PAC EVK Quick Start: Hardware Setup

00:00:07.840 --> 00:00:08.520
Hey, everyone.

00:00:08.520 --> 00:00:13.200
My name is Jonathan De Luna-Rodriguez,
one of control applications engineer

00:00:13.200 --> 00:00:16.600
here at Qorvo in the Power Management
Motor Control team.

00:00:17.240 --> 00:00:21.240
This video is a getting started
using PAC, walking through the hardware

00:00:21.240 --> 00:00:24.240
setup and first power up for Qorvo's

00:00:24.360 --> 00:00:27.120
PAC Motro Control Evaluation Kits.

00:00:27.120 --> 00:00:29.880
The goal here is to walk
through the connections, show

00:00:29.880 --> 00:00:35.400
how to power the board for the first time,
and confirm everything looks normal.

00:00:35.560 --> 00:00:38.200
For this video, no motor spinning just yet.

00:00:38.200 --> 00:00:41.520
Some quick context
on what these evaluation boards are for.

00:00:42.000 --> 00:00:45.400
PACs EVKs are designed to help you
evaluate the PAC device

00:00:45.400 --> 00:00:49.200
in a real motor control
set-up and start development immediately.

00:00:49.720 --> 00:00:54.200
They expose key device signals to headers
for probing and integration.

00:00:54.720 --> 00:01:00.440

They provide PC connectivity over
UART as a virtual comport, or GUI control

00:01:00.640 --> 00:01:05.840
and monitoring and support
programing and debugging through SWD

00:01:08.600 --> 00:01:10.840
So here's what you need on the bench.

00:01:10.840 --> 00:01:13.560
An EVK, each EVK will include

00:01:13.560 --> 00:01:17.920
an ET-UARTSWD module board, two four pin

00:01:17.920 --> 00:01:21.000
connectors, and a micro USB cable.

00:01:22.080 --> 00:01:24.800
Next, you will need a brushless DC motor

00:01:24.800 --> 00:01:27.960
or a permanent magnet synchronous motor,

00:01:28.920 --> 00:01:35.200
a DC bench supply, and a SWD debugger
such as J-link.

00:01:35.960 --> 00:01:38.400
Here's a high level EVK walk through.

00:01:38.400 --> 00:01:42.600
I'll be using the PAC55724
EVK as the example.

00:01:43.000 --> 00:01:47.640
But basically any PAK more control f k
you'll find these connection points.

00:01:48.120 --> 00:01:51.480
So firstly the PAC55724 device

00:01:51.480 --> 00:01:54.200
IC is right in the center

00:01:54.200 --> 00:01:57.440
You have your motor phase outputs U, B
and W.

00:01:57.720 --> 00:02:01.160
This is where you connect

your brushless DC motor.

00:02:01.680 --> 00:02:04.200
You have your power inputs Vin

00:02:04.200 --> 00:02:07.200
and ground. Using SPADE terminals.

00:02:07.440 --> 00:02:09.840
You have your SWD header.

00:02:09.840 --> 00:02:11.920
This is where you connect the SEGGER J-Link

00:02:11.920 --> 00:02:14.080
for programing and debugging.

00:02:15.280 --> 00:02:16.960
The UART connector here

00:02:16.960 --> 00:02:20.480
which will be used to communicate
with the PAC FOC GUI.

00:02:21.240 --> 00:02:24.000
You'll also find the DC-to-DC buck converter

00:02:24.000 --> 00:02:27.040
components down here as highlighted below.

00:02:27.600 --> 00:02:30.600
And hall sensor inputs on this channel
block.

00:02:31.440 --> 00:02:34.320
One quick note when using hall sensors is

00:02:34.320 --> 00:02:37.320
that you'll need to apply jumpers.

00:02:37.320 --> 00:02:40.320
A jumper one, two and three,

00:02:40.320 --> 00:02:42.240
shown labeled on the board.

00:02:42.240 --> 00:02:45.240
This is for hall mode operation.

00:02:45.600 --> 00:02:49.800
Let's take a closer look and walk you
through the connections in the lab bench.

00:02:50.160 --> 00:02:53.400
Let's walk through the required
connections for the evaluation board.

00:02:53.800 --> 00:02:56.560
So before flashing the firmware
or opening the GUI,

00:02:56.560 --> 00:02:59.560
you need to make sure everything is wired
correctly.

00:02:59.640 --> 00:03:01.800
The first step is connecting to the DC

00:03:01.800 --> 00:03:04.400
power supply as shown here.

00:03:04.400 --> 00:03:06.920
Vin and ground on the PAC55724.

00:03:06.920 --> 00:03:09.920
For this device.

00:03:10.320 --> 00:03:13.680
It should not exceed the absolute
max voltage of 60 volts.

00:03:14.160 --> 00:03:16.680
It is optimized to operate with voltages
ranging

00:03:16.680 --> 00:03:19.680
from 14V to 36V nominal.

00:03:19.960 --> 00:03:23.160
For my case, I'll stick with 20V
as shown in the power supply.

00:03:24.160 --> 00:03:25.000
When power is

00:03:25.000 --> 00:03:28.360
applied,
you should see the Vin LED turn on,

00:03:29.040 --> 00:03:32.040
as well as the 5V LED.

00:03:33.120 --> 00:03:36.120
Second step is connecting the J-Link debugger.

00:03:36.560 --> 00:03:39.560
It uses a four pin SWD cable.

00:03:39.720 --> 00:03:41.080
Make sure to match the polarity

00:03:41.080 --> 00:03:44.400
between the isolator board
and the evaluation board.

00:03:45.000 --> 00:03:49.880
So this is used for downloading the
firmware and debugging the PAC device.

00:03:50.480 --> 00:03:53.480
Third step
is connecting the UART interface.

00:03:53.720 --> 00:03:56.720
It also uses a four pin jumper cable.

00:03:57.000 --> 00:03:59.560
Make sure to match the polarity.

00:03:59.560 --> 00:04:02.080
This is what's used to communicate

00:04:02.080 --> 00:04:05.360
with the PAC FOC GUI over a COM port.

00:04:06.360 --> 00:04:09.040
At this point,
you should now have your power connected,

00:04:09.040 --> 00:04:12.040
your J-Link connected,
and your UART connected.

00:04:12.640 --> 00:04:15.360
Now the hardware is ready
and we can move on to the firmware

00:04:15.360 --> 00:04:17.040
installation and tool setup.