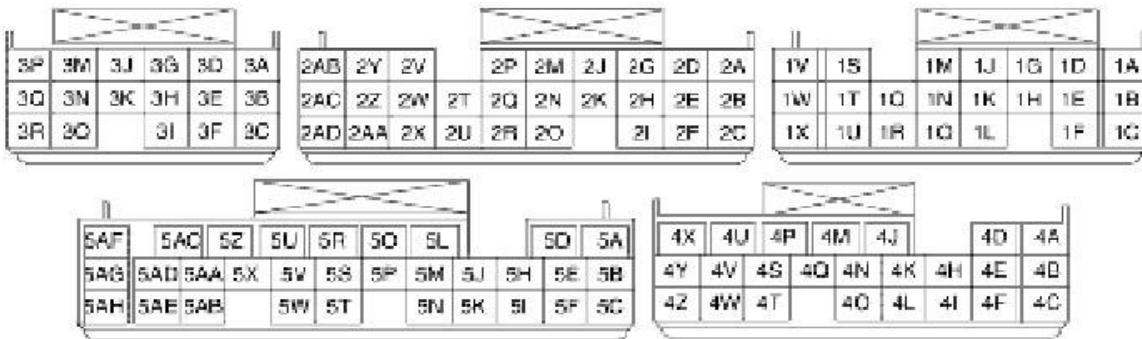


**Adaptronic Select
ECU for Mazda RX-8**

View from loom side
of plug:



Factory Pin	Factory Function (NC means No Connection in factory loom)	Adaptronic Pin (blank means no connection to Adaptronic)	Still connected to factory ECU?	Comments
1A	NC			
1B	Drive-By-Wire throttle control		Yes	
1C	Drive-By-Wire throttle control		Yes	
1D	SSV switch		Yes	
1E	NC			
1F	Knock sensor -		Yes	
1G	Knock sensor shield		Yes	
1H	NC			
1J	Throttle position sensor 1		Yes	
1K	NC			
1L	SSV solenoid valve	Aux Output 4	No	Secondary Side Valve
1M	Throttle position sensor 2		Yes	
1N	NC			
1O	Air solenoid valve		Yes	
1Q	Throttle Position Sensor power		Yes	
1R	NC			
1S	APV position sensor power		Yes	
1T	Knock sensor +	Knock signal input	Yes, shared with both ECUs	
1U	Sensor ground	Sensor Ground	Yes, shared with both ECUs	
1V	Front O2 sensor heater		Yes	
1W	VDI solenoid valve	Aux Output 3	No	Variable Dynamic Intake
1X	NC			

Factory Pin	Factory Function (NC means No Connection in factory loom)	Adaptronic Pin (blank means no connection to Adaptronic)	Still connected to factory ECU?	Comments
2A	Rear O2 sensor heater		Yes	
2B	O2 sensor ground		Yes	
2C	Front O2 sensor signal		Yes	
2D	Rear (Rotor 2) secondary injector	Injector Output 4	No	Secondary injectors for rotors 1 and 2 fire together
2E	Oil Pressure switch		Yes	
2F	Throttle Position Sensor ground		Yes	
2G	Front (Rotor 1) secondary injector	Injector Output 4	No	Secondary injectors for rotors 1 and 2 fire together
2H	Sensor shields		Yes	
2I	Generator control		Yes	
2J	Rear (Rotor 2) primary injector 1	Injector Output 3	No	
2K	Engine Coolant Temperature sensor	ECT signal input	Yes, shared with both ECUs	
2M	Front (Rotor 1) primary injector 1	Injector Output 1	No	
2N	Oil Metering Pump switch		Yes	
2O	Neutral switch	Digital Input 2	Yes, shared with both ECUs	
2P	Purge solenoid valve		Yes	
2Q	Rear O2 sensor signal	O2/EGO signal input	Yes, shared with both ECUs	
2R	Oil Level switch		Yes	
2T	Generator control		Yes	
2U	Eccentric shaft position sensor +	CAS 1 input	Yes, shared with both ECUs	Reluctor trigger for ignition timing
2V	Oil Metering Pump		Yes	
2W	Oil Metering Pump		Yes	
2X	Eccentric shaft position sensor -		Yes	
2Y	Oil Metering Pump		Yes	
2Z	Rear (Rotor 2) leading ignition	Ignition output 4	No	Aux Output 1 cannot be used due to the fourth ignition output
2AA	Front (Rotor 1) leading ignition	Ignition output 1	No	
2AB	Oil Metering Pump		Yes	
2AC	Rear (Rotor 2) trailing ignition	Ignition output 3	No	
2AD	Front (Rotor 1) trailing ignition	Ignition output 2	No	

Factory Pin	Factory Function (NC means No Connection in factory loom)	Adaptronic Pin (blank means no connection to Adaptronic)	Still connected to factory ECU?	Comments
3A	Front (Rotor 1) primary 2 injector	Injector Output 2	No	The Adaptronic ECU fires both primary 2 injectors together
3B	APV position sensor	0-5V Ext/Spare input	Yes	
3C	NC			
3D	Rear (Rotor 2) primary 2 injector	Injector Output 2	No	The Adaptronic ECU fires both primary 2 injectors together
3E	NC			
3F	NC			
3G	APV motor control	Controlled by Aux Output 7 via additional high current circuitry inside the Adaptronic ECU	No	Auxiliary Port Valve
3H				
3I				
3J	APV motor control	Controlled by Aux Output 8 via additional high current circuitry inside the Adaptronic ECU	No	Auxiliary Port Valve
3K	NC			
3M	NC			
3N	NC			
3O	NC			
3P	NC			
3Q	NC			
3R	NC			
4A	Ground	Power Ground	Yes, shared with both ECUs	
4B	NC			
4C	Power from Drive-By-Wire relay		Yes	
4D	NC			
4E	Main Relay enable		Yes	
4F	Clutch switch	Digital Input 1	Yes, shared with both ECUs	
4H	NC			
4I	NC			
4J	Ground	Power Ground	Yes, shared with both ECUs	
4K	Barometric sensor power		Yes	
4L	NC			

Factory Pin	Factory Function (NC means No Connection in factory loom)	Adaptronic Pin (blank means no connection to Adaptronic)	Still connected to factory ECU?	Comments
4M	Fuel pump speed control		Yes	
4N	NC			
4O	Air pump relay		Yes	
4P	Brake switch		Yes	
4Q	Ignition switch	+12V Ignition	Yes, shared with both ECUs	
4S	CAN low		Yes	
4T	Coolant Level switch		Yes	
4U	Sensor ground		Yes	
4V	CAN high		Yes	
4W	High/Low A/C control		Yes	
4X	APP sensor power 2		Yes	
4Y	APP sensor power 1		Yes	
4Z	Medium A/C control		Yes	
5A	Starter		Yes	
5B	NC			
5C	APP sensor 2		Yes	
5D	Ground	Power Ground	Yes, shared with both ECUs	
5E	NC			
5F	APP sensor 1	Aux temp input	Yes	
5H	Drive-By-Wire relay		Yes	
5I	NC			
5J	Constant power		Yes	
5K	Intake air temperature sensor	Air Temp signal input	Yes, shared with both ECUs	
5L	Fuel pump relay		Yes	
5M	NC			
5N	Air flow meter signal	MAP signal input	Yes, shared with both ECUs	AFM signal pin can be used for MAP signal when fitting an external MAP sensor
5O	Ground	Power Ground	Yes, shared with both ECUs	
5P	Fuel pump relay		Yes	
5R	Ground	Power Ground	Yes, shared with both ECUs	
5S	Barometric pressure sensor		Yes	
5T	Ground	Power Ground	Yes, shared with both ECUs	
5U	Intake air temperature sensor ground		Yes	
5V	Cruise control switch		Yes	
5W	A/C amplifier		Yes	
5X	Cooling fan relay 1		Yes	
5Z	VFAD solenoid valve	Aux Output 2	No	Variable Fresh Air Duct
5AA	Aircon relay		Yes	

Factory Pin	Factory Function (NC means No Connection in factory loom)	Adaptronic Pin (blank means no connection to Adaptronic)	Still connected to factory ECU?	Comments
5AB	APP sensor ground 2		Yes	
5AC	Power from Main Relay		Yes	
5AD	Cooling fan relays 2 and 3		Yes	
5AE	APP sensor ground 1		Yes	
5AF	Power from Main Relay		Yes	
5AG	NC			
5AH	NC			

The following spare Adaptronic pins can be accessed by removing the ECU lid and fitting a plug on the 6-pin or 8-pin headers...

8-pin header:

Pin	Description	Comments
1	Sensor 5V supply	
2	Sensor Ground	
3	MAP signal	Connected to the Air Flow Meter signal pin (pin 5N)
4	Air Temperature signal	Connected to pin 5K
5	MVSS1 (master vehicle speed sensor 1)	
6	MVSS2 (master vehicle speed sensor 2)	
7	SVSS1 (slave vehicle speed sensor 1)	
8	SVSS2 (slave vehicle speed sensor 2)	

6-pin header:

Pin	Description	Comments
1	CAS3	Can be used for flex fuel sensor input
2	Aux Temperature signal	Temperature sensors must be wired with one wire to sensor ground and the other wire to the ECU signal input
3	Aux Output 5	Low current, only suitable for low current loads such as relay coils
4	Aux Output 6	Low current, only suitable for low current loads such as relay coils
5	Digital Input 7	
6	Digital Input 8	

Load Sensing Options:

Option	Description	Comments	How to
1	Select ECU internal MAP sensor (recommended option)	Simple, up to 43psi boost	Simply run a hose from the barb on the ECU to the engine bay. Base map is configured for using the first port after the throttle body.
2	Standard Air Flow Meter (AFM) (naturally aspirated only)	Simple, but limited range	No mechanical or electrical changes required.
3	External MAP sensor using AFM wiring	Nothing through firewall, sensing range dependent only on chosen sensor	In the engine bay, use the AFM signal wire for the MAP signal wire, and use the 5V and Ground wires from the TPS to power the external MAP sensor.
4	External MAP sensor with separate wiring	3 wires from ECU to sensor, sensing range dependent only on chosen sensor	Run 3 wires from the 5V, Ground, and MAP signal pins on the 8-pin header, out to the external MAP sensor in the engine bay.

Other RX8 Specific notes:

Diagram on the right shows the MAP sensor hose location, when looking from the left hand side of the car towards the plastic plenum:



Injector staging:

From the factory, the RX8 series 1 has 3 levels of staging: Primary 1, Primary 2, and Secondary. Primary 1 and Primary 2 injectors are both 290cc/minute, and Secondary is 380cc/minute. The Select RX8 ECU will recognise that it is configured for an RX8, and deliver the first amount of fuel to the primary 1 injectors, sequentially. Any remainder of fuel quantity required which can not be delivered by the primary 1 injectors (due to lack of available on-time) will be at first delivered to the primary 2 injectors, which are fired together, once every 360 degrees. Any remaining fuel requirement not fulfilled by Primary 1 and Primary 2 injectors will be met by the Secondary injectors, which are also fired every together every 360 degrees. The flow rates of the 3 levels of injector staging can be set in the Tuning Modes tabsheet in WARI, allowing you to change injector sizes.

Note that you MUST configure the SSV (aux output 4) to open whenever the secondary injectors will be open. The SSV can be open at other times as well (when the additional airflow generates more torque), but if the secondary injectors are firing and the SSV is closed, the fuel will not get into the engine.

Valves and flaps:

There are 4 valves on the RX8 engine, controlled by various aux outputs on the ECU:

The SSV is controlled by aux output 4, and is typically an AND result of RPM and MAP, for example so that it opens above 4000 RPM and above 80 kPa MAP. The solenoid activates a vacuum valve which opens the secondary port valves. These runners hold the secondary injectors so it is imperative that this output is activated whenever the secondary injectors are in use.

The VFAD is controlled by aux output 2, and is typically activated above a certain RPM. It operates a vacuum valve which opens a flap in the airbox to allow fresh air (at the expense of greater acoustic noise). This is often removed if the airbox is modified, and the output can be redeployed (eg for boost control).

The VDI is a flap between the two main intake runners, and is controlled by aux output 3. On a naturally aspirated engine it assists with torque above about 7900 RPM. On a turbocharged engine it seems not to help with torque production (ie, better to leave it off).

The APV, auxiliary port valve, is controlled by a DC motor which can drive backwards and forwards. Closing the valves assists with torque production at low and medium RPM (up to about 6000 RPM), and above 6500 RPM the APV needs to be fully open. The setting for the open and closing is done by setting the RPM based switchpoint to change the idle position, where 100 = fully closed and 0 = fully open. The output is controlled by idle up/down functions. The default behaviour is against RPM only but can be changed to be dependent on RPM and load.

