

MX-5 R8 Coil Kit

Installation guide

This guide takes you through fitting the kit and updating your ECU calibration. Work through the parts in order. The kit suits Motorsport Electronics ME221 (gen 2) and ME442 ECUs.

What you'll need

- The kit: four R8 coils with fitted sleeves, the coil harness for your car and the ECU connector.
- New spark plugs (recommended). R8 coils earth through the spark plug body, so fresh plugs give a good contact on clean, un-oxidised metal.
- A laptop with MEITE installed, to update the calibration.
- A 10 mm drill bit and a cutting wheel, if your ECU case doesn't already have a cut-out for the expansion connector.
- Cable ties and a little grease.
- **Mk1 only:** a soldering iron for the tach modification, and a short jumper wire on 1.6 cars.

Overview

Part	What it covers
1 Fit the coils	Swap the original coils for the R8 coils and connect the harness in the engine bay.
2 Connect to the ECU	Route the harness to the ECU and fit the expansion connector.
3 Tachometer	Mk1 only. Keep the rev counter working now the original coils are gone. Mk2 owners skip this part.
4 Update the calibration	Switch the ECU to fully sequential ignition and set the dwell for R8 coils. Do it yourself or send us your file.
5 Troubleshooting	Common problems and how to get help.

Don't drive the car until Part 4 is done

Until the calibration is updated, only coils 1 and 2 will fire and the dwell time will be too long for R8 coils, which shortens their life.

1 Fit the coils

1. Remove the HT leads.
2. Unplug the original coils and remove them from the engine. **Label which connector was plugged into the coil for cylinders 1 and 4, and which was for cylinders 2 and 3.** You'll need this in step 7.
3. **VVT cars:** remove the plastic clips that hold the coil harnesses so the connectors can move freely. They will sit at the back of the engine once the kit is fitted.
4. Fit the new coils. Each coil has a sleeve that makes it a snug fit in the spark plug hole, so it can't move about and wear over time. If they're tight, apply a little grease so they can come out again later without damage.

Coil too tight to fit?

This is unlikely, but you can reduce the sleeve diameter with sandpaper, or cut the sleeve off and wind tape around the coil to the correct diameter.

5. Check that all four coils are properly seated. The retention clip can be stiff but should clip onto the hex of the spark plug. The photos below show the clip and roughly how high a fitted coil sits. There will be a gap between the cam cover and the rubber section at the top of the coil; this is normal.



The retention clip grips the plug hex

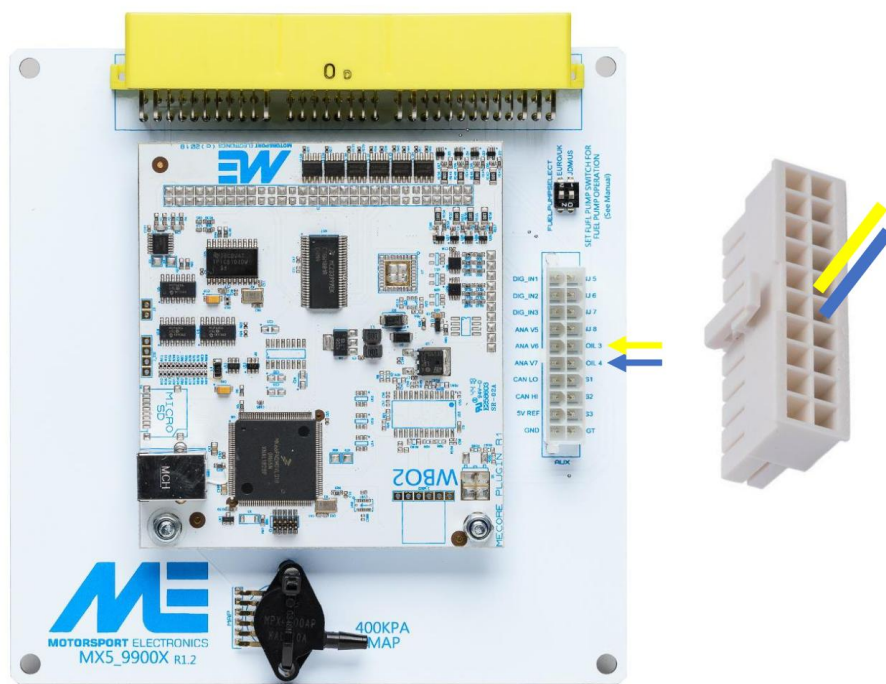


A correctly seated coil

6. Plug a connector into each of the four coils. Make sure each one clicks home.
7. Connect the original coil connectors to the new coil harness. The harness connectors are numbered 1 and 2 (the number is scratched into each one). **Connector 1 goes to the original connector that fed cylinders 1 and 4**, and connector 2 goes to the one that fed cylinders 2 and 3.

2 Connect to the ECU

1. Feed the ECU end of the coil harness through the firewall to the ECU. On early Mk1 1.8 cars the harness also has an orange tach wire; feed that through too (it's connected in Part 3).
2. Insert the terminals into the connector housing: **yellow goes to Coil 3 and blue goes to Coil 4.** The picture below shows where they sit on the ECU's expansion header and in the housing.



Yellow to Coil 3, blue to Coil 4

3. If your ECU case doesn't already have a cut-out for the expansion connector, make one now. Drill a 10 mm hole level with the top of the connector and another level with the bottom, then join the two holes with two parallel cuts using a cutting wheel.
4. **Mk1 cars:** do the tach modification in Part 3 now, while the ECU is out of its case.
5. Reassemble the ECU into its case and plug in the expansion connector.
6. Support the harness bundle with a cable tie so it can't move about and fatigue over time. The bracket that holds the CAS blanking plate is a good anchor to loop the tie through.



The CAS blanking plate bracket

3 Tachometer (Mk1 only)

On a Mk1, the rev counter takes its signal from the original coils. Once they're removed, the ECU has to drive it instead, which needs a small change on the ECU board. The pads you need are marked "Odd tach" on the back of the ECU board.

Mk2 and Mk2.5 owners don't need to do anything for the tach. Skip to Part 4.

Hardware: find your car below

Your car	What to do
Early Mk1 1.8 (4-pin coils)	Solder the orange wire from the coil harness to the "Odd tach" pads, bridging the two pads together.
Mk1 1.6	Bridge the two "Odd tach" pads together with solder. No wire is needed. Then, in the diagnostic port, link FEN to IG- with a short jumper wire.
Mk2 and Mk2.5	Nothing to do.

Software: all Mk1 cars

In MEITE, check the tach output settings. They should be set to **Toggles per revolution**, with **4** toggles per revolution. If they aren't, change them and click **Save**.

Do this check after the calibration changes in Part 4, so they can't overwrite it.

Not sure which applies?

If your car isn't listed or you're not sure which coils it had, contact us before you close up the ECU.

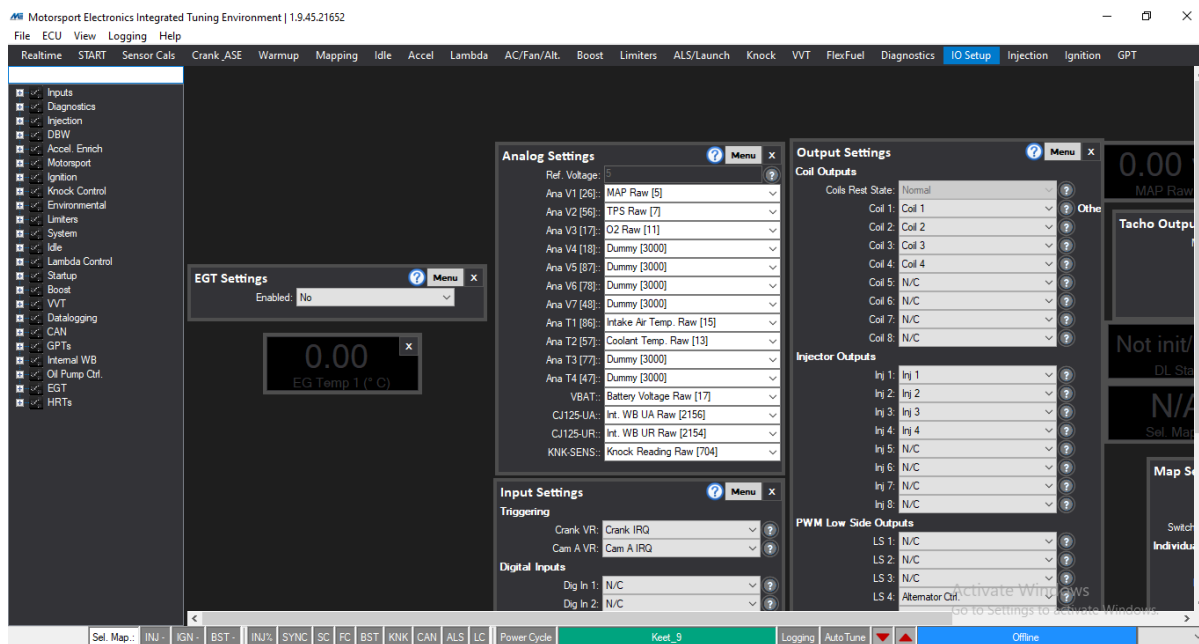
4 Update the calibration

R8 coils are much more powerful than the original coils, so they must run in fully sequential mode to avoid excessive voltage drop on the original harness. The dwell time also needs to come down to suit them.

You can make the changes yourself (Option A), or send us your calibration file and we'll do it for you (Option B).

Option A: do it yourself

1. Open MEITE and connect to the ECU.
2. On the **IO Setup** tab, set the Coil 3 and Coil 4 outputs to **Coil 3** and **Coil 4**.



IO Setup tab: coil outputs (circled)

3. On the **START** tab, find the ignition driver. It's also in the settings tree under **Ignition** → **Ignition driver**.
4. Change the mode from **Wasted spark** to **Wasted spark – COPS**. This is temporary; you'll switch to fully sequential in step 9.
5. Switch the ignition off and back on.
6. Find the ignition dwell table in the settings tree under **Ignition**.

7. Enter the values from the table below, then click **Save**.

Ignition dwell (ms) rows: battery voltage (V) columns: engine speed (rpm)

V \ rpm	500	850	1250	1500	2000	2500	3000	4000	4500	5000	5500	6000	6500	7000	7500	8000
6	7.15	7.15	7.15	7.15	7.15	7.15	7.083	6.95	6.883	6.817	6.75	6.683	6.617	6.55	6.55	6.55
6.6	6.25	6.25	6.25	6.25	6.25	6.25	6.183	6.05	5.983	5.917	5.85	5.783	5.717	5.65	5.65	5.65
7.2	5.6	5.6	5.6	5.6	5.6	5.6	5.533	5.4	5.333	5.267	5.2	5.133	5.067	5	5	5
7.8	5.05	5.05	5.05	5.05	5.05	5.05	4.983	4.85	4.783	4.717	4.65	4.583	4.517	4.45	4.45	4.45
8.4	4.55	4.55	4.55	4.55	4.55	4.55	4.483	4.35	4.283	4.217	4.15	4.083	4.017	3.95	3.95	3.95
9	4.2	4.2	4.2	4.2	4.2	4.2	4.133	4	3.933	3.867	3.8	3.733	3.667	3.6	3.6	3.6
9.5	3.95	3.95	3.95	3.95	3.95	3.95	3.883	3.75	3.683	3.617	3.55	3.483	3.417	3.35	3.35	3.35
10	3.7	3.7	3.7	3.7	3.7	3.7	3.633	3.5	3.433	3.367	3.3	3.233	3.167	3.1	3.1	3.1
10.8	3.35	3.35	3.35	3.35	3.35	3.35	3.283	3.15	3.083	3.017	2.95	2.883	2.817	2.75	2.75	2.75
11.4	3.15	3.15	3.15	3.15	3.15	3.15	3.083	2.95	2.883	2.817	2.75	2.683	2.617	2.55	2.55	2.55
12	3	3	3	3	3	3	2.933	2.8	2.733	2.667	2.6	2.533	2.467	2.4	2.4	2.4
12.6	2.8	2.8	2.8	2.8	2.8	2.8	2.733	2.6	2.533	2.467	2.4	2.333	2.267	2.2	2.2	2.2
13.2	2.65	2.65	2.65	2.65	2.65	2.65	2.583	2.45	2.383	2.317	2.25	2.183	2.117	2.05	2.05	2.05
14	2.5	2.5	2.5	2.5	2.5	2.5	2.433	2.3	2.233	2.167	2.1	2.033	1.967	1.9	1.9	1.9
14.4	2.4	2.4	2.4	2.4	2.4	2.4	2.333	2.2	2.133	2.067	2	1.933	1.867	1.8	1.8	1.8
15	2.3	2.3	2.3	2.3	2.3	2.3	2.233	2.1	2.033	1.967	1.9	1.833	1.767	1.7	1.7	1.7

A flat 2.5 ms everywhere also works, but these values give a stronger spark when cranking and reduce dwell at high rpm to keep the coils cooler.

- Start the car and check that it runs smoothly.
- Switch the car off and change the ignition driver mode to **Fully sequential**.
- Switch the ignition off and back on.
- Try to start the car. Whether it starts depends on whether the trigger offset is out by 360°. If it starts, you're done. If not, go to the engine driver and change the trigger offset: **add 360 if it's currently below 360, or subtract 360 if it's above 360**.

1999–2000 cars

With the standard trigger wheel, these all need 360 adding to the trigger offset, and should end up close to 464.

- Mk1 only:** check the tach output settings (see Part 3).
- Go for a drive and enjoy a stronger spark!

Option B: send us your calibration

Send us your file

- Open MEITE and connect to the ECU.
- Click **File** → **Save calibration file**. Save the file and send it to us.

We'll send back three files: **Wasted spark COPS**, **Fully sequential** and **Fully sequential 360**. Load them in that order, as below.

Load the files we send back

- Open MEITE and connect to the ECU.
- Click **File** → **Load calibration file** and select the **Wasted spark COPS** file.

3. In the loading wizard, set Quick Selection to **All** so that the IO settings are loaded too.



Choose All in the Load Calibration Wizard

4. Switch the ignition off and back on.
5. Start the car and check it runs as smoothly as usual.
6. Click **File** → **Load calibration file** and select the **Fully sequential** file.
7. Switch the ignition off and back on.
8. Check that the car starts. If it doesn't, load the **Fully sequential 360** file instead and try again.
9. **Mk1 only:** check the tach output settings (see Part 3).
10. The car is now running fully sequential. Go for a drive and enjoy a stronger spark!

5 Troubleshooting

Problem	What to check
Won't start after switching to fully sequential	The trigger offset is out by 360°. See Part 4, Option A, step 11, or load the Fully sequential 360 file if we made your calibration.
Misfiring, or only two cylinders firing	Check the Coil 3 and Coil 4 outputs on the IO Setup tab, and that yellow and blue are in the right positions in the connector. If you loaded our files, make sure you chose All in the loading wizard.
Rev counter not working (Mk1)	Work through Part 3, including the tach output settings in MEITE.
Coils won't go into the spark plug holes	See the note under Part 1, step 4.

Need help?

If you run into any problems, or the car won't start, contact us at digitune.co.uk/contact. We'll suggest troubleshooting steps, or connect to your laptop live over AnyDesk to look at it with you. You can download AnyDesk from anydesk.com.