affect BW pin high or low logic for bandwith control

*. MODE, use to set AGC F(fast) or S (slow), this with affect AGC pin logic high or low for AGC control

*. A/B, use to NB, Noise blanker , this will affect NB pin logic high or low for Noise blangker control

Push SET button to go back to dial mode

5. **DOWN/UP** button



Button UP atau DOWN use to auto scan up and down on selected band

6. Button rotary **DIAL**

Button rotary dial use to choose operation frequency by left (down) or right (up).

7. Button rotary **PUSH DIAL**

If we push the button rotary dial this will change frequency step for each rotary step.

RTC02B Initialization

Factory Reset

Push **SET** button when powering on module until setup menu appear it will reset all EEPROM setting into factory default.

EEPROM Value setting

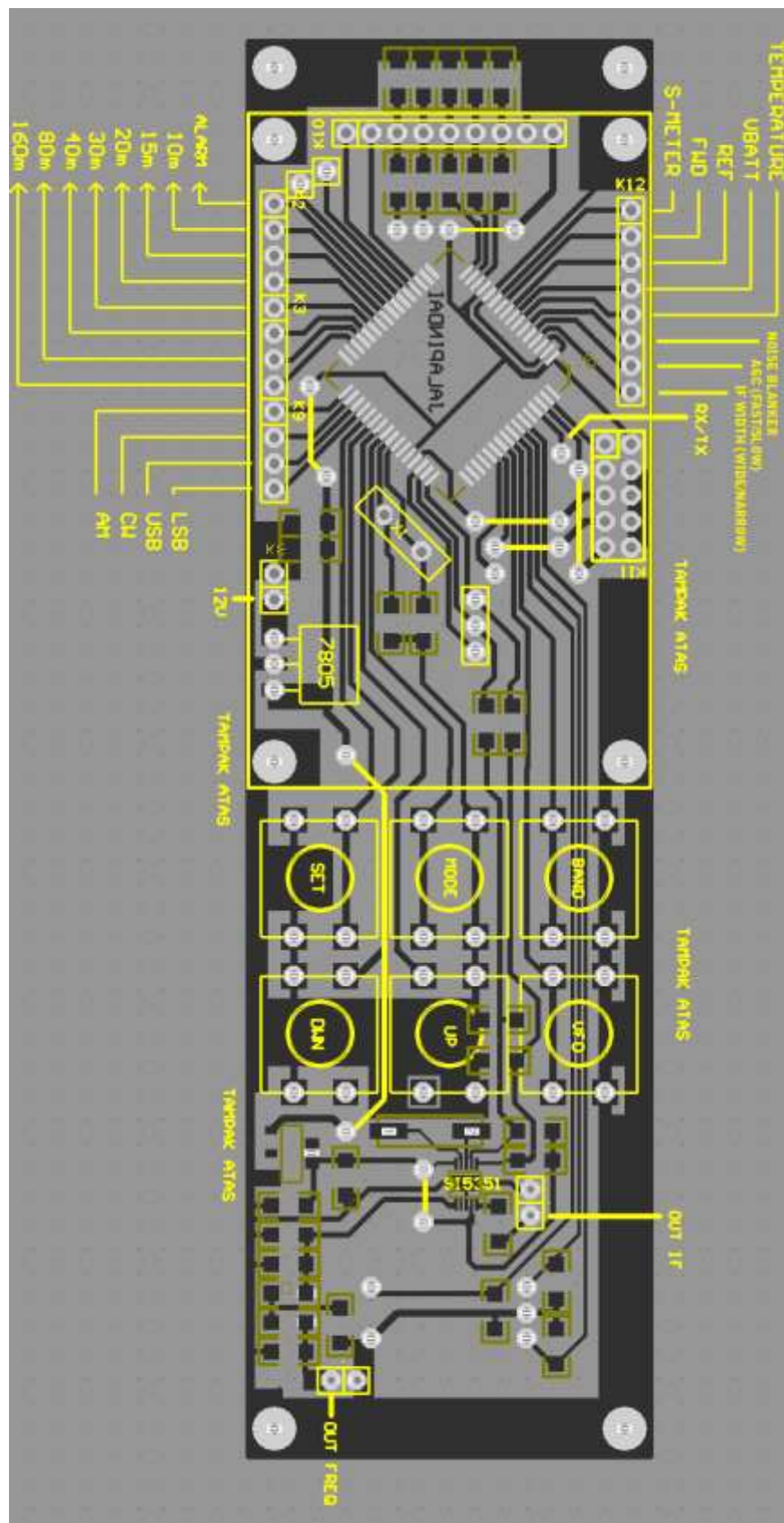
For the first time we need to set up the system such as correction value (calibration), IF and etc. We need to push **DWN** button on start up until initialization menu show up. Below are step by step initialization set up. *Push DWN button on start up did not reset to factory default value.*

1. Correction menu will show up as default initialization.
Default correction value is zero except already calibrate. If we don't want to set the new calibration value, just push DWN button to skip then go to other setup.

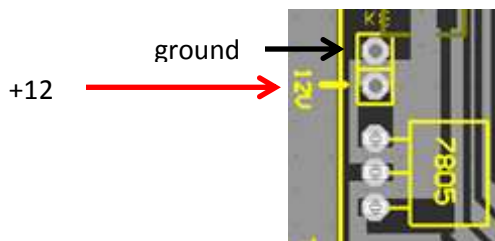
Read the vfo value on VFO out pin. If counter read value did not show exact 10MHz please do rotate dial button left or right until counter read exact. Then push DWN button for next step.
2. IF SSB
IF SSB use to set up IF offset value, we need to rotate dial rotary button left or right. We could push rotary dial button also to change step.
Then push DWN button for next step.
3. IF CW
Same as above but for CW mode
Then push DWN button for next step.
4. IF AM
Same as above but for AM mode.
Then push DWN button for next step.
5. BFO USB
BFO offset for USB. Default value is 1500Hz (1.5KHz), we could rotate rotary dial button to change the value.
Then push DWN button for next step.
6. BFO LSB
BFO offset for LSB. Default value is -1500Hz (-1.5KHz), we could rotate rotary dial button to change the value.
Then push DWN button for next step.
7. BFO CW
BFO offset for CW. Default value is 600Hz, we could rotate rotary dial button to change the value.

Then push DWN button to exit Initialization step.. then restart (power on – off)

RTC02B Connetion and pinout



- 12V supply pin (beware connecting this pin)



- Output pin
 - This pin pin have logic high (5V) when active and logic low (0V) when not active
 - Alarm pin (K2.0)
 - Band control pin (K2.1 – K2.3)(10m, 15m, 20m)
 - Band control pin (K3.0-K3.3)(30, 40m, 80m, 160m)
 - Mode control pin (K9.0-K9.3)(AM, CW, USB, LSB)

- Frequency out pin
 - OUT FREQ (VFO out)
VFO out = IF + Display Frequency + SSB BFO offset
 - OUT IF (BFO out)
BFO out = IF - SSB BFO Offset

- RX/TX input pin
This digital input in will accept 5v as RX state and 0V as TX state.

RX state wil drive LCD display to show RX state and set up VFO value according to rx state, special for AM mode, will offset RX vfo to AM IF. This wil also drive microcontroller to read s-meter value (see ADC input s-meter).

TX state will drive LCD display to show TX state and set up VFO value according to tx state, special for AM mode will not offset TX vfo to AM IF. This will alos drive microcontroller to read fordward (FWD) and reflected (REF) value (see ADC input pin REF/FWD)

- ADC input pin
This input pin accept 0-2.56 DC volt input. Please be aware to to exceed the value. It will damage the Microcontroller.
 - Temperature input (0-2.56V)
Connect this pin into LM35 sensor temperatur (sold separately). Then glue it into Power Amplifer heatsink to read heatsink temperature.

Typical Applications

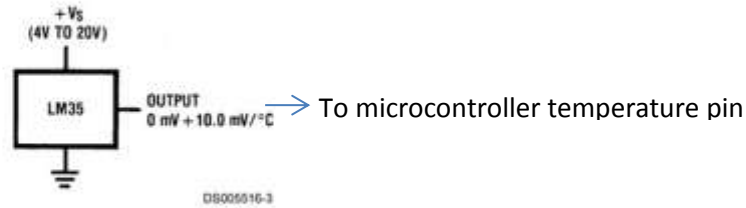
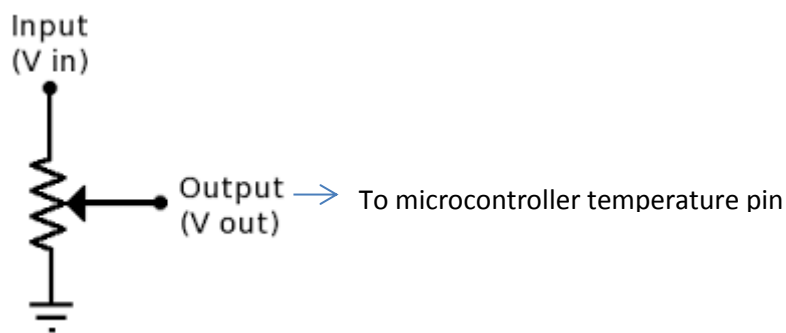
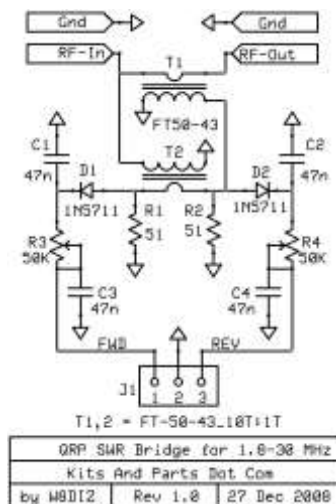


FIGURE 1. Basic Centigrade Temperature Sensor
(+2°C to +150°C)

- Vbatt (0-2.56V)
Connect this pin through 10K trimpot/potentiometer to read supply voltage then do calibration with other voltmeter



- REF (0-2.56V)
Connect this pin into SWR pickup reflected out then do calibration.



- FWD (0-2.56V)
Same as above but for forward out.



This is "KitsandParts" SWR pickup

- S-Meter (0-2.56V)
Connect this pin so s-meter buffer then do calibration. (replace analog meter then connect it to microcontroller s-meter input)

