TYPE #4

Hardware Installation – Type 4 boards (V1.9.1)

(JECS 1990-2001 Engine Control Units)

INTRODUCTION

Welcome to Nistune.

The Nistune hardware and software solution provides a means for the car enthusiast to retune their vehicle whilst retaining their factory ECU and its default programming.

This solution provides many advantages over aftermarket ECUs in that the:

- Factory default tuning is maintained once the NIStune board is installed. Upon installation of the board, vehicle will be operational as usual.

- Additional tuning can then be made against the factory maps for modifications made to the vehicle. There is no need to tune the car to get it running from scratch, reducing time and costs of tuning required on dyno.

- There is no need for wiring loom modifications.

NIStune provides real-time tuning and maptracing. It provides the ability to make changes to the factory ECU while it is running the vehicle. When the desired results are achieved they are saved permanently to the NIStune real-time board (in non-volatile memory).

NIStune also provides data logging and playback facilities using the Nissan Consult Port. NIStune software also provides a user friendly, responsive graphical interface to perform modifications.

Contained in this manual are the instructions for installing a Type 4 NIStune board into the Nissan (JECS) ECU's containing the Mitsubishi 7700 series microcontroller. These ECU's support the use of the "Consult" diagnostic port – through which NIStune communicates.

Type NIStune board vehicle application list

Model	Name	Engine	ECU series	Comments
B14	Sentra	SR20DE	OM76x, 1M86x, 2M08x	to 1997
N15	Pulsar	GA16DE	1N90x, 1N91x	
N15	Almera Gti	SR20DE	1N4xx	
P11	Primera	SR20DE	3J4xx, 3J5xx, 3J8xx, 3J9xx	
G20	Infiniti	SR20DE	0J2xx, 0J6xx	to 1995 only
S13	180SX late	SR20DET	60Fxx	1994 – 1999 (Type X/R)
S14A	Silvia/200SX	SR20DET	80Fxx, 82Fxx, 83Fxx	
S15	Silvia/200SX	SR20DET	91Fxx, 93Fxx	
W10	Avenir	SR20DET	95Nxx	Late W10 only (1997>)
S14	240SX	KA24DE	70Fxx	1995 (takes regular T4 board)
S14	240SX	KA24DE	72Fxx	1996 (takes Dual ROM T4 board)
ER34	Skyline	RB25DET	AA5xx	
WC34	Stagea S2	RB25DET	0V8xx	JECS ECU only (NEO engine)
U13	Altima	KA24DE	4E8xx	to 1995 only
Y33	Cedric	VQ30DE(T)	4P2xx, 5P7xx, 6P5xx	
K11	Micra	CG13DE	74Bxx	"facelift" model 98-02
A32	Maxima	VQ30DE	40Uxx, 49Uxx, 54Uxx	1995 (takes Dual ROM T4 board)
A32	Maxima	VQ30DE	54Uxx	1996 (takes Dual ROM T4 board)
Z32	300ZX	VG30DETT	54Pxx	1996 (takes Dual ROM T4 board)

IMPORTANT INFORMATION

Nistune Developments has performed necessary measures to ensure that the Nistune software and boards are built to high standards. However Nistune Developments will not be held responsible for any damages which may arise from the use or misuse of this product. By using this product you agree to the following terms:

IMPORTANT - READ CAREFULLY: This License Agreement is a legal agreement between you and Nistune Developments for the software product Nistune. The software product includes computer software, the media belonging to it, printed materials and electronic documentation. With installing, copying or any other use of this software product, you agree to the terms of this agreement. If you do not agree to the terms of this agreement, you are not allowed to use or copy this software product. Further you are required to remove the software product from your computer.

1. GRANT OF LICENSE
You are granted a license as a single user of this software. You are allowed to install and use this software freely. However you may not install this software for another user and may only make a single backup. The software may be installed on multiple machines belonging to the single user whilst those machines remain property of that single user. Regardless of other rights, the author of the software product is allowed to terminate this license agreement if you offend against the determinations and conditions of this agreement. If so, you will have to remove all copies of the Software and its components.

2. COPYRIGHT
You may not copy, modify or distribute the Software except under the terms given in this licence document. You may not sublicense the Software or in any way place it under any other licence than this one. The Software is protected by copyright laws of the Australia and international copyright treaties. Copyright and property right of the software product are set to the authors of the software. You do not purchase any rights on the Software except those called in this license agreement.

3. TERM
Your license is effective upon your acceptance of this agreement and installing the Licensed Product. You may terminate it at any time by destroying the Licensed Product together with all copies. It will also terminate upon conditions set forth elsewhere in this Agreement or if you fail to comply with any term or condition of this Agreement. You agree upon such termination to destroy all copies of the Licensed Product in any form in your possession or under your control.

4. DECOMPILING
You agree not to reverse engineer the Software, change, spilt, decompile, disassemble or translate the Software in part or in whole, without prior written consent from Nistune Developments.

5. UPDATES
Nistune Developments may, from time to time, revise or update the product. In so doing, Nistune Developments incurs no obligation to furnish such revision or updates to you.

6. WARRANTY
The author of this Software has verified as best as possible to make sure the main features and functions work as described while normal usage on compatible equipment. Due to the complexity of computer software, we cannot guarantee that the software or documents does not contain errors or works without intermissions on any equipment and software configuration. The Software and the documentation are distributed in the state as present and you accept all risks with the usage. The author does not take any warranty either express or implied to the software or the documentation about its fitness generally or its qualification for special purposes except those warranties that have to be applied through obliged laws and that cannot be excluded. You know that you have to regularly backup your data and that you have to affect additional security provisions if a software error is supposed. The entire risk as to the quality and performance of the Software is with you. Should the Software prove defective, you assume the cost of all necessary servicing, repair, legal defence, punishment, damages or correction.

NISTUNE DEVELOPMENTS OFFERS NO WARRANTY OF PERFORMANCE, EXPRESS OR IMPLIED, WITH REGARD TO THE LICENSED PRODUCT AND ALL ACCOMPANYING MATERIALS. NISTUNE DEVELOPMENTS FURTHER DISCLAIMS ALL OTHER WARRANTIES, EXPRESS OR IMPLIED, INCLUDING BUT NOT LIMITED TO THE IMPLIED WARRANTIES OF MERCHANTABILITY AND FITNESS FOR A PARTICULAR PURPOSE, WITH REGARD TO THE LICENSED PRODUCT AND ALL ACCOMPANYING MATERIALS.

7. DISCLAIMER OF LIABILITY

NO LIABILITY FOR CONSEQUENTIAL DAMAGES. IN NO EVENT SHALL NISTUNE DEVELOPMENTS BE LIABLE FOR ANY SPECIAL, INCIDENTAL, INDIRECT, OR CONSEQUENTIAL DAMAGES WHATSOEVER (INCLUDING, WITHOUT LIMITATION, DAMAGES FOR LOSS OF BUSINESS PROFITS, BUSINESS INTERRUPTION, LOSS OF BUSINESS INFORMATION, OR ANY OTHER PECUNIARY LOSS) ARISING OUT OF THE USE OF OR INABILITY TO USE THE NISTUNE PRODUCT, EVEN IF NISTUNE DEVELOPMENTS HAS BEEN ADVISED OF THE POSSIBILITY OF SUCH DAMAGES.

IN NO EVENT WILL NISTUNE DEVELOPMENTS BE LIABLE FOR ANY COMPUTER DAMAGE, VEHICLE DAMAGE, PERSONAL INJURY, DEATH, FINES, LAWSUITS, PROSECUTION, LOST PROFITS, LOST DATA, INCORRECT DATA, ENVIRONMENTAL DAMAGE, GOVERNMENT, LAW AND REGULATORY VIOLATIONS OR ANY OTHER INCIDENTAL OR CONSEQUENTIAL DAMAGES THAT RESULT FROM USE OR INABILITY TO USE THE NISTUNE PRODUCT.

THE NISTUNE PRODUCT IS NOT INTENDED FOR USE IN OPERATION OF MOTOR VEHICLES AND/OR MACHINES WHERE THE USE, FAILURE OR MISUSE OF THE SOFTWARE COULD LEAD TO DEATH, PERSONAL INJURY OR PHYSICAL OR ENVIRONMENTAL DAMAGE AND OR VIOLATE ANY ENVIRONMENTAL, SAFETY, TRANSPORTATION OR OTHER LAWS OR REGULATIONS.

IT IS THE USER'S RESPONSIBILITY TO OBTAIN ANY CERTIFICATION, RECERTIFICATION OR NEW CLASSIFICATIONS PERTAINING TO USE OF THE NISTUNE PRODUCT. WHERE THE LIMITATION OF LIABILITY FOR INCIDENTAL OR CONSEQUENTIAL DAMAGES IS NOT ALLOWED, NISTUNE DEVELOPMENTS TOTAL LIABLITY TO YOU FOR ALL DAMAGES WILL NOT EXCEED $1.00 AUD. NISTUNE PRODUCT INSTALLATION REMAINS THE SOLE RESPONSIBILITY OF THE VEHICLE OWNER.

8. GENERAL
This License is personal between you and Nistune Developments. It is not transferable and any attempt by you to rent, lease, sublicense, assign or transfer any of the rights, duties or obligations hereunder, except as provided in Section 2, above, is void. This Agreement and the conduct of the parties hereto shall be governed by the laws of the Australia.

YOU ACKNOWLEDGE THAT YOU HAVE READ THIS AGREEMENT, UNDERSTAND IT AND AGREE TO BE BOUND BY ITS TERMS AND CONDITIONS. YOU FURTHER AGREE THAT IT IS THE COMPLETE AND EXCLUSIVE STATEMENT OF THE AGREEMENT BETWEEN YOU AND NISTUNE DEVELOPMENTS WHICH SUPERSEDES ANY PROPOSAL OR PRIOR AGREEMENT, ORAL OR WRITTEN, AND ANY OTHER COMMUNICATIONS BETWEEN YOU AND NISTUNE DEVELOPMENTS RELATING TO THE PRODUCT.

TABLE OF CONTENTS

- **ECU covers removal**

Tip : The screws that secure the covers will have thread locking compound applied from factory. This is a high strength locking compound so make sure you use a screwdriver with a tip which fits the screw head properly. We use a cordless drill-driver. The combination of quality screwdriver tips available and being able to use an adjustable clutch makes this method far superior.

- **Conformal coating removal**

Remove the coating from around the header on both top and bottom of ECU circuit board and around SMD jumpers using solvent or contact cleaner (see later in document for jumper details).

- **Solder removal**

Using a de-soldering gun with a small tip carefully remove the solder for the connector matching your ECU type. This is best performed from the rear of the board.
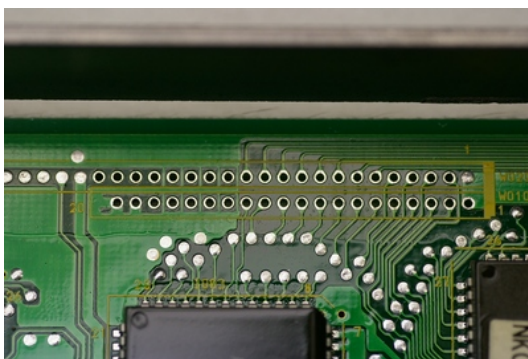
Pads de-soldered for Adaptor A

Adaptor A

SR20DET from Late S13 180SX, S14A & S15, UK N15 Almera GTi, P11 Primera, Late W10 Avenir, Late K11 Micra 98-02.

On W010 (20 pads) de-solder pads 1 - 20
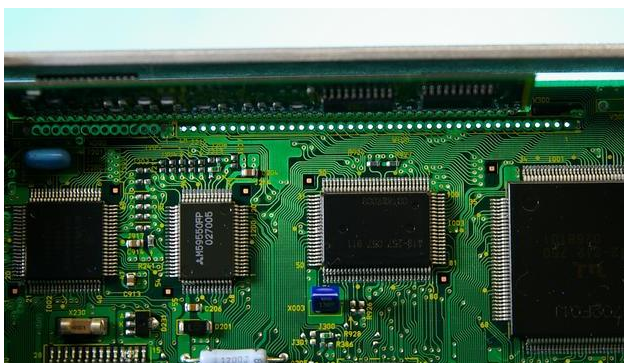On W020 (30 pads) de-solder pads 2 – 21

Note the 1 pad offset between the two rows.

Adaptor B

S14 KA24DE/U13 KA24DE/N15 GA16DE/B14 SR20DE/A32 VQ30DE/Z32 VG30DETT 1996 - De-solder the W001 row of pads 1 - 40 (outside row).

Y33 VQ30 – de-solder W010 pads 1 - 40 (no photo currently available).
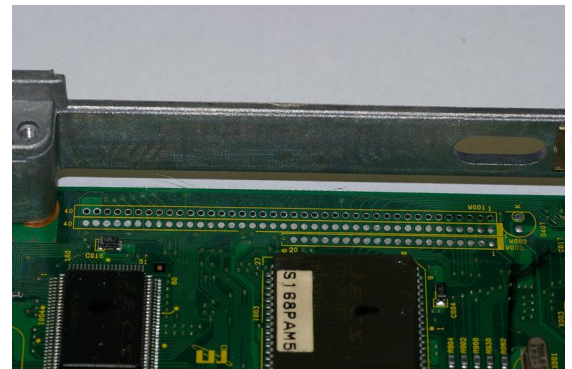
Pads de-soldered for Adaptor B

Adaptor C

ER34 RB25DET / WC34 RB25DET (series 2)
De-solder the W100 row of pads 1 - 40 (inside row)

Autos will have the outside row of pads already used by a board containing auto control circuitry, as shown in this photo. You may need to carefully bend this board towards the ECU wall to obtain clearance.

Pads de-soldered for Adaptor C

Tips: The best way to de-solder the pads is to run a line of flux down the row of pads you intend to work on. This will provide a heat-bridge between the de-soldering gun and the solder in the pads. Do not push on the pads otherwise you will damage them – try to hold the iron so it only just touches the pad.

Note that these ECUs use multi layered boards. The middle layer usually consists of ground and VCC copper planes. These absorb a lot of heat and make the de-soldering process quite difficult, due the amount of temperature they soak up from the gun. Heating the area with a hot air gun will help. Apply heat mainly from rear of board to avoid damaging main components which are on the top side. Don't overheat the board. You should still be able to *just* touch the board.

Ground planes will connect to pads on these connectors, where one pad (pin 1) is VCC plane and two pads (19/20 on Adaptor A boards and pin 39/40 on Adaptor B/C boards) are ground planes. A good quality iron will remove the solder from these pads without a problem, although you may need to increase the time on the pad from the usual 0.5 – 1 second to 1 – 3 seconds.

Another technique is to stand the ECU vertically and use the de-soldering iron from one side of the board and a soldering iron from the other side. This heats the solder from both sides of the pad. This is a particularly effective method but requires considerable skill and is ideally done with help from an assistant.

Warning: Pads on these ECUs are very delicate. Don't attempt this unless you have the right equipment. It's quite easy to damage the board. Don't overheat the pads (about a second per pad is a safe maximum) or damage can easily result. If in doubt get somebody with the right equipment to do it for you.

Check that holes are clear

Hold the ECU up to the light and check that all the holes are clear. If any holes still have solder in them do not try to clear them out using a drill bit! The boards are multi-layer and it is quite likely that an internal connection will be damaged.

If some holes are not clear then reapply solder to both sides of the hole – this helps create a more effective "heat bridge" between the iron and the solder. Then re-attempt de-soldering. It's usually only pads that connect to power or ground that cause problems.

It is very important the holes are completely clear, otherwise it will make the next step impossible when attempting to insert the strip connectors.

Clean the row(s) of pads on both sides of the board with solvent and inspect to ensure there are no solder slivers/bridges/blobs between any pads.

- **Adaptor fitment**

    Type 4 boards are supplied with an adaptor board for your ECU type. They use a delicate flex strip cable. Be careful not to bend the ends of the cable when fitting through the de-soldered holes in your ECU. See Appendix A for a list of ECU vs Adaptor type.

    Ensure the cable is facing the correct orientation (refer images below). Trial fit the board inside your ECU and make sure the adaptor cable will mate up properly. Square pad on the adaptor board matches up to pin 1 on the ECU (except for W020 on the Type A adaptor which is offset by one pin and so goes to pin 2 on the ECU end).

Adaptor A

Adaptor B

Adaptor C

- **Fit Power Support Wires (for Dual Bank board only)**

Applies only to dual bank Type 4 board: S14 KA24DE (1996), A32 VQ30DE (1995-1996), Z32 300ZX (1996). Not required for the normal Type 4 board as used on all other vehicles.

Due to the higher current draw of the dual bank board it is necessary to fit additional power and ground wires from the ECU to the board for it to function correctly.

Run wires as follows

Adaptor Pin 1	>	ECU W020 pin 1	(5V power)
Adaptor pin 40	>	ECU W020 pin 40	(Ground)
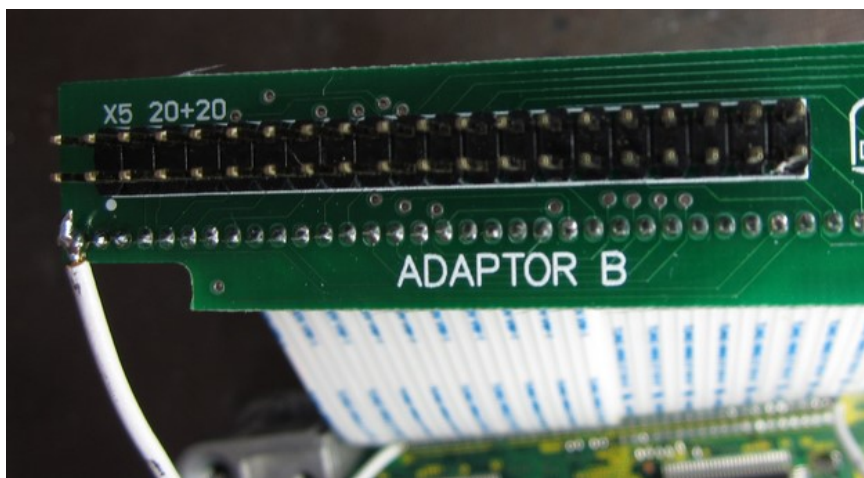
- **Soldering Tips and techniques**

Feed the tips of the ribbon cable into the holes and then support the adaptor as shown. Working from the inside of the ECU, carefully solder one pad from the top to hold the adaptor in place. Take care not to short adjacent pads or melt the insulation of the ribbon cable. Clean around the pads with acetone/solvent and a cotton bud.

For Adaptor A temporarily bend one ribbon cable out of the way to gain access to the other as shown.
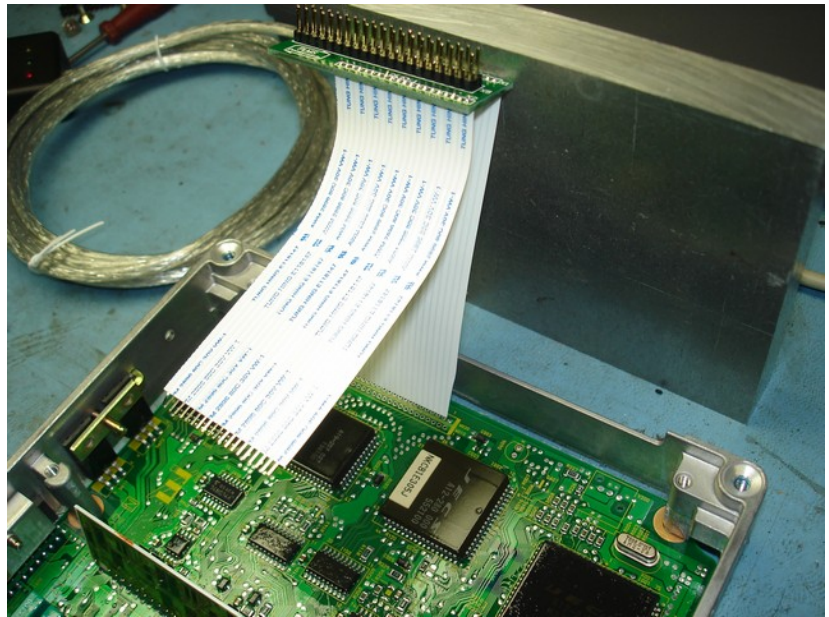
Photos show pads on each end soldered but you may find it easier to solder one pad towards the centre as end pads connect to power/ground planes making them more difficult to solder.

Turn the ECU over and place it so that the adaptor hangs over the edge of the bench.

Now you can solder away. Ensure the solder flows right through. Extra time may be required on the end pads due to power/ground planes. A large "chisel" style tip is ideal for this rather than increasing heat.

Note size of tip in use in the photo - using the corner of a large tip with thin gauge solder is a very effective technique. And the two ground pins can be soldered simultaneously – giving very effective heat transfer. No problems getting solder to flow through to other side of board here!
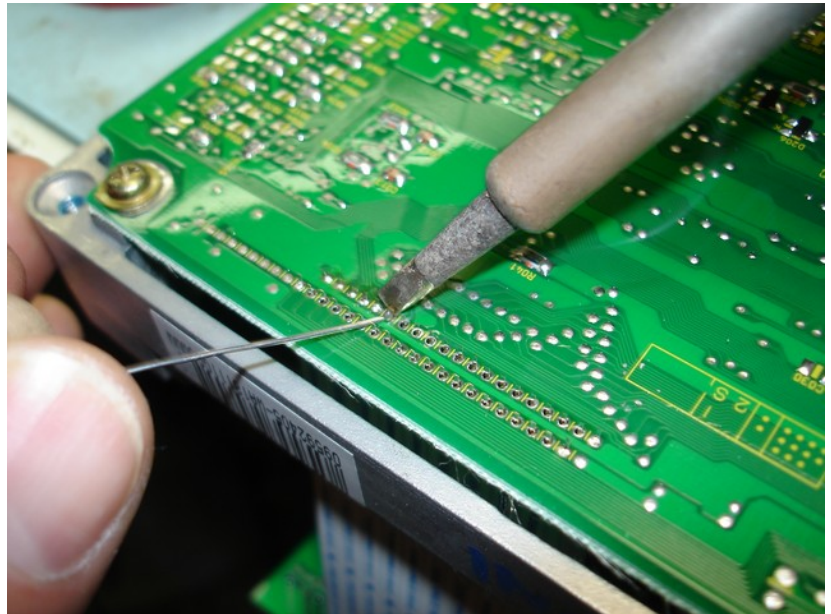
Clean off flux with acetone or similar solvent. Inspect solder joints with eyeglass.

Watch out for solder slivers between pads and make sure solder has flowed through to the top side of the board.

Poor soldering is the number one cause of problems.
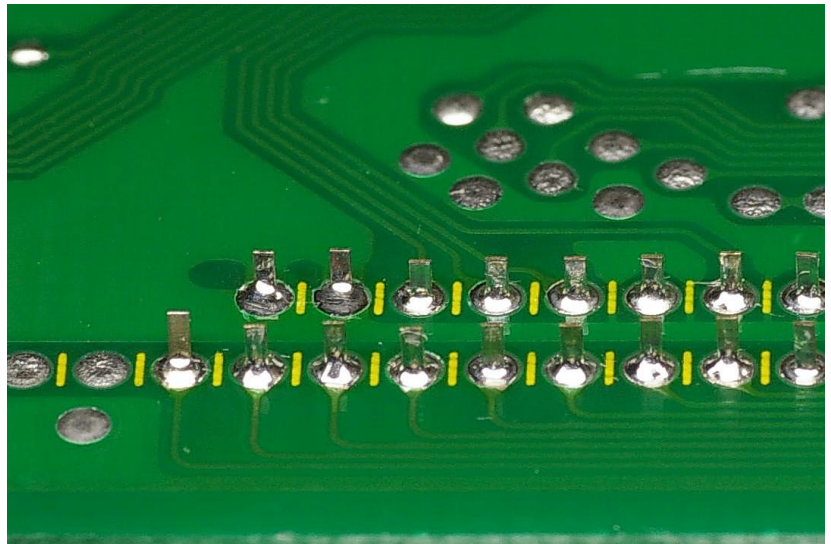
- **Change ECU jumper settings**

Jumpers are used on the ECU to tell it to read from either standard factory code (located in a memory chip on the ECU main board) or from the NIStune board. Move the jumpers as per the following table.

Refer to Appendix B for some practical tips on moving the jumpers.

| Move Jumper	Model	Name	Engine	Jumper Position	ECU PN 23710 -
R021 to R020	S14a	Silvia	SR20DET	Top side of ECU near large square IC	80Fxx, 82Fxx, 83Fxx
	S15	Silvia	SR20DET		91Fxx, 93Fxx
	P11	Primera	SR20DE		3J4xx, 3J5xx, 3J8xx, 3J9xx, 71Jxx
	N15	Almera Gti	SR20DE		1N4xx (UK)
	S13	180SX late	SR20DET		60Fxx
	W10	Avenir late	SR20DET		95N15
R025 to R022	K11	Micra	CG13DE	Rear of ECU	0U4xx, 101xx, 74Bxx (98 – 02)
	N15a	Pulsar	GA16DE		1N90x
	P10	G20 Infiniti	SR20DE		0J2xx 0J6xx (to 1995)
	U13	Altima	KA24DE		3E6xx, 48Exx (1995 – 1996)
	S14	240SX	KA24DE		70Fxx (1995 - regular T4 board)
	S14	240SX	KA24DE		72Fxx (1996 - Dual ROM T4 board)
	B14	Sentra	GA16DE		0M2xx
	B14	Sentra	SR20DE		1M8xx, 0M76x, 2M0xx
J923 to J922	Y33	Cedric/Cima	VQ30DE(T)		4P2xx
J932 to J933					6P5xx
J904 to J905 and J903 to J902	ER34	Skyline	RB25DET		AA5xx (NEO engine)
	WC34	Stagea S2	RB25DET		0V8xx (NEO engine)
	B14	Sentra	SR20DE		Not available
J031 to J030	A32	Maxima	VQ30DE		40Uxx, 49Uxx (Dual ROM T4 board)
	A32	Maxima	VQ30DE		54Uxx (Dual ROM T4 board)
	Z32	300ZX	VG30DETT		54Pxx (1996 only - Dual ROM T4 board)

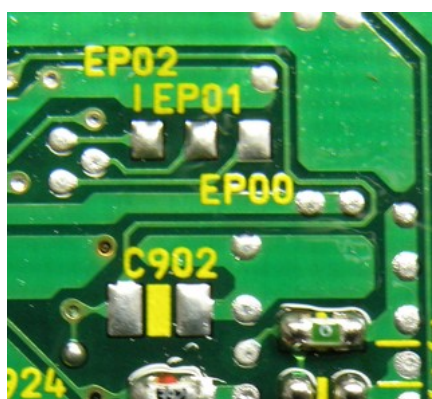**ECU Jumper Illustrations**
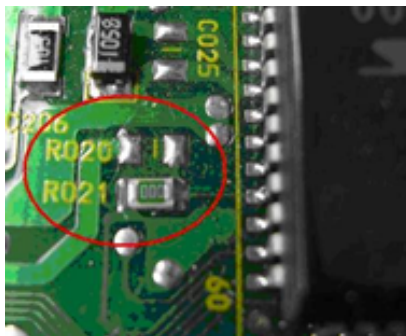
R021 to R020 – found on top side of main board near the memory chip (large square device)
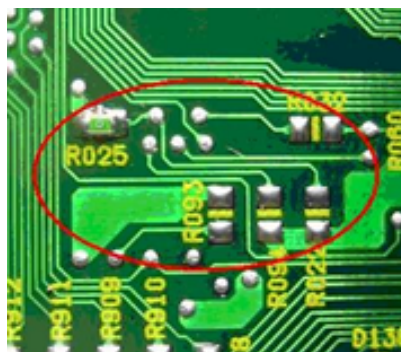
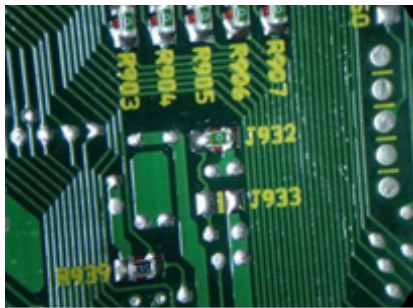R025 to R022 – for all except S14 KA24DE (1996)
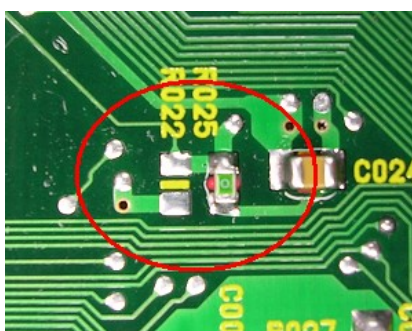
R025 to R022 - for S14 KA24DE (1996 model, dual ROM board)
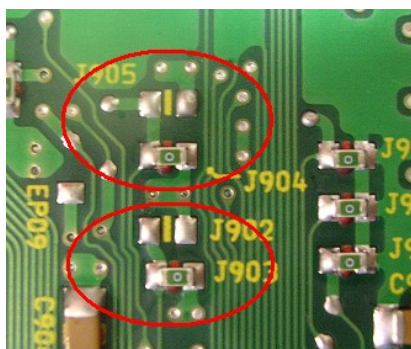
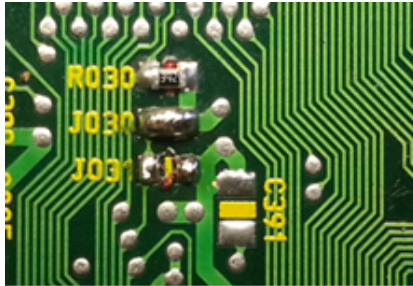J904 to J905 and J903 to J902 - for ER34/WC34 S2

J923 to J922 - for Y33 4P2XX

J932 to J933 - for Y33 6P5XX

J031 to J030 – for A32 VQ30DE
1995 model: Top side of ECU
between two small square chips

J031 to J030 – for A32 VQ30DE
1996 model: Rear of ECU as
pictured

J031 to J030 – for Z32 1996 model

- **Check jumpers on NIStune board**

Most users will not need to change these as the board will be set up at the factory. Tuners/dealers who buy bulk boards and then program the base images themselves will need to set these jumpers after programming.

Jumpers J1 – J3 on the NIStune board are used to select between different ECU types. Details are printed on the Type 4 board for reference and there's a detailed list in Appendix A.

J4 "PGM" jumper is only used when programming the base image into the board and must always be removed when the board is fitted to the ECU.
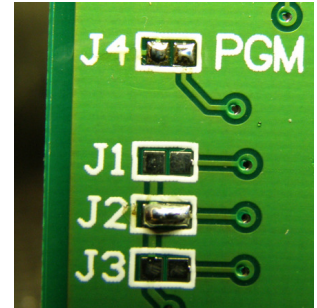
- **Fit board to adaptor**

The NIStune board simply plugs onto the adaptor. Be careful to check that all pins line up correctly as the connector is not polarised. Installing the board offset by 1 pin will cause the ECU to run in "limp" mode.

It is recommended to use hot-melt glue (or similar) against the edges of the 20+20 connector to ensure it stays attached to the board. This will prevent movement if the ECU suffers vibration.
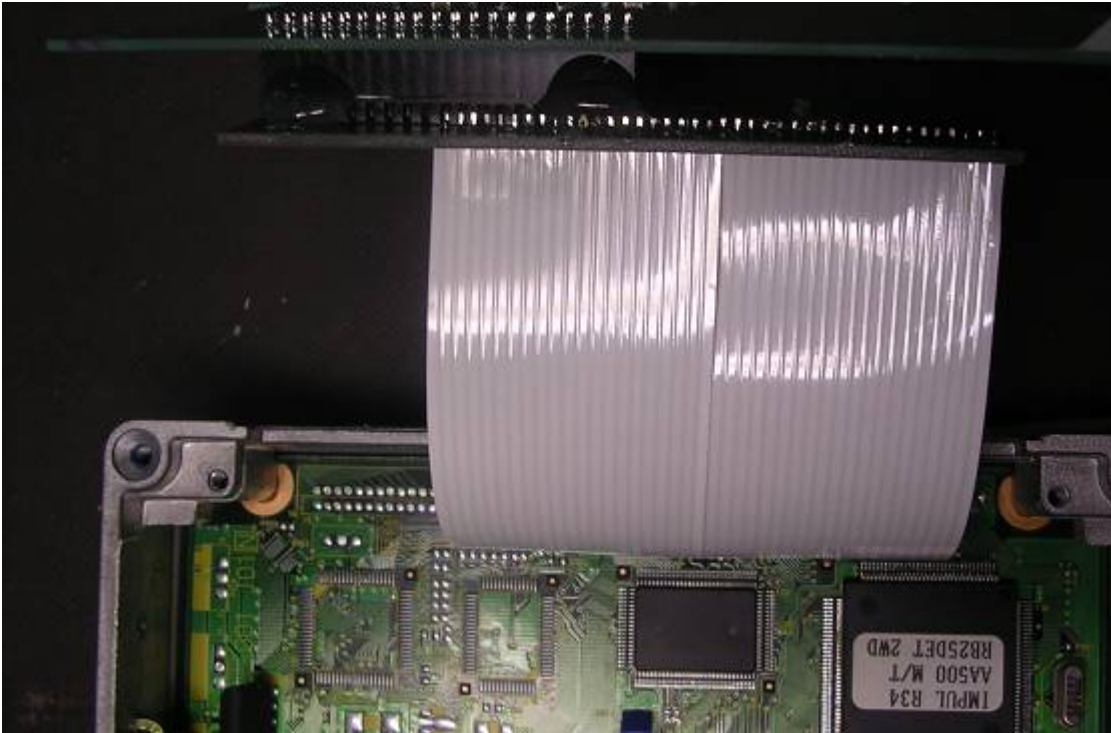
- **Fit board to ECU**
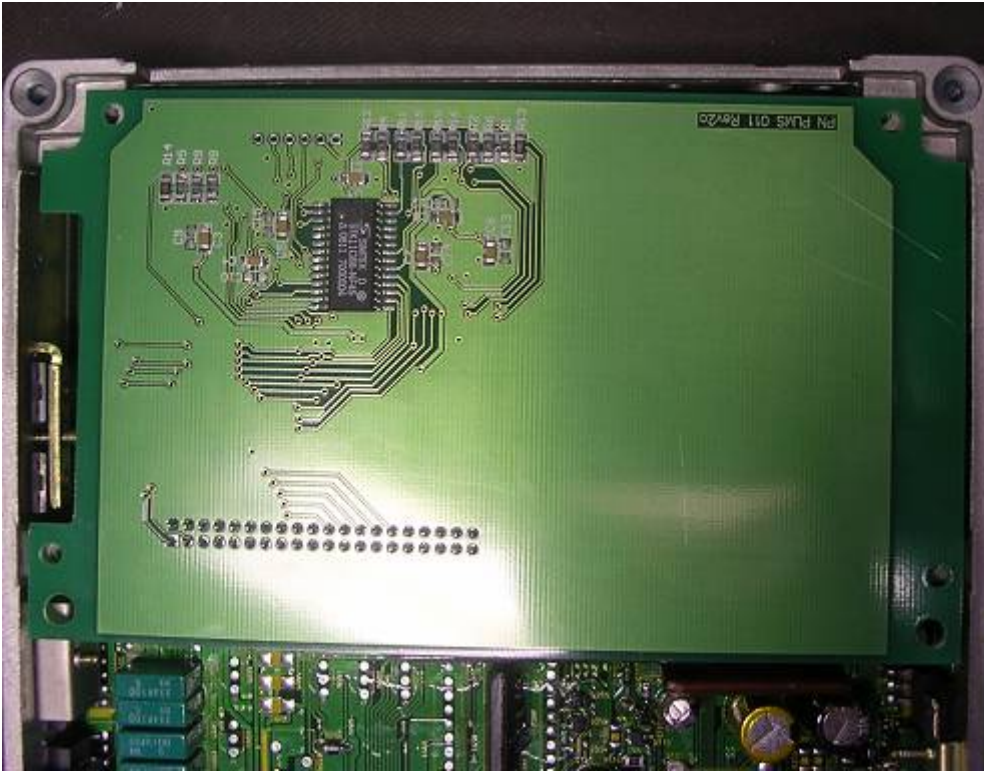
Place the Type 4 daughterboard inside the ECU and ensure that it does not push against any other components. It may be necessary to carefully bend some components back so they do not contact the daughterboard or adaptor.

Use supplied M3 screws to hold in the Type 4 daughterboard. Sometimes the screw threads may have conformal coating in them from when the ECU had coating applied at the factory – making it difficult to fit the screws. This may need to be removed using solvent or (preferably) by running an M3x0.5 thread tap down the hole.

P11 Primera (3Jxx series ECU) and K11 Micra owners : These vehicles use a Bosch ECU and they do NOT have the features to mount the daughterboard. The only way around this is to remove the main board from the ECU and machine (mill + drill) the step + threaded holes into the case or use a case from another Nissan ECU.

*** Special thanks to Steve at FC Tuning for testing of our Type 4 boards in the UK N15 Almera and P11 Primera ***

NIStune Board Jumper Settings Listing

Fit Jumper	Model	Name	Engine	Remarks	ECU PN 23710 -
J2	S14a	Silvia	SR20DET	Adaptor A, SR20DE not supported	80Fxx, 82Fxx, 83Fxx
	S15	Silvia	SR20DET	Adaptor A, SR20DE not supported	91Fxx, 93Fxx
	Y33	Cedric	VQ30DET	Adaptor B	4P2xx
	K11	Micra	CG13DE	Adaptor A, "facelift" model 98-02	0U4xx, 101xx, 74Bxx
	P11	Primera	SR20DE	Adaptor A	3J4xx, 3J5xx, 3J8xx, 3J9xx, 71Jxx
	N15	Almera Gti	SR20DE	Adaptor A, UK model	1N4xx
J1+J2	N15a	Pulsar	GA16DE	Adaptor B	1N90x
	P10	G20 Infiniti	SR20DE	Adaptor B, USDM to 1996 only	0J2xx 0J6xx
	U13	Altima	KA24DE	Adaptor B, USDM to 1997 only	3E6xx, 48Exx
	S14	240SX	KA24DE	Adaptor B, USDM to 1995	70Fxx (takes regular T4 board)
	S14	240SX	KA24DE	Adaptor B, USDM 1996 only	70Fxx (takes dual ROM T4 board)
	B14	Sentra	SR20DE	Adaptor B, USDM to 1997 only	1M8xx, 0M76x, 2M0xx
	A32	Maxima	VQ30DE	Adaptor B	40Uxx, 49Uxx (dual ROM T4 board)
	A32	Maxima	VQ30DE	Adaptor B	54Uxx (dual ROM T4 board)
	Z32	300ZX	VG30DETT	Adaptor B 1996 only	54Pxx (dual ROM T4 board)
J3	S13	180SX late	SR20DET	Adaptor A, "Late 180SX" Type X/R	60Fxx
	W10	Avenir	SR20DET	Late model (>97) only	95N15
J1 + J3	ER34	Skyline	RB25DET	Adaptor C, RB25DE not supported	AA5xx
	WC34	Stagea S2	RB25DET	Adaptor C, NEO engine only	0V8xx

For end user there is no need to change jumpers. This table is provided for reference only.

But for tuners/distributors who wish to program the board for use in a different type of ECU it must first be reprogrammed with the required BASE ROM IMAGE, and then jumpers set for the vehicle as per above table.

To program base image:

1) Solder the PGM (J4) jumper and open all others (J1-J3)
2) Program the board using NIStune Base Image Programmer (see separate instructions on NIStune website)
3) Remove PGM (J4) jumper and set other jumpers (J1-J3) as per table above

Tips/techniques for moving ECU jumpers

The jumpers used on Nissan ECU's are actually surface mount resistors of zero ohms value. If you're not familiar with working on surface mount technology (SMT) then you may find them somewhat fiddly to deal with. But it's important that they are done properly or unpredictable results may occur. Having the ECU jump randomly between its standard configuration and using the NIStune board can be a frustrating and time consuming fault to locate. Get it right.

There are 3 different size jumpers commonly used in Nissan ECU's, and we use a variety of techniques to move them.

1206 size (big)
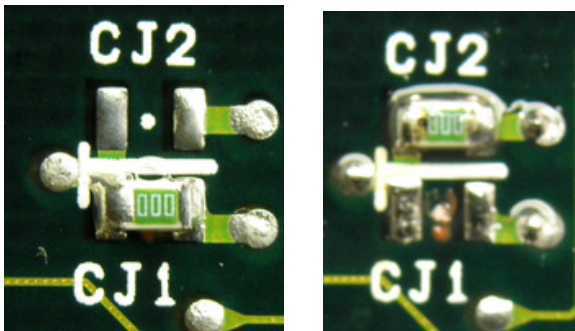
Found on S13 SR20 and similar vintage ECU's (N14/15, U13, RNN14). Remove conformal coating with acetone and cotton bud. Use soldering iron one end and de-solderer on the other end (or 2 soldering irons) to heat simultaneously. They come off quite easily. After removal clean the area again with acetone and cotton bud. Move to other position and solder in place. **Use flux**

0805 size (med)
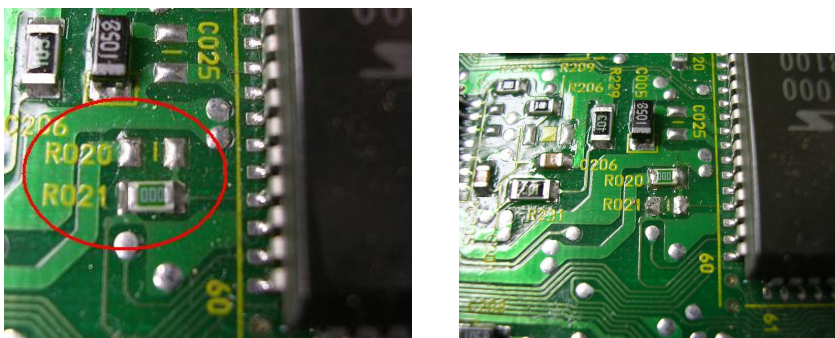
Found on S14a/S15. Can be done same as 1206 size (fiddly though) but I've developed a technique using a large chisel tip that touches both ends at once. Remove conformal coating with acetone and cotton bud first. Then apply soldering iron from the side. Once the solder melts (sometimes you need to add a small amount of extra solder to make the heat bridge on both ends simultaneously) just push the resistor across to the new position (use tweezers to help hold the resistor). Works a treat – **relies heavily on using flux**.

0603 size (small)
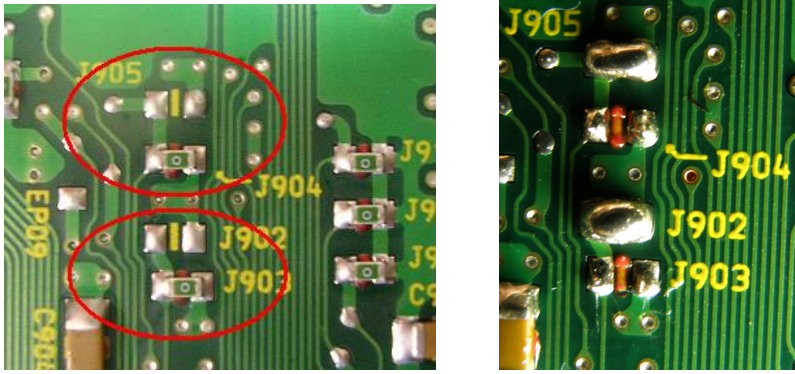
Found on R34 and similar ECU's. VERY small. Remove conformal coating with acetone and cotton bud first. Then remove jumpers using large chisel tip applied to side of jumper as per 0805's – **use flux and extra solder**. The jumpers can be refitted in the new positions if you have the skills but in reality the pads are closely spaced and can be shorted with solder. The best technique is to clean the area of flux first, then build up the solder on each pad until it forms a tall spherical blob. Then quickly dab the soldering iron across both pads to join them. Helps if you turn iron temperature down a tad. **Do not use flux as it will tend to puddle between the pads and stop the solder bridge from forming..**

Main points of note for moving jumpers:

1)   You need good light.
2)   You need some sort of visual aid (the magnifying visors available for under $20 are indispensable).
3)   Keep everything clean – I use acetone and a cotton bud. Clean coating off first, do the job, then clean again after soldering.
4)   You must use flux – this is critical for a good job.
5)   Inspect the solder joints after you've finished – preferably with an eyeglass. It's very easy to have a joint that looks fine – but closer inspection shows otherwise.

Besides getting a decent soldering iron, the rest of the gear would total under $50. Magnifying visor, eyeglass, bottle of flux, acetone, cotton buds and a pair of fine tweezers can all be had from common electronics retailers or eBay.

Revision History

DATE	VERSION	DESCRIPTION	AUTHOR
Aug08	1.1.1	Initial	MB
Sep08	1.1.2	Fixed minor errors	MB
Nov08	1.1.3	Added extra details and additional images	PL
Jan09	1.1.4	Added details for UK N15 Almera	PL
May09	1.1.5	Updated vehicle application list	PL
Jul09	1.1.6	Added details for late S13 180SX "type X"	PL
Sep09	1.1.7	Added details for late K11 Micra 98-02 & new disclaimer	PL
Jan10	1.1.8	Added details for UK P11 Primera	PL
Mar10	1.1.9	Added details for late W10 Avenir	PL
Aug10	1.1.10	Added further detail for moving ECU jumpers	PL
Mar11	1.1.11	Added further detail for moving ECU jumpers, added tips for dealing with solder jumpers	PL
May11	1.1.12	Fixed details for ER34 and S14 KA24DE/B14 SR20DE. Added images.	MB
Dec11	1.2	Added even further jumper detail.	PL
Jul12	1.3	Added jumper detail and image for Y33 6P5xx	PL
Feb14	1.6	Added detail for OBDII boards	MB
May14	1.7	Differentiate 1995/1996 A32 jumper locations	MB
Jun14	1.8	Add pictures for 1995 A32 and Y33 ECUs	MB
Aug15	1.9	Change jumper for N15A GA16 ECU	MB
Mar18	1.9.1	Update W10 95N15 jumper	MB