X microwave

X-Microwave
Getting Started Plate

XM-RDK-200

User Manual

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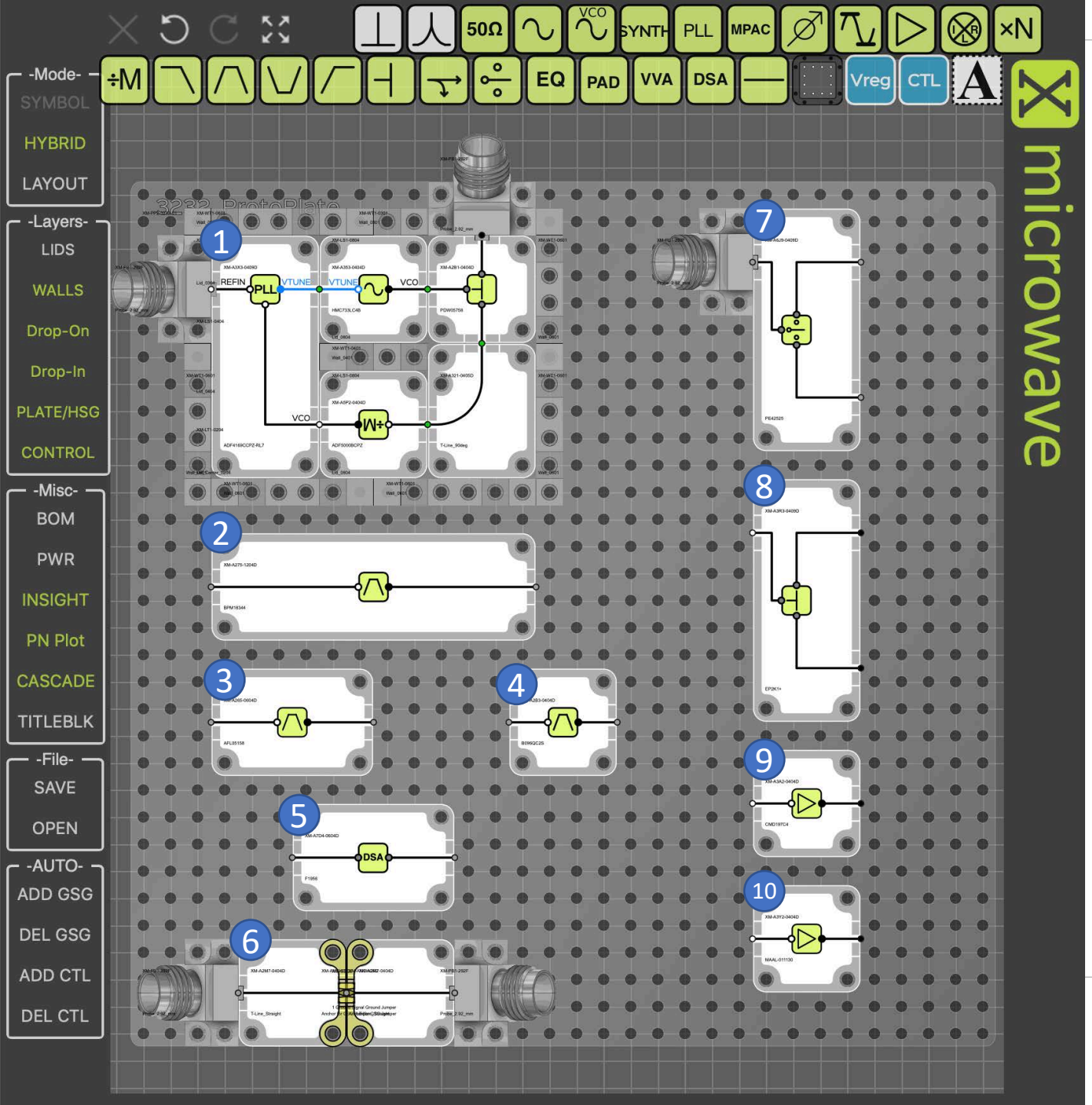
This product uses semiconductors that can be damaged by electrostatic discharge (ESD).
When handling, care must be taken so that the devices are not damaged.

- Wear ground foot or wrist straps and use a grounded anti-static mat to cover your work surface
- Always discharge yourself by touching a grounded bare metal surface before picking up the plate



Getting Started Proto Plate

(1) Synthesizer
PLL, XM-A3X3-0409D, ADI ADF4169CCPZ-RL7, [PCB 0357], F=500M – 13.5G
VCO, XM-A353-0404D, ADI HMC733LC4B, [PCB 0234] F=10G-20G
Divide x2, XM-A5P2-0404D, ADI ADF5000BCPZ, [PCB 0206], F=4G-18G
2-Way Splitter, XM-A2B1-0404D, DLI PDW05758, [PCB 166], F=4.5G-18G

(2) Lumped Element Filter
Band Pass Filter, XM-A275-1204D, [PCB 044] CF=640MHz BW=39M

(3,4) Planar Filters
(3) Band Pass Filter, XM-A265-0604D, DLI AFL05158, [PCB 079], CF=15G BW=7.5G
(4) Band Pass Filter, XM-A2B3-0404D, DLI B096QC2S [PCB 082], CF=10G BW=5.4G

(5) Digital Step Attenuator

DSA, XM-A7D4-0604D, IDT F1956, [PCB 0701], F=1M-6G, 31.75dB, 7bit

(6) Transmission Line w/ Interconnect
0404 Transmission Line, XM-A2M7-0404D, [PCB 306], F=DC-50 GHz

(7) Switch
SPDT Switch, XM-A6J9-0409D, pSemi PE42525, [PCB 0456], F=40M – 60GHz

(8) Splitter
2-Way Splitter, XM-A3R3-0409D, Mini-Circuits EP2K1+, [PCB 364B], F=2G-26.5G

(9,10) Amplifiers
(9) 15.5dB Amp, XM-A3A2-0404D, Custom MMIC CMD197C4, [PCB 320], F=1G-24G
(10) 20dB Amp, XM-A3Y2-0404D, MACOM MAAL-011130, [PCB 403], F=2.4G-18.5G

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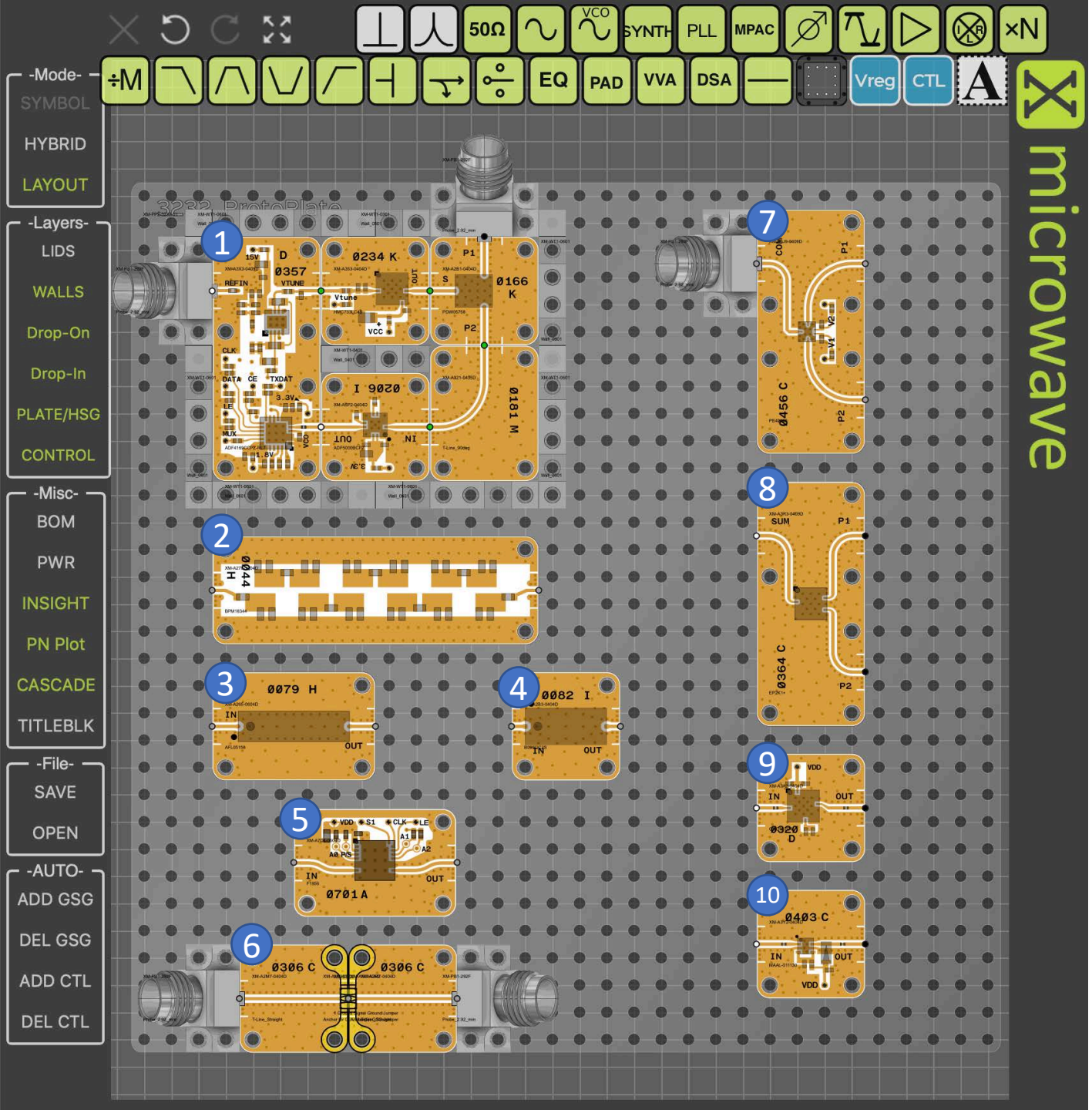
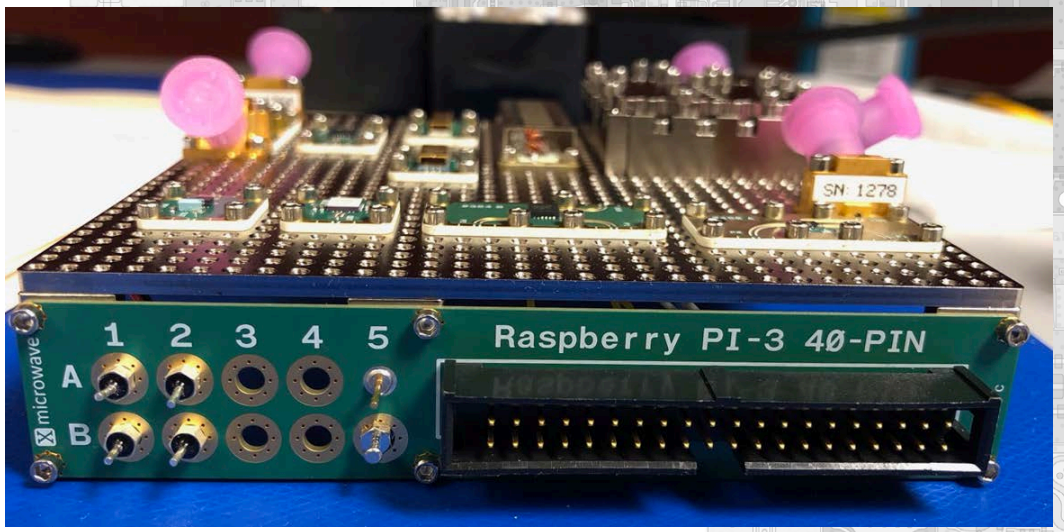




Powering the Prototyping Plate

(A1) +16 VDC
PLL, VCO, Divider

(A2) +9 VDC
Amplifiers

(B1) +5 VDC
DSA, Switch - pos

(B2) -5 VDC
Switch - neg

Control Information (X-MWcontroller)

LE0 = XM-A3X3-0409D, PLL
LE 1 = XM-A7D4-0604D, DSA
PIN 7 = Switch Control Line (0VDC = P1 | 3.3VDC = P2)

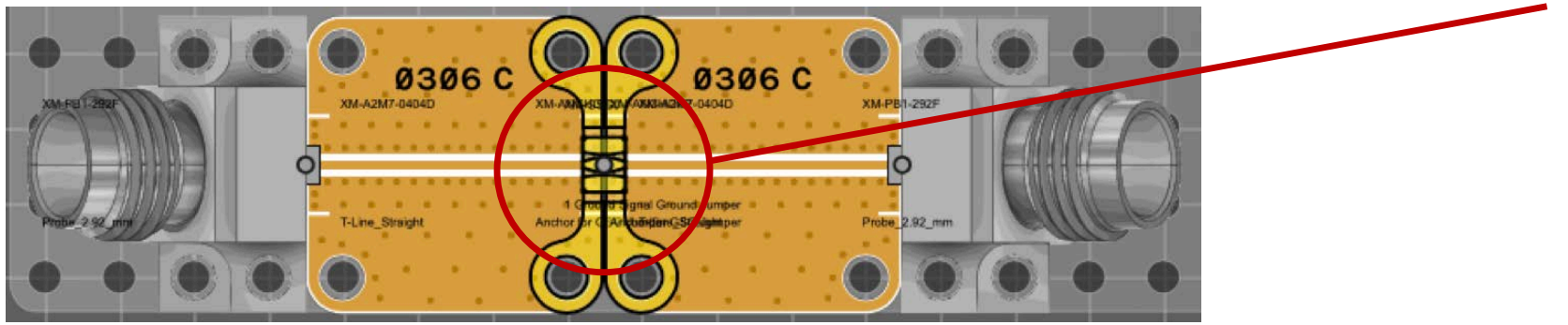
Recommended for your first measurement…

(6) Transmission Line

Note:
The 2.92 mm X-MWprobes provide high performance measurements from DC - 40 GHz. 1.85mm X-MWprobes are also available for measurements to 67 GHz.

Instructions

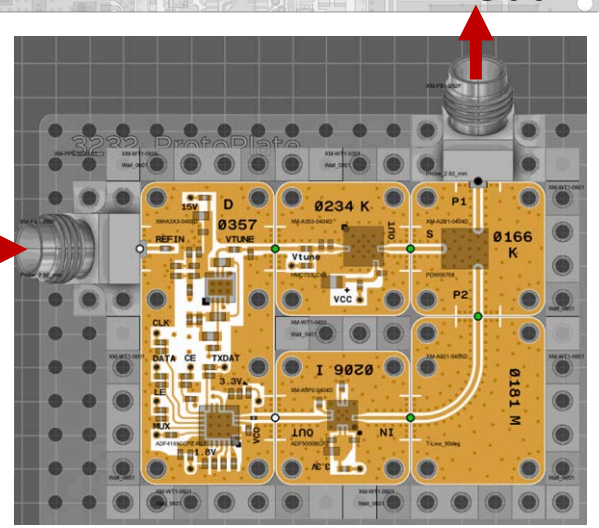
1. Attach network analyzer to RF ports
2. Set frequency range from DC – 67 GHz
3. Capture S2P of the transmission line



4. Probes can be moved to other devices

   ** Review the getting started guide for best practices. **
5. Repeat measurements as desired for filters (2), (3), (4)
6. Apply power (+9V DC to A2) and move probes to Measure gain of amplifiers (9), (10)

(1) Synthesizer



Instructions

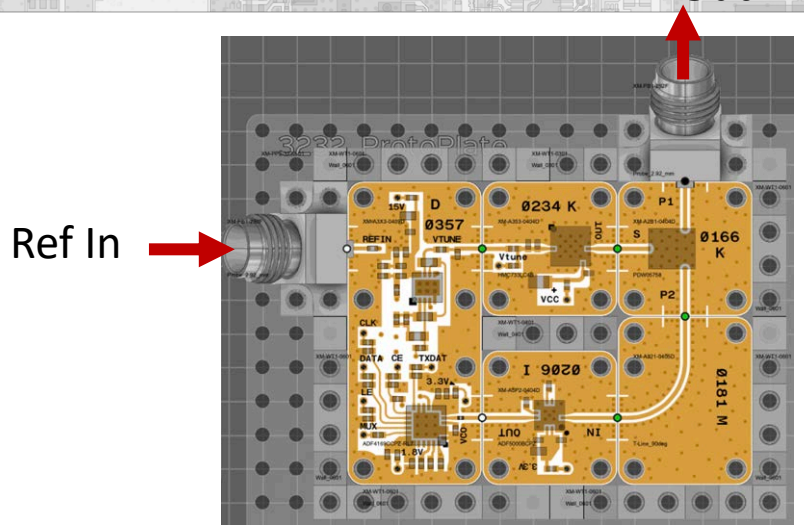
1. Attach the X-MWcontroller, 40 pin IDC Cable
2. Prepare to generate a 100 MHz @ 0dBm @ Ref In X-MWprobe
3. Attach spectrum analyzer to splitter output X-MWprobe
4. Power the circuit (A1) +16 VDC & enable 100 MHz Reference
5. Program the XM-A3X3-0409D, ADI ADF4169CCPZ-RL7**
    a. Add X-Mwblock to home screen of the X-MWcontroller (set line enable to LE0)
    b. Set Ref to 100 MHz @ 0dBm
    c. Set desired frequency between 5,000 and 10,000 MHz
    d. Press ‘Write’ to program
6. Measure output (2x PLL setting) 10 GHz – 20 GHz

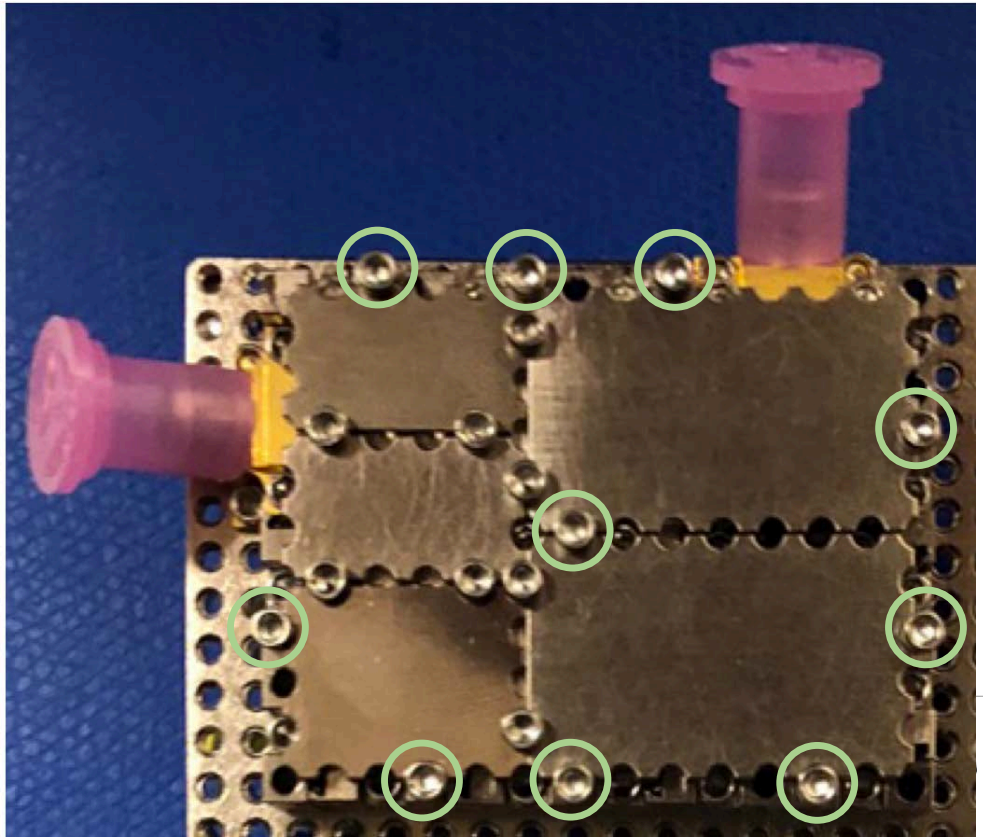
**Download the X-MWsystem Getting Started Guide to learn more about the X-MW System

(1) Synthesizer

Look Under the Lid

- Only 9 screws are holding the lid in place.
- Remove the ◯ screws to see inside.
- Please replace them when finished.



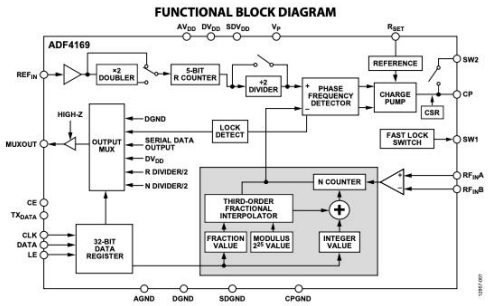


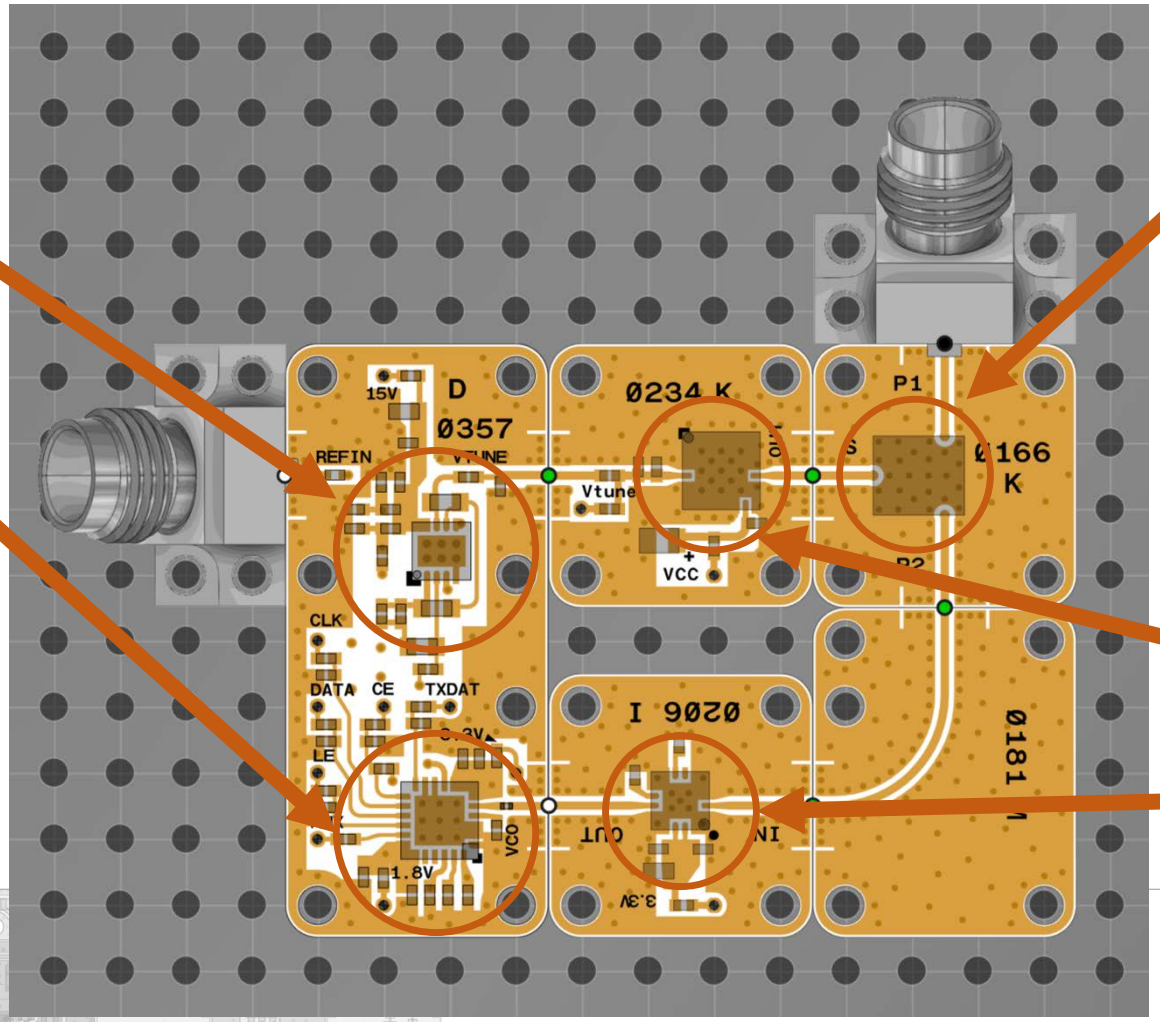
(1) Synthesizer

Synthesizer
- **PLL**, XM-A3X3-0409D, ADI ADF4169CCPZ-RL7, [PCB 0357], F=500M – 13.5G
- **VCO**, XM-A353-0404D, ADI HMC733LC4B, [PCB 0234] F=10G-20G
- **Divide x2**, XM-A5P2-0404D, ADI ADF5000BCPZ, [PCB 0206], F=4G-18G
- **2-Way Splitter**, XM-A2B1-0404D, DLI PDW05758, [PCB 166], F=4.5G-18G

Loop Filter + Gain
- OpAmp

PLL
- ADF4169CCPZ
- F=500M – 13.5G





Splitter
- PDW05758
- F=4.5G-18G

VCO
- HMC733LC4B
- F=10G-20G

Divider
- ADF5000BCPZ
- F=4G-18G

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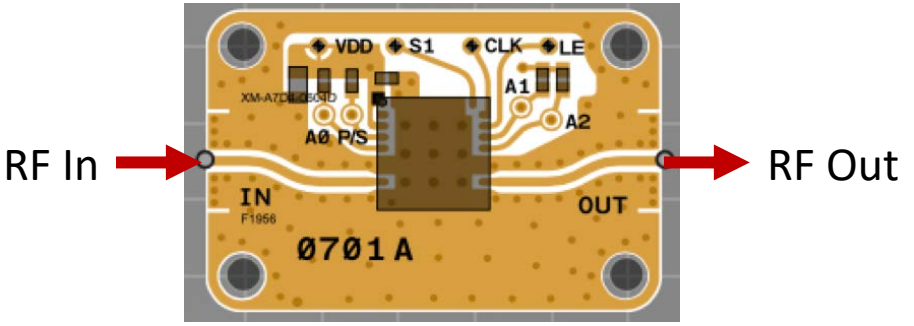
(5) Digital Step Attenuator

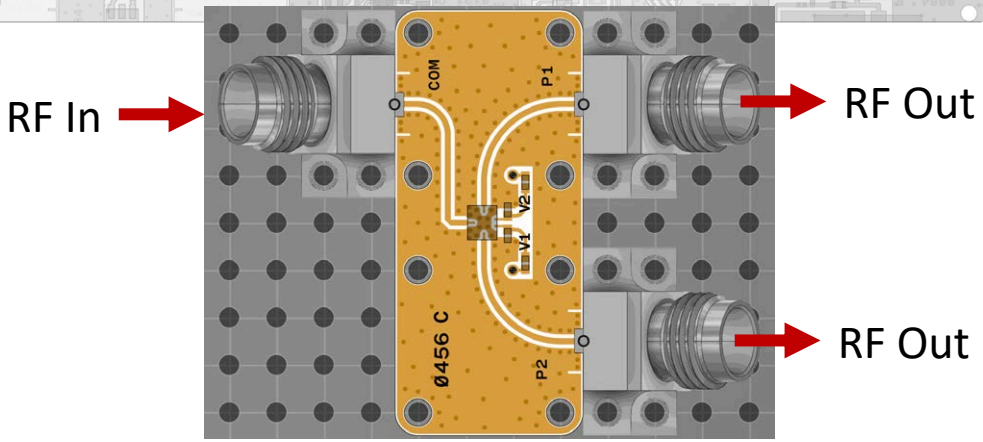


Instructions

1. Attach the X-MWcontroller, 40 pin IDC Cable
2. Attach X-MWprobes to the input and output ports
3. Attach a network analyzer to the X-MWprobes
4. Power the circuit (B1) +5 VDC
5. Program the XM-A7D4-0604D, IDT F1956**
   a. Add X-MWblock to home screen of the X-MWcontroller (set line enable to LE1)
   b. Set desired attenuation level
   c. Press ‘Write’ to program
6. Measure S2P of the device (DC – 10G)

**Download the X-MWcontroller Getting Started Guide

(7) SPDT Switch



Instructions

1. Attach the X-MWcontroller, 40 pin IDC Cable
2. Attach X-MWprobes to the input and output ports of the switch
3. Attach a network analyzer to the X-MWprobes
4. Power the circuit (B1) +5 VDC and (B2) -5 VDC
5. Control the XM-A6J9-0409D, pSemi PE42525**
   a. Add X-MWblock to home screen of the X-MWcontroller (choose Pin 7 to Control)
   b. Set desired switch value
   c. Press 'Write' to program
6. Measure S3P of the device (DC – 50GHz)

**Download the X-MWcontroller Getting Started Guide

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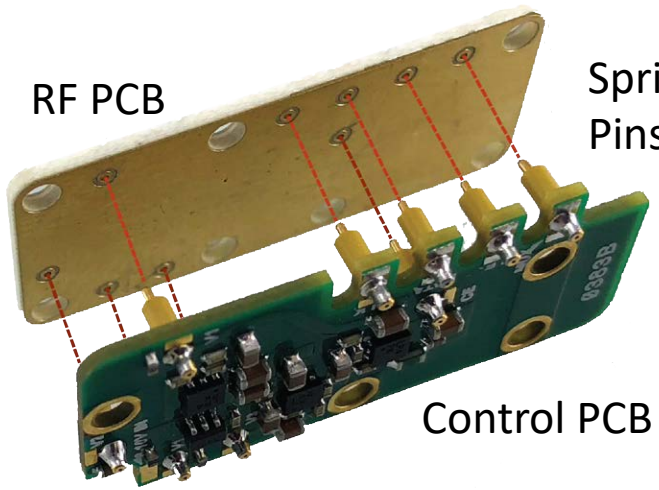
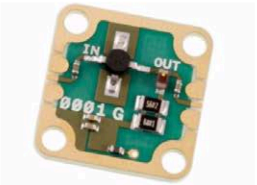
X-Microwave Essentials



X-MWsystem Vocabulary

X-MW**block** RF



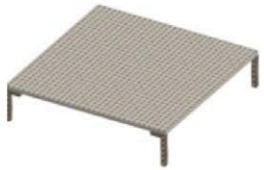
X-MW**probe**

Anchor

gsg Jumper

X-MW**block** Bias and Control

X-MW**protoplate**



X-MW**wall**

X-MW**lid**

X-MWblocks (bottom of plate)

1-72 x 1/8” (0.125”)

X-MWblocks (top) X-MWprobe (short)

1-72 x 5/32” (0.156”)

Lid (top)

1-72 x 3/16” (0.187”)

X-MWanchor Pinbridge

1-72 x 1/4” (0.25”)

X-MWProbe (tall) X-MWwall (short)

1-72 x 3/8” (0.375”)

X-MWwall (tall)

1-72 x 1/2” (0.5”)

X-MWwall Edge with Lid

1-72 x 5/8” (0.625”)

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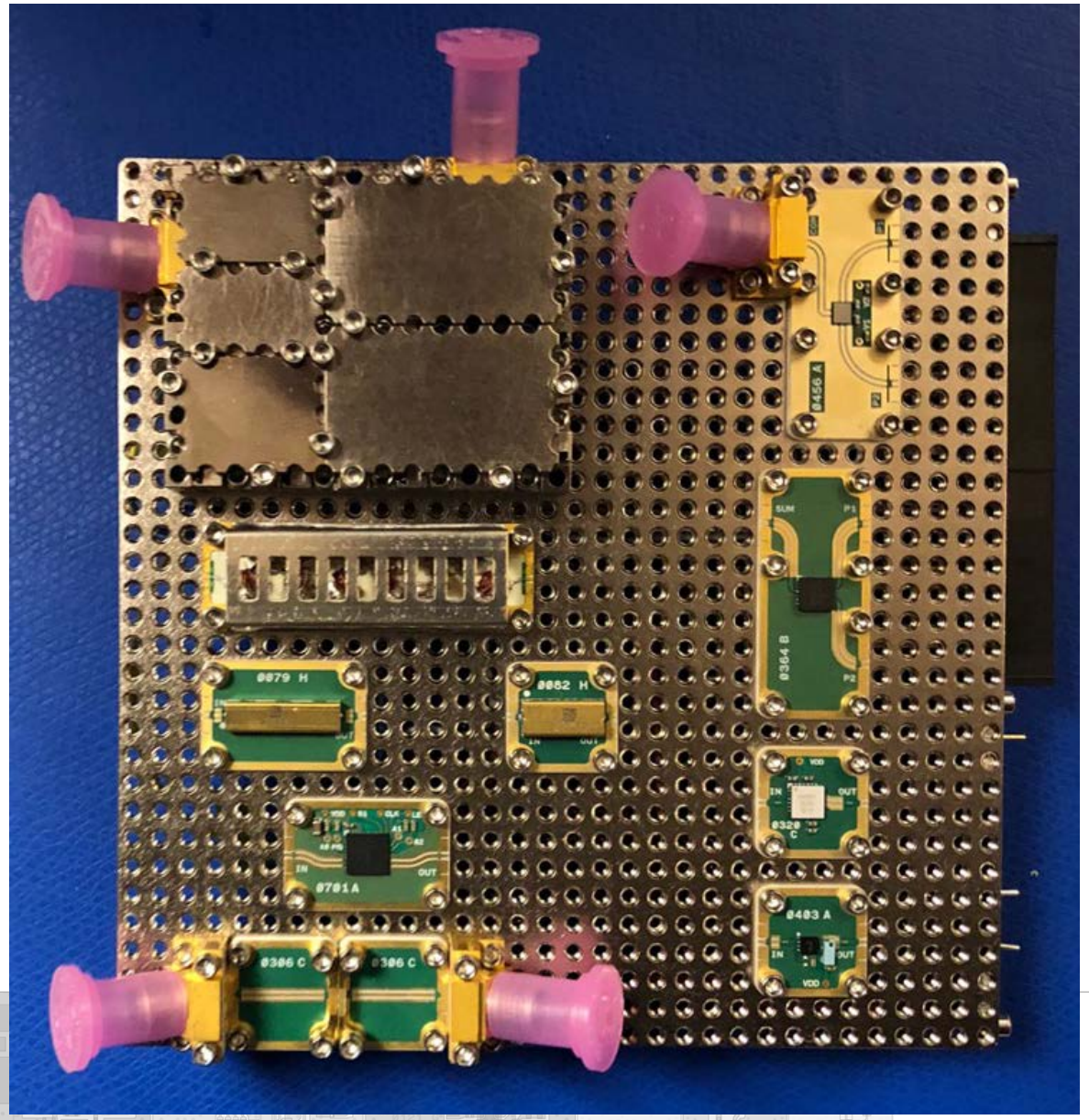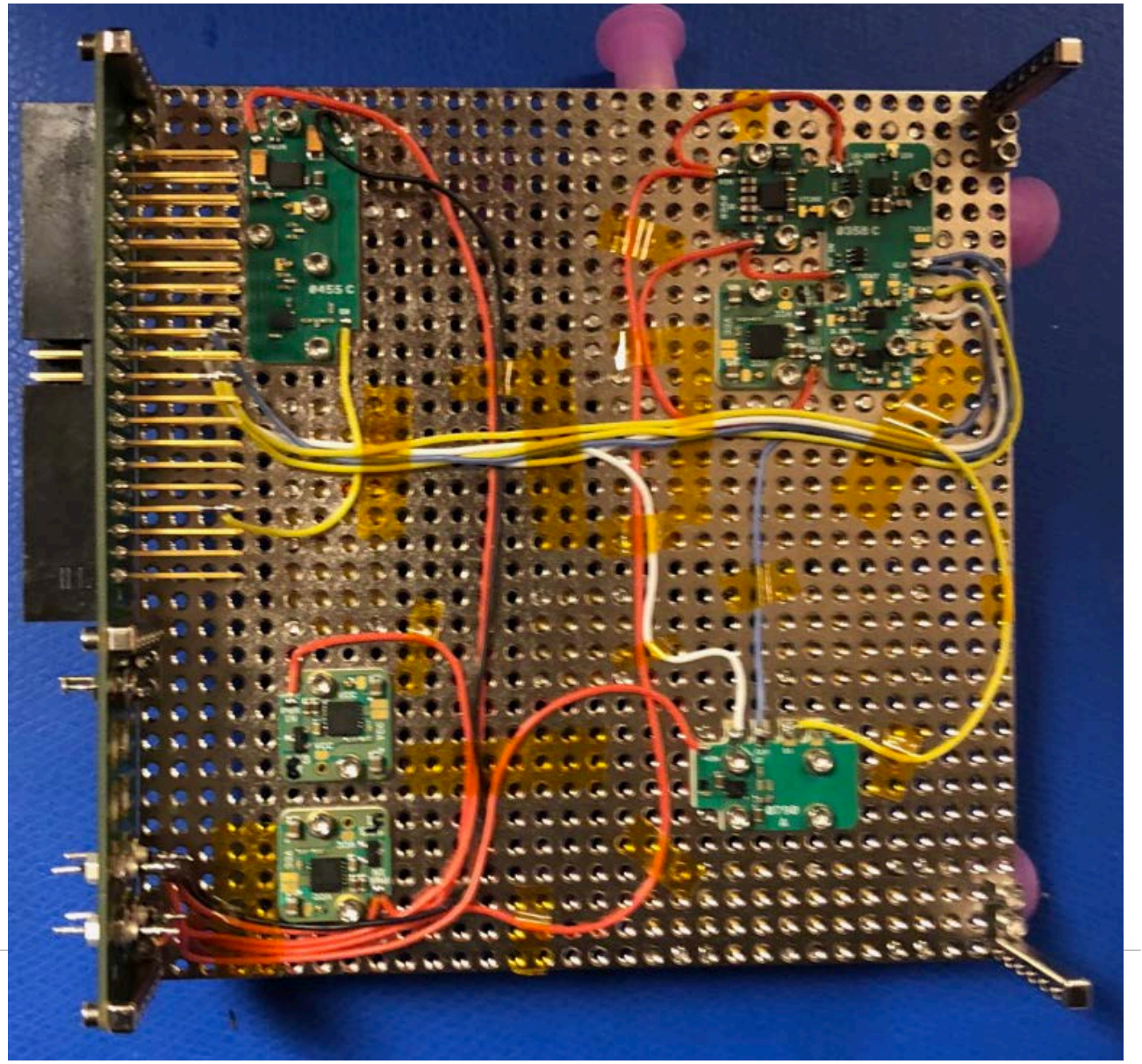
Reference Photos