

NISMO PICK'S 280ZXT TO Z31T ECU / MAF SWAP GUIDE

PROCEDURE AND INFORMATION – V1 OFFICIAL – 03/29/16

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PURPOSE:

The 81-83 Datsun 280ZX Turbo (S130) and 84-89 Nissan 300ZX Turbo (Z31) both use Nissan's ECCS fuel injection system. The Z31T ECU is virtually plug & play into the 280ZXT EFI harness with a few quick wiring changes. Benefits of this upgrade include: updated fuel and ignition timing control, less airflow restriction, option to use NIStune, PocketROM, JWT, AFC or similar aftermarket programmable ECU controls, ECU diagnostic codes, wiring fixes, etc. This swap alone will only add about 10hp, but eliminates the troublesome AFM and wiring bugs of the 280ZXT. Running with a boost controller and intercooler, the Z31T ECU will make big improvements.

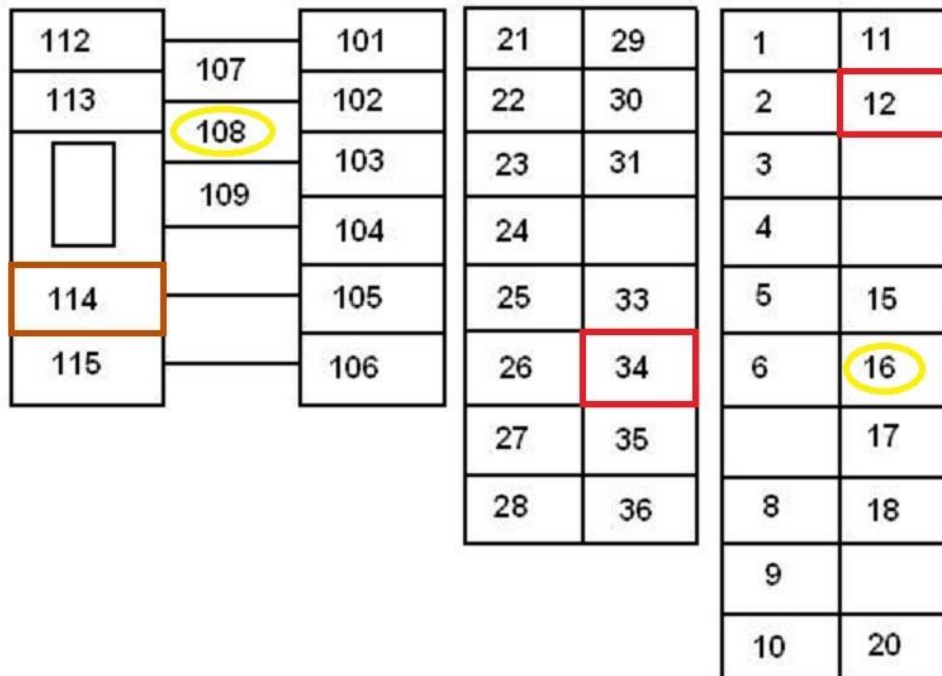
NOTE:

The Z31T had several EFI changes throughout its production that may affect your installation procedure. Details will be discussed below, but be aware of ECU high / low impedance, *o2 sensor type, and internal circuit boards. Before attempting this swap, read these steps many times to become familiar with the nomenclature. Also print out and study the wiring schematics.

PARTS NEEDED:

- Any year Z31 MAF (Mass Air Flow Sensor). Yellow sticker = Federal, blue sticker = California.
- 84-85 Z31T ECU is direct plug & play, 86-87T requires Titania O2 sensor, 88-89T is high impedance and requires Titania O2 sensor.
- Any year VG30E(T) or VG33E distributor encoder disc (chopper wheel). It's also a good idea to use its associated CAS (Crank Angle Sensor) as the 280ZXT's is only gel covered.
- Any year Z31 ECU and MAF plugs (CA emissions MAF only has 5 pins).
- Several spools of automotive wire.
- Soldering kit.
- Wire heat shrink and electrical tape.
- *If using 86-89T ECU: Titania O2 sensor.
- If using 88-89T ECU: Six drop resistors (6.8 ohm / 10watt). 81T already has drop resistors.
- 81T needs the 82-83T distributor and shaft.

ECU PLUGS: PINOUT WITH MARKED NEEDED CHANGES:



PROCEDURE:

Wiring colors: B = black, G = green, L = blue, R = red, W = white, Y = yellow

Connecting the ECU

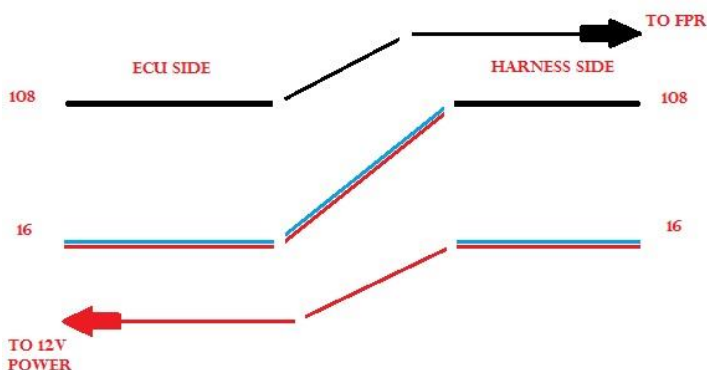
1. Insert new wire (from Z31 ECU plug) into empty pin 12 of ECU connector then cut wire 33 Y/L with several inches of wire. Attach to new pin 12. So pin 12 from the Z31 ECU thru wire 33 Y/L will be connected to the 12 R/W wire on the MAF (marked as F). Now the ECU will be able to self clean the MAF filament. Z31T ECU pin 33 is not used and can be taped off.
2. Insert new wire (from Z31 ECU plug) into empty pin 34 of ECU connector then connect it to a new wire going to 12v switched power (27 / 35 B/W from fuel pump control module sub harness).
3. For 81T harness, insert new wire into empty pin 114, connect to direct battery power (fused).

Connecting the Air Regulator

1. The air regulator was controlled thru pin 108 B on the 280ZXT ECU (which controls the FPR on the Z31T ECU). Cut pins 108 B and 16 L/R coming out of the ECU connectors with several inches of wire.
2. Connect harness side of 108 to ECU pin 16 and now the Z31T ECU will control the air regulator from ECU pin 16.

Connecting the Fuel Pump Relay (FPR)

1. Connect the remaining harness side of pin 16 L/R (12v+ power source for turning on relay) to 12v switched power (27 / 35 B/W from fuel pump control module sub harness).
2. Remove glove box and with flashlight locate the green FPR (removing dash may be easier). Cut black wire (ground source used to turn on relay) before FPR and connect relay side of black wire to new wire. Run new wire under dash to ECU pin 108 (just cut from above step) on the ECU connector. The Z31T ECU now controls the FPR ground from ECU pin 108.



Electrical System Inspection – ENGINE FUEL & EMISSION CONTROL SYSTEM

CHECKING FUEL PUMP RELAY

The fuel pump relay is installed on the dash right side.

1 Seat belt warning
linter unit
2 Fuel pump relay
3 Ignition relay
4 Accessory relay
5 Fan motor timer unit

Check terminals	Normal condition	12V direct current is applied between terminals ① and ②
① - ②	Continuity	—
③ - ⑤	No continuity	Continuity
③ - ⑥	Continuity	No continuity

If test is O.K., check harness.
If test is not O.K., replace relay and retest.

Connecting the MAF

1. Connect MAF Position A/wire 30 Y/G to 30 Y/B wire from 280ZXT harness.
2. Connect MAF Position B/wire 31 B to 31 Y/R wire from 280ZXT harness.
3. Connect MAF Position C/wire B to body ground.
4. Connect MAF Position D/wire 26 B to 26 B wire from 280ZXT harness.
5. Connect MAF Position E/wire Run new wire to 27/35 B/W (V.C.M solenoid power source located under the AFM bracket).
6. Connect MAF Position F/wire 12 R/W (for cleaning cycle) to 33 Y/L wire from 280ZXT harness.

Installing the distributor encoder disc

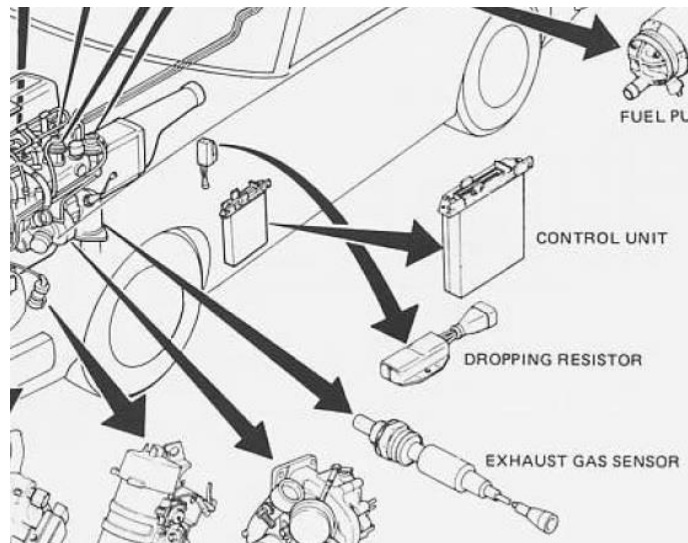
1. Remove distributor cap, then rotor.
2. Under the rotor is a Phillips / Flathead screw. With the appropriate screwdriver, apply pressure and remove screw.
3. Remove rotor mount, then remove 280ZXT encoder disc.
4. Install new encoder disc opposite of removal. Make sure to install with number stamp UP.
5. For 81T needing the 82-83T distributor, see procedure on ZDriver:

<http://www.zdriver.com/forums/280zx-s130-forums-77/turbo-distributor-swap-guide-how-fix-maxed-out-timing-40948/>



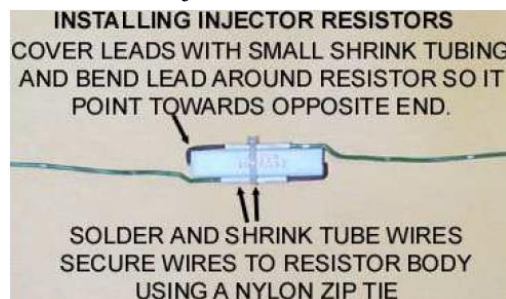
81T: Disconnect drop resistor pack (if using 84-87T Z31 ECU)

You can either create a set of 6-to-1 spade jumpers to fit into the resistor plug, or cut out the plug entirely and connect all 7 wires together (1 hot + 6 injectors). Do not bypass resistors if using the 88-89T Z31 ECU).



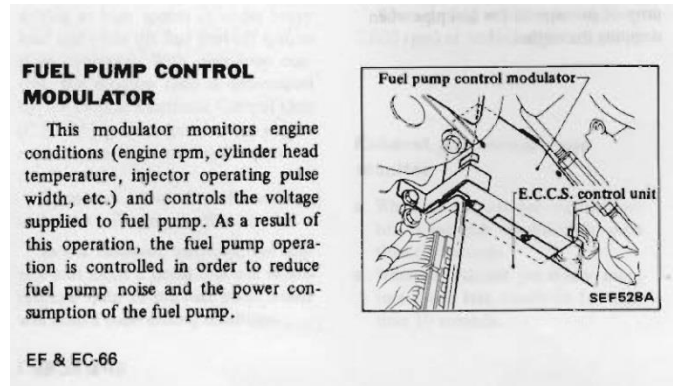
88-89T ECU: Adding drop resistors

If you choose to keep the stock low impedance injectors with the 88-89T, you will need to add 6 drop resistors inline with the power wires to each injector. Use 6.8 ohm 10watt resistors, offset one by one so they don't bulge the harness.



82-83T: Disconnect and remove Fuel Pump Control Module

The Z31T ECU does not use a FPCM, instead internally controlling the FPR ground. Remove FPCM and tape up plug / connector. 81T does not have a FPCM.



Disconnect the VCM for the AAC and EGR

The Z31T ECU does not use the same style AAC and EGR systems. You may leave the AAC and EGR actuators in place on the manifold, but they won't function. Remove the VCM solenoid and cap any open vacuum lines. **FYI: If you remove the AAC actuator, you will need to adjust the throttle body stop screw for idle RPM's.

Disconnect Detonation Sensor

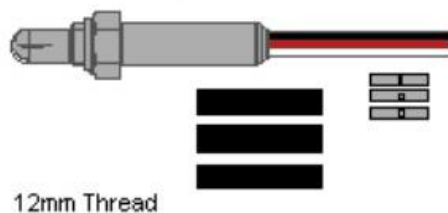
The Z31T ECU does not use the same signal for the detonation sensor. Disconnect and tape up wires, located on right side of block, by oil filter.

*Titania O2 Sensor

The 86-89T ECU requires the use of a heated Titania O2 sensor. You can either use an 18mm to 12mm adapter bung or weld in a new M12x1.25 O2 sensor bung.

NGK 24007 Titania O2 sensor can be found on eBay for \$12.50 shipped.

1. Connect Black wire to ECU pin 24.
2. Connect Red heater wire to switched 12v power.
3. Connect White heater wire to ECU pin 115.

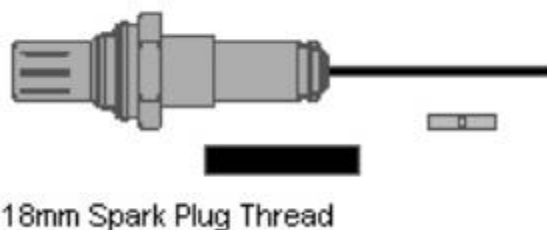


Three Wire Titania Sensor

Colour Connection
Black Ref. (out)
Red Ref. (in) and Heater (+)
White Heater (-)

250-23880

Universal Titania Sensor
Output 0 to 1 Volt*
*(See below)



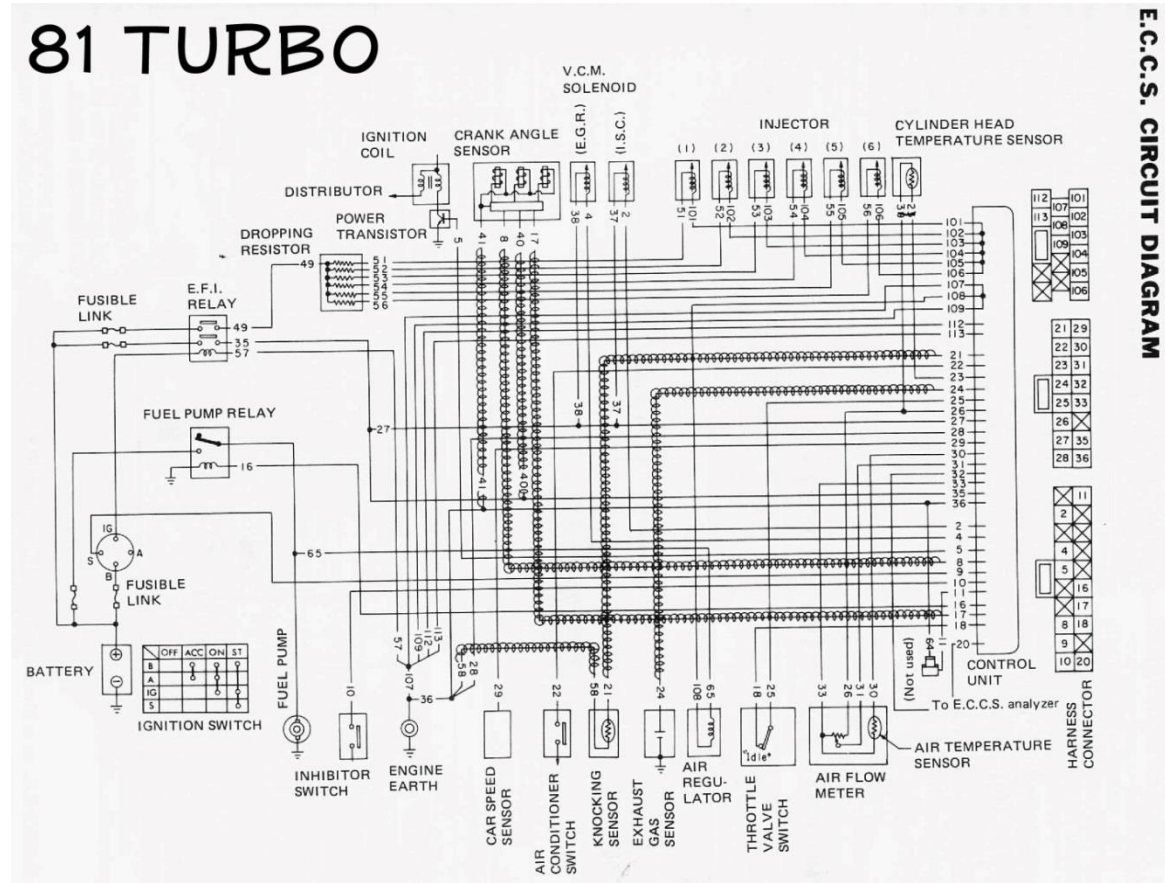
One Wire Zirconia Sensor

Output 0.1 to 0.9 Volt

Colour Connection
Black - Signal

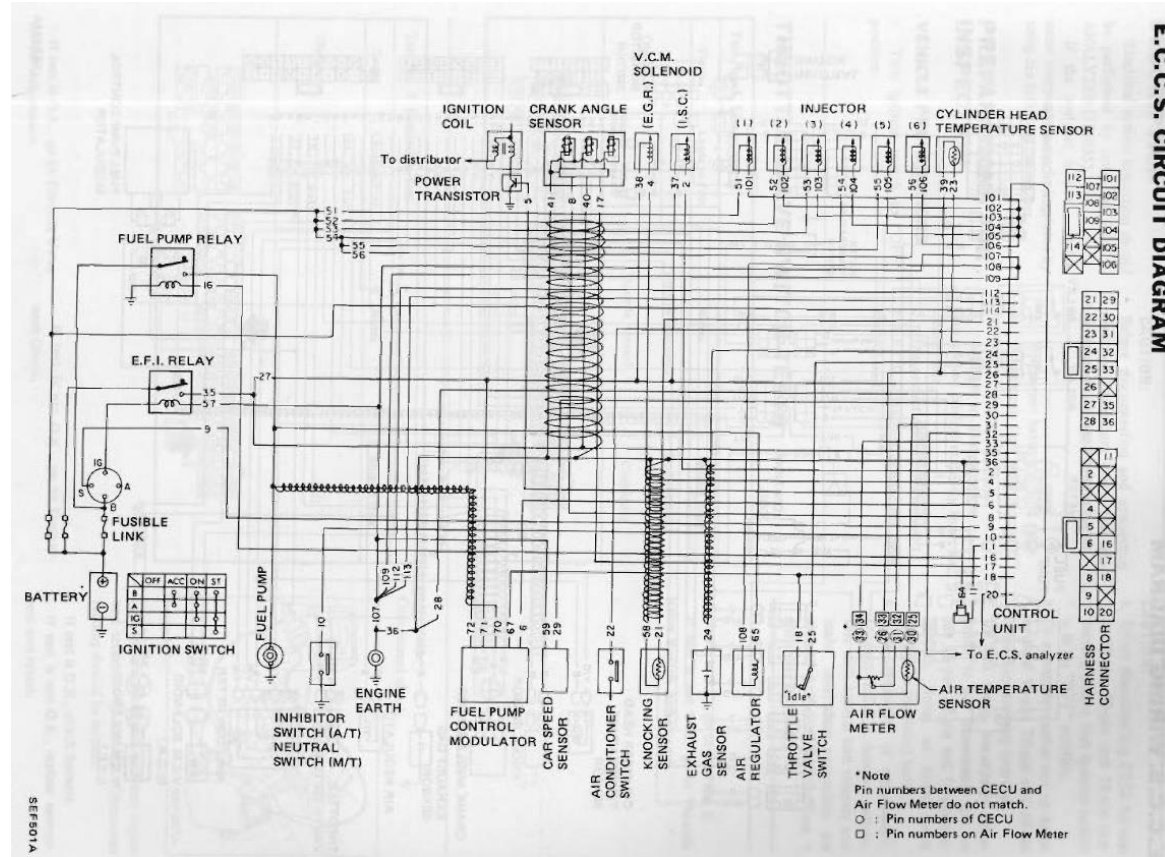
SUPPLEMENTAL DOCUMENTATION:
FSM EFI Schematics:

81 TURBO



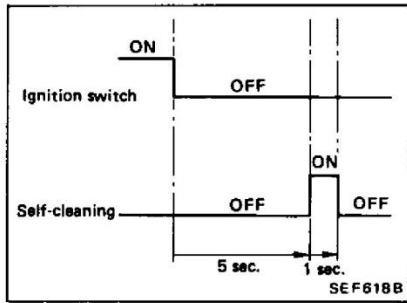
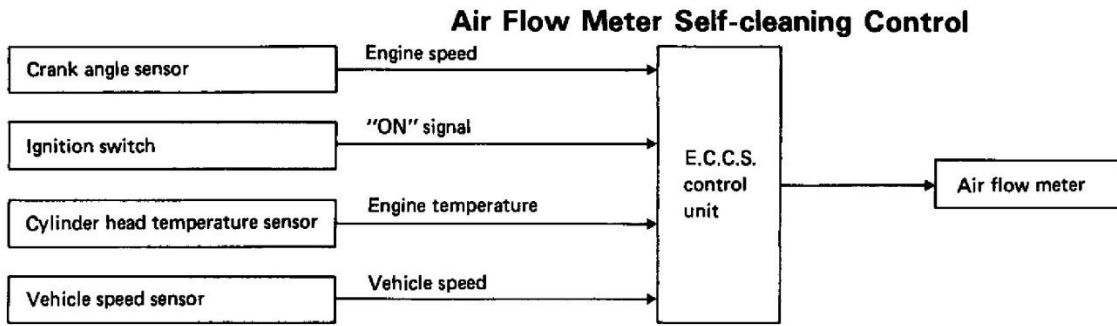
E.C.C.S. CIRCUIT DIAGRAM

82-83T ECU:



E.C.C.S. CIRCUIT DIAGRAM

E.C.C.S. DESCRIPTION



Description

After the engine is stopped, the E.C.U. heats up the hot wire to approximately 1,000°C (1,832°F) to burn out dust which adhered to the hot wire.

Operation

Condition	Self-cleaning system
<ul style="list-style-type: none"> • Engine speed has not exceeded 1,500 rpm before key off. • Vehicle speed has not exceeded 20 km/h (12 MPH) before key off. • Cylinder head temperature is higher than 115°C (239°F) when key off. • Engine stall with key in ON position. 	Does not operate
Except as shown above	Operates

Comparison chart of ECU pins throughout the years:

ECU PIN#	82-83 280ZX Turbo	84-86 Z31 Turbo	87 Z31T	88 Z31T	NOTES
1	not used	not used	DIAGNOSTICS	DIAGNOSTICS	
2	AAC	AAC	AAC	AAC / IDLE UP	Not compatible. Remove 280zxt's AAC / EGR vacuum module.
3	not used	IGN COIL	IGN COIL	IGN COIL	
4	EGR	EGR	EGR	EGR	Not compatible. Remove 280zxt's AAC / EGR vacuum module.
5	IGN COIL	IGN COIL	IGN COIL	IGN COIL	
6	not used	EFI RELAY	EFI RELAY	EFI RELAY	
7	not used	not used	DIGI COMBO METER	DIGI COMBO METER	
8	C.A.S.	C.A.S.	C.A.S.	C.A.S.	
9	FUSE LINK	IGN START	IGN START	IGN START	
10	INHIBIT SWITCH	NEUTRAL SWITCH	NEUTRAL SWITCH	NEUTRAL SWITCH	
11	not used	not used	DIAGNOSTICS	DIAGNOSTICS	
12	not used	AFM (MAF)	AFM (MAF)	AFM (MAF)	Add pin to 280zxt ecu plug: attach to 280zx wire 33 y/l
13	not used	not used	DIAGNOSTICS	DIAGNOSTICS	
14	not used	not used	AIV CONTROL	AIV CONTROL	
15	not used	FUEL TEMP SENSOR	FUEL TEMP SENSOR	FUEL TEMP SENSOR	
16	FPUMP RELAY	AIR REGULATO R	AIR REGULATOR	AIR REGULATOR	Swap w/ #108. This wire now controls the air regulator.
17	C.A.S.	C.A.S.	C.A.S.	C.A.S.	
18	TPS	TPS	TPS (IDLE SWITCH)	TPS (IDLE SWITCH)	
19	not used	not used	PR CONTROL	PR CONTROL	
20	ANALIZER	FUEL PUMP RELAY	FUEL PUMP RELAY	FUEL PUMP RELAY	
21	KNOCK SENSOR	KNOCK SENSOR	KNOCK SENSOR	KNOCK SENSOR	
22	A/C	A/C	A/C	A/C	
23	CHTS	CHTS	CHTS	CHTS	
24	O2 SENSOR	O2 SENSOR	O2 SENSOR	O2 SENSOR	
25	TPS	TPS	TPS (IDLE SWITCH)	TPS (IDLE SWITCH)	
26	AFM SWITCHED	AFM (MAF) SWITCHED	AFM (MAF) SWITCHED	AFM (MAF) SWITCHED	
27	POWER	POWER	POWER	POWER	
28	GROUND	GROUND	GROUND	GROUND	
29	SPEED SENSOR	SPEED SENSOR	SPEED SENSOR	SPEED SENSOR	
30	AIR TEMP	AFM (MAF)	AFM (MAF)	AFM (MAF)	EGT (CAL)
31	AFM	AFM (MAF)	AFM (MAF)	AFM (MAF)	
32	ANALYZER	not used	DIAGNOSTICS	DIAGNOSTICS	
33	AFM	not used	not used	THROTTLE SENSOR	
34	not used	IGN EFI FUSE	IGN EFI FUSE	IGN EFI FUSE	Add pin to 280zxt ecu plug: attach to + switched power (black white stripe: 27 / 35)
35	EFI RELAY	SWITCHED POWER (MAF)	SWITCHED POWER	SWITCHED POWER	
36	GROUND	GROUND	GROUND	GROUND	

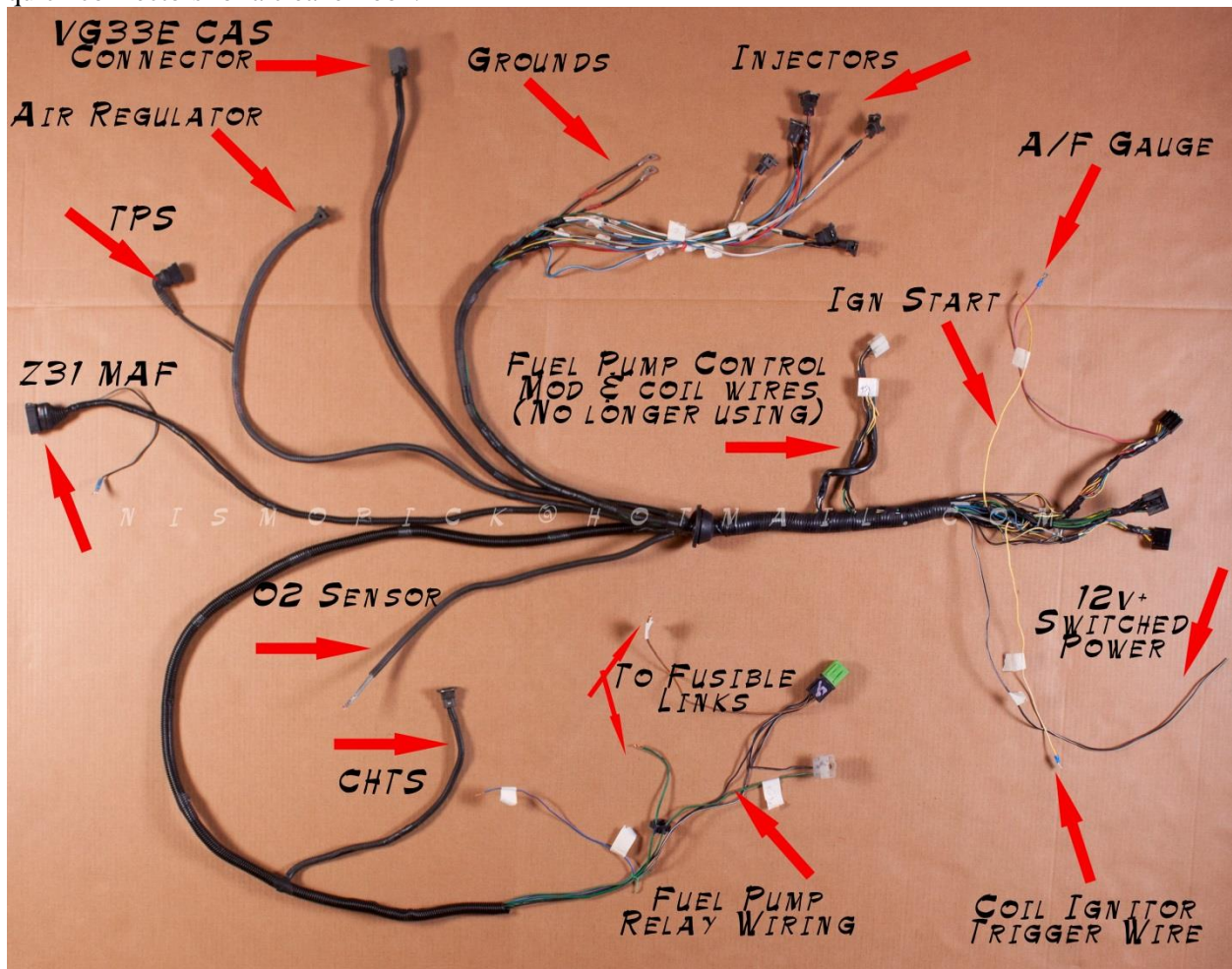
101	INJECTOR 1	INJECTOR 1	INJECTOR 1	INJECTOR 1
102	INJECTOR 2	INJECTOR 2	INJECTOR 2	INJECTOR 2
103	INJECTOR 3	INJECTOR 3	INJECTOR 3	INJECTOR 3
104	INJECTOR 4	INJECTOR 4	INJECTOR 4	INJECTOR 4
105	INJECTOR 5	INJECTOR 5	INJECTOR 5	INJECTOR 5
106	INJECTOR 6	INJECTOR 6	INJECTOR 6	INJECTOR 6
107	GROUND	GROUND	GROUND	GROUND
108	AIR REGULATOR	FUEL PUMP	FUEL PUMP	FUEL PUMP
109	GROUND	GROUND	GROUND	GROUND
110	not used	not used	not used	THROTTLE SENSOR LOCKUP CONTROL
111	not used	not used	not used	GROUND
112	GROUND	GROUND	GROUND	GROUND
113	GROUND	GROUND	GROUND	GROUND
114	DIRECT 12V POWER	DIRECT 12V POWER	DIRECT 12V POWER	DIRECT 12V POWER
115	not used	PRESSURE REG	O2 SENSOR (GROUND)	O2 SENSOR (GROUND)

Swap w/ #16. This wire now grounds the fuel pump relay

82-83 280zxt's have this wire. On 81 this wire must be added.

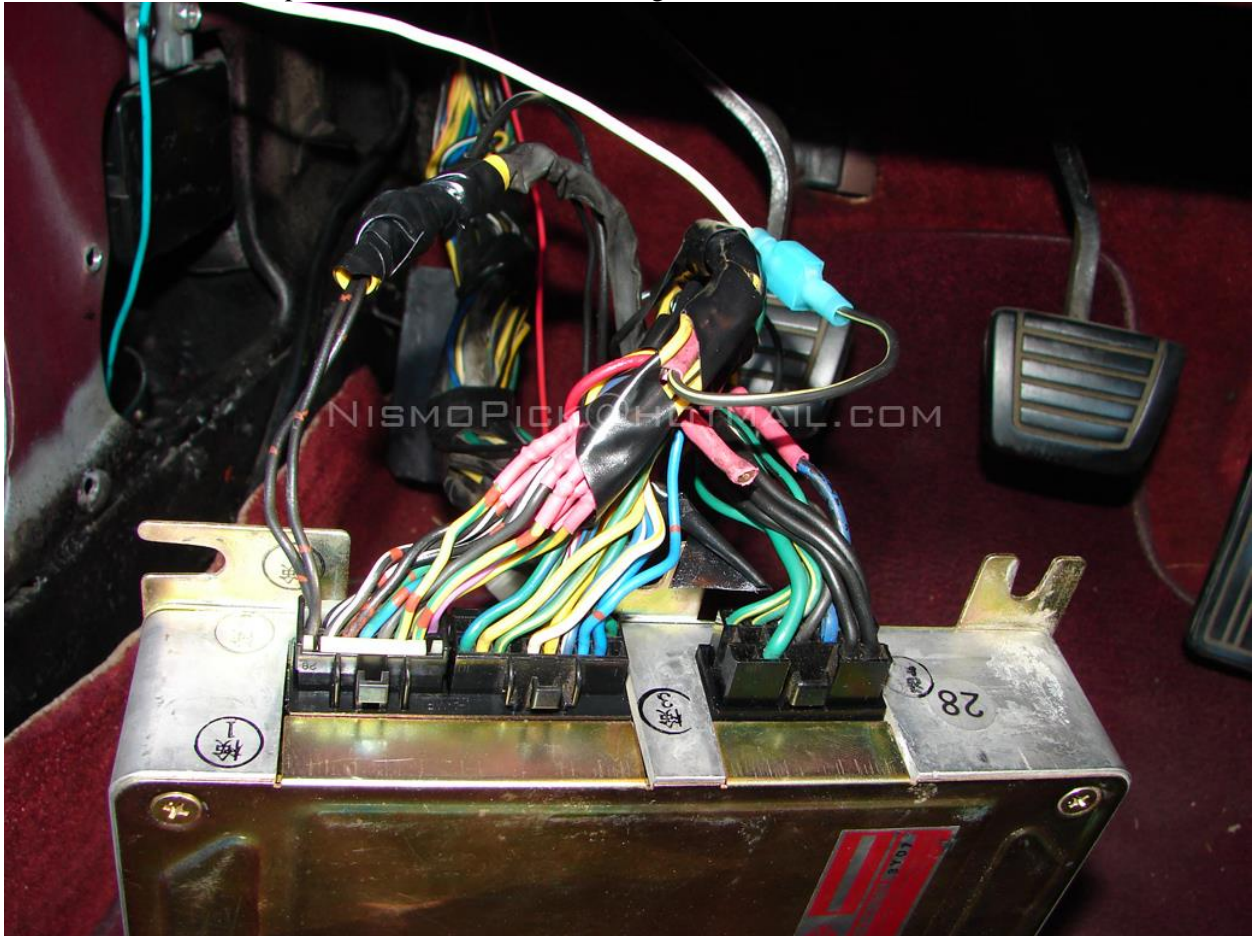
82 280ZXT harness pulled from car and upgraded for Z31T ECU:

Notice that the detonation sensor wire was removed, FPR wire tucked back into loom, and new EV1 quick connectors for a cleaner look.



Alternative option to adding ECU pins:

Completely chop out 280ZXT ECU plugs and solder in Z31 plugs which holds in the pins more securely. Ground wires on left in picture are notorious for causing 280ZXT EFI issues.



Complete kit:



SOURCES:

- Nissan Factory Service Manuals. Hard copies, and PDF downloads from <http://www.xenonzcar.com>
- Original swap how-to by *Afshin*: <http://forums.hybridz.org/topic/26230-z31300zx-ecumaf-to-280zxt-swap-guide/>
- 81T supplement by *280Z Turbo*: <http://forums.hybridz.org/topic/49087-z31300zx-ecumaf-to-280zxt-swap-guide-1981-supplement/>
- Jim Wolf Tech 280ZXT 450HP Upgrade: <http://jimwolftechnology.com/wolfpdf/280%20Z31%20450HP%20UPGRADE.PDF>
- NIStune: <http://www.nistune.com/support-documentation-installation.php>

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