# FT9
Eval Board Quick Start Guide

Overview

The FT9-EVAL BOARD support several products in CW's FT9 Series product line. The model series supported are the FT9-TFC, FT9-CC and FT9-P. This board can be configured in various ways to support functionality within each model series. This board can be used with no on-board MCLK oscillator by using the MCLK_IN BNC connector at J4 to provide the required 10 MHz signal from an external source. When using the FT9-P series, the MCLK_IN BNC connector at J4 is used as the REF_IN for the -P series modules, not the 1PPS REFIN_1 and REFIN_2 connectors at J11 and J12.
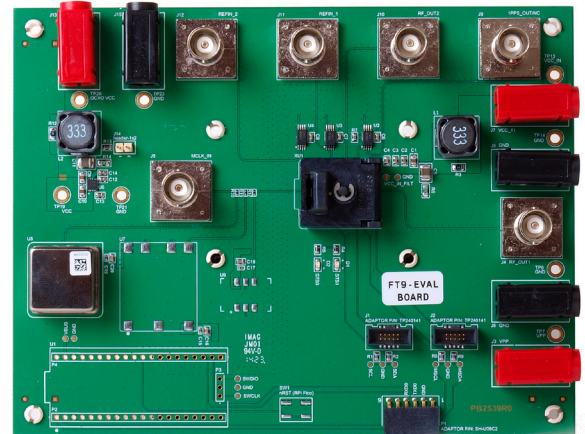
Each model series will be addressed separately in this document. For access to the internal IC in the FT9 series modules, space has been allocated at U1 for an RPi Pico (Raspberry Pi) board which acts as a USB-to-Serial adapter and an MCU (Micro Controller).

The MCU can be programmed via the Arduino IDE (free) in C, to talk and probe the NS3D02 internal IC via its I2C interface.

https://www.raspberrypi.com/products/raspberry-pi-pico/
https://www.arduino.cc/en/software

General Description

This FT9-EVAL board can be configured with various MCLK source options mounted onto directly onto the board. These options include various OCXOs and TCXOs. Consult with the factory for stability options within each type. In addition, TSE (Temp Sense Enabled) OCXO and TCXO options also can be mounted directly to this EVAL board. This allows for the automatic temp sense and frequency compensation function to operate when using the correctly configured FT9 model number that enables this functionality. See the table below to configure the appropriate FT9-EVAL board part number to request these various options. Separate power connections at J13 and J15 support power to the onboard MCLK module, if there is one. Care should be taken to ensure the appropriate power supply voltage levels are applied per the OCXO or TCXO specification sheets.

Bulletin	**TM148-EV**
Revision	**01**
Date	**15 Feb 2024**

Board Version Options

Base P/N	OnBoard MCLK Options	CC Option-	Add Processor
FT9-EVAL	-Blank (no MCLK)	-CC or blank	-RP or blank
	-14T (9x14 S3TCXO)		
	-14O (9x14 OCXO)		
	-20 (20x20mm OCXO)		
	-22 (22x25mm OCXO)		

The FT9-TFC is the most feature rich module that will generally use all the available connection points. While most functionality in each FT9 module is pre programmed based on the part number selected, some functionality is not capable of being used without accessing the internal IC register set. For instance, only a 1PPS input on RF_IN1 will be accepted. If another 1PPS signal is present on RF_IN2, it will be ignored unless switched to via internal register programming changes. While connections have been made to allow power to the OTP-VPP pins, it is not recommended to attempt to modify OTP stored content for pre-programmed FT9-Series modules.

Designator	Label	Input/Output	Voltage /Logic Level	Function
J4	MCLK_IN	Input	3.3V LVCMOS	10MHz MCLK IN signal *
J5	RF_OUT 1	Output	3.3V LVCMOS	CLOCK Outut 1 (-TFC),(-CC), (-P)
J7	VCC IN	Input	3.3V +/-5%	Main board Power
J9	GROUND	Input	GND	Main board Ground
J8	1PPS OUT	Output	3.3V LVCMOS	1PPS OUTPUT (-TFC)
J10	RF_OUT2	Output	3.3V LVCMOS	CLOCK Outut 2 (-TFC),(-CC)
J11	REFIN_1	Input	3.3V LVCMOS	1PPS IN (-TFC)
J12	REFIN_2	Input	3.3V LVCMOS	1PPS IN 2 (-TFC)
J13	VCC IN OCXO	Input	5.0V ± 5%	On Board OCXO Power supply
J15	GND OCXO	Input	GND	On Board OCXO Ground
J3	VCC IN OTP VPP	Input	6.5V-7V	OTP-VPP Power supply
J6	GND OTP VPP	Input	GND	OTP-VPP Ground

*J4 connector is used for REF_IN on FT9-P model series

General Instruction for all Model series parts.

1. Insert the FT9 unit into the eval board socket

- Ensure that Pin 1 of the FT9-TFC is oriented properly inside the socket relative to the marking for Pin 1 on the socket itself.
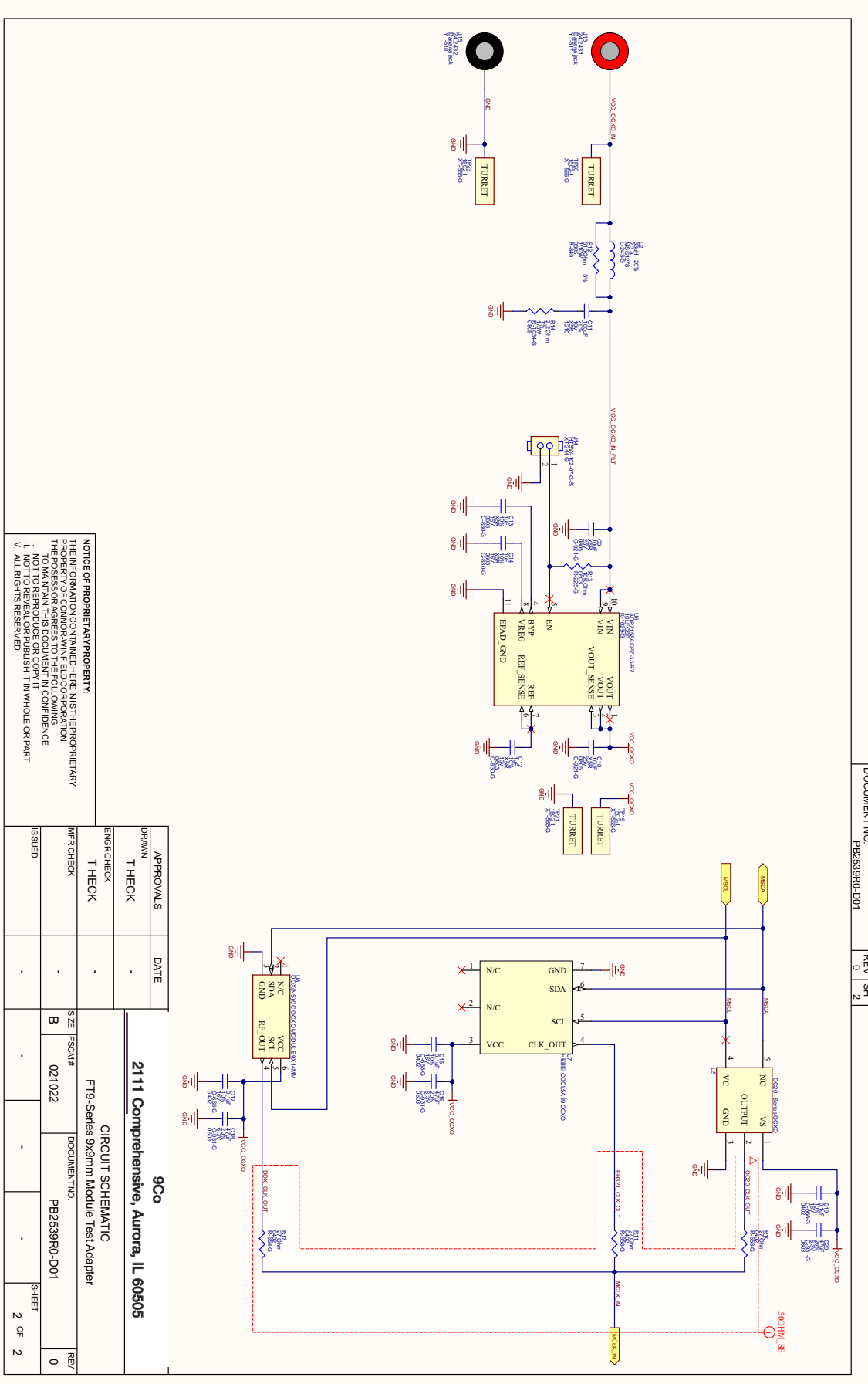- Close the clam-shell cover until it clicks.

2. Connect power

- Connect +3.3Vdc at VCC connector J7 to an appropriate 3.3V power supply capable of supplying ~ 0.2A.
- If an on-board OCXO or TCXO MCLK is used, connect J13 to a 5.0V power supply with appropriate current capability for the particular OCXO or TCXO.

3. Connect the appropriate inputs and applicable outputs.

- For CMOS outputs, use a high impedance probe if possible.

FT9-EVAL Schematic 1 of 2

APPROVALS		DATE
DRAWN	T HECK	-
ENGR CHECK	T HECK	-
MFR CHECK	T HECK	-
ISSUED		-

9Co
2111 Comprehensive, Aurora, IL 60505

CIRCUIT SCHEMATIC
FT9-Series 9x9mm Module Test Adapter

| SIZE B | FSCM # 021022 | DOCUMENT NO. PB2539R0-D01 | | | | | | REV 0 |

SHEET 1 OF 2

DOCUMENT NO. PB2539R0-D01   REV 0   SH 1

FT9-EVAL Schematic 2 of 2

CIRCUIT SCHEMATIC
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SHEET 2 OF 2

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