RX-7 Turbo Timer Installation

This document details the installation of my GReddy Turbo Timer, and also gives a brief set of <u>instructions</u> that explains how the device is used (since the instructions are in Japanese.)

Tools Necessary:

- Phillips Screwdriver
- 10 mm socket wrench
- Coat Hanger - Only if installing Parking Brake security
- Electrical Tape
- Nylon cable-ties
- GReddy Turbo Timer (Surprise!)
- Bracket and wire-splicers provided with Turbo Timer
- Turbo Timer Wiring Harness (specific to RX-7) - Optional

Background:

After having to sit through idle down periods for more than a year, I decided that it was time to get a Turbo Timer. The idea behind a Turbo Timer is that after hard driving, or other conditions under which the turbo is active, the turbos (predictably enough) get very, very hot. If the engine is shut down under these circumstances, the engine oil stops circulating, and the oil in the turbo bearings 'cokes,' shortening the life of the bearing (basically, the oil sits in the bearings, cooks, and turns to gritty sludge.)

Leaving the engine sit at idle for a minute or so after the car's shut off allows the engine to circulate through the bearings enough to cool them down to sub-fusion temperatures, preventing (or at least reducing) bearing wear.

Unfortunately, it's often a big pain in the butt to sit in the car for a couple of minutes after a session of driving. Thus, the good people of HKS and GReddy have invented "Turbo Timers" which idle your engine for a specific amount of time after you remove the key from the ignition, allowing you to leave the car, while the engine idles for a while, and then shuts off.

I select the GReddy device instead of the HKS device because the GReddy unit is significantly cheaper, and the HKS device has features which I probably will never use (stopwatch, etc.)

The GReddy unit has two settings, is painless to use, and has safety features, such as a parking-brake kill switch, and a vehicle-speed-sensitive mode. Basically, what these two features do is if the engine is 'idling down,' and someone either releases the parking brake or moves the car enough for it to register on the speedometer, the turbo timer automatically shuts itself off and kills

the engine, to prevent said person from driving off with the car...although with the key out of the ignition, this sort of joyride would tend to be shortlived, since the steering wheel would lock up.

It's strongly recommended that you acquire the wiring harness. The ignition wires you'll need to tap into are in a **very** small area, and there's very little maneuvering room. The wiring harness is basically two connectors, with a very short length of wires (2 inches or so) between them, which hook between the ignition switch connector and the wiring harness which normally fits into the ignition switch connector.

I installed a GReddy Turbo Timer into a 3rd generation RX-7 (1994 PEG), but the principles listed here are likely applicable to either unit into almost any car, but the exact locations and wire colors may be slightly different. Since the manual which came with the timer was completely in Japanese, I enlisted a friend to help with the translations.

We'll concern ourselves with three major components that we'll be dealing with:

- Turbo Timer itself
- Turbo Timer harness - This is the component which comes inside the Turbo Timer box, with a black connector on either end, and a short bullet connector, and two long wires (purple and brown)
- RX-7 specific ignition harness - This is the short 'adaptor' harness, which is introduced between the ignition switch connector and the normal ignition harness. This is NOT standard equipment with the Turbo Timer, and needs to be ordered as an additional piece, usually around $20. It's specific to the RX-7.

References to "left" and "right" are as you are looking at the steering wheel as you would normally while driving.

There are several connectors on the ignition harness and one on the turbo-timer harness which I didn't do anything with. According to the manual, there's an 'option box' which can be had. I don't know what this does, though!

Step 1: Remove steering column cover
This is the plastic cover which surround the steering column and the ignition key mechanism. There are 3 Phillips screws on the underside which hold this cover together. Remove these three screws (placing them in a safe place). This should allow the plastic cover to move around. In the process of this wiggling around, a metal surround from around the ignition key switch may fall off. Put this away, as well.

The steering column cover is actually made up of two pieces, held together buy plastic pegs and four or five little plastic tabs. After you've unscrewed the three

screws from the bottom of the cover, reach a finger in through the blinker hole (the hole from which which the blinker stalk comes out), and feel around (towards the steering wheel). You'll feel a plastic tab. **Gently** push the plastic from underneath the plastic tab while applying pressure to separate the two plastic halves. This plastic feels very thin and brittle, so too much force will almost definitely crack it. (The short of it is, if you stick your finger in the blinker stalk hole, and crook it towards the steering wheel, you'll feel what I'm talking about.)

Once you get the first one open, the rest will be a bit easier, since you'll be able to make use of the gap that's already been opened to expose the rest of the tabs. This will separate the top half of the cover from the bottom half. Be careful of the ignition key courtesy light. This light bulb is on a very short leash, and needs to be turned a quarter turn to remove it from the cover.

Put these two pieces away in a 'safe place' where they won't get crushed or stepped on.

Step 2: Install new ignition harness
Directly underneath the left side of the newly exposed steering column, you'll find a massive (like 10-wire) connector. This connector is literally 2 inches across, and is primarily white, with a small red tab as well. The red tab is an additional safety against the connector's disengaging. You'll need to push the red tab back away from the connector, and then push the small white tab into the connector to disengage the two connectors. The space available to work in is very small, and the tabs are very stiff, so this is not the most amusing part of this exercise. It's also very difficult to describe without pictures (I don't have a digital camera, sorry) so let me take another crack at it.

Basically, the two connectors have the standard push-together-and-click type mechanism, with the notable exception that there's a red tab which may then be used to make sure that the 'click' mechanism doesn't accidentally disengage. If found it easier to push on where the the small 'rails' on the red tab protrude from the connector, then the tab itself. My suggestion to you is to print this document out, and have it handy when doing this step, as it's a lot easier to see what I'm talking about when the connector in question is right in front of you!

One half of the now-separated connector pair is held immobile on the steering column. Push the other half slightly out of the way, enough to install your new ignition harness with the Turbo Timer connector. There's not much play on this connector, so you'll have to almost 'fold' the new ignition harness to make it fit!

At this point, I plugged in the Turbo Timer into this harness, and grounded the ground wire temporarily to test the unit and my installation. (Ok, I admit it. I wanted to see the blinky lights!) It should go on, (and play a little tune).

Step 3: Install ground
Take a look at where you want the turbo timer mounted, and route your ground wire (black wire with a loop at the end) accordingly. I used a nut by the accelerator pedal to ground the Turbo Timer. Most nuts on this car are 10 mm bolts, the one holding the accelerator pedal mechanism to the firewall is no exception.

At this point, the Turbo Timer should 'work,' and be able to idle down your car. If you put your ignition key in the 'on' position (engine not started), the turbo timer should do its 'startup sequence.' Then, if you remove the key, all the lights on the dashboard should stay on (the radio will go off, though), and the turbo timer should start counting down from its default setting (1 minute). I left it this way for a night, until visions of people driving off with my car took over my imagination and made me install the parking brake security.

Step 4: Install Parking Brake Security Switch (Optional)
This switch shuts the turbo timer down if someone releases the parking brake while the car is idling down.

To install this wire, you'll want to remove the panel covering the parking brake (and containing the rear defroster switch, security light, and ashtray). To remove this panel, first, unscrew the gear shift knob. This knob simply unscrews counterclockwise (like 25 full turns!), (if its never been off, it may be a bit tight). Then, remove the panel by simply pulling up on it. I found it easiest to just get my fingers underneath the left edge of the panel, and lifting up. (It's held on by like 5 little clips) (**Note: Do not** wrap your fingers around the panel through the parking brake boot, as this piece of plastic/cloth is NOT attached to this panel, and has its own frame. Pulling on that section of the boot will break the parking brake boot frame!) This will expose the underside of this panel. Be careful, as the wiring harness which goes to the lights and switches on this panel are very short.

Remove the boot frame from the parking brake lever. This frame is held on by a plastic tab in front of the lever (underneath the brake's handle), and a screw in back. Remove the screw, and release the tab.

Immediately underneath where the screw was, you'll see a green wire. This is the wire you'll want to splice with the brown wire from the turbo timer wiring harness.

Using a coat hanger, fish the brown wire from the wiring harness through to the space underneath the panel you just removed. Using one of the provided wire-splicing widgets, splice this brown wire to the green parking brake sensor wire.

At this point, if you've done everything correctly, if you put the ignition key in the 'on' position (thus activating the turbo timer), and then turn it off, the turbo timer should again begin counting down. Once you release the parking brake, the turbo timer should immediately turn off, shutting the car down as well.

Step 5: Installing 'vehicle speed sensor'
The purple wire on the Turbo Timer harness allows the Turbo Timer to read the vehicle speed from already-existing sensors. If someone is silly enough to drive your car while the turbo timer's counting down, and leave the parking brake on, this is a third level of security. I chose not to install this particular option, as hacking into a CPU wiring harness was not particularly appealing to me, given the space restraints in this car. I have had someone translate the original Japanese manual, so I can identify which wire you'll want to splice the purple wire into, but I haven't bothered to do it myself. If you want more details on this topic, I'll be more than happy to provide them, just send me an E-mail.

Step 6: Mount Turbo Timer
I decided I wanted the turbo timer mounted directly over my right leg in the passenger compartment. I chose this location because I didn't want it to be conspicuous, nor did I want it to look like a radar detector which needed to be stolen.

I did not want the turbo timer 'permanently' mounted in the car. I definitely did not want to use any solutions which involved drilling or otherwise defacing the interior of the car.

I tried using double-sided tape and velcro to mount the device in the car, but these sticky devices have little to no chance of sticking to the curved, textured plastic used in the car. (They both fell off within 15 minutes of my trying them.)

I settled on using a binder clip (yes, the ones you find in offices), and a bundle of napkins. I clipped the binder clip onto the edge of the interior panel underneath the steering wheel, over towards the right side of the steering wheel. I then put a layer of napkins between the surface of the panel, and the bracket for the Turbo Timer. (The layer of napkins was used to prevent the bracket from scarring the plastic panel). This seems to be a pretty good 'temporary/permanent' solution, and I'm not having any problems with clearance whilst driving.

Step 7: Reassemble car
Put your car back together again! Make careful use of cable ties to make sure that the cables underneath the steering column don't interfere with driving.

Step 8: Enjoy your turbo timer!
I set my turbo timer to 2:30 and 4:00. My next project will be to try to figure out how to keep the fans running in the car after the turbo timer shuts the engine off. I don't like the fact that the underhood components are 'baked' for periods of up to an hour after the engine's off.

Operation of Turbo Timer
Since the instruction manual is completely in Japanese, I thought I'd write a short addendum how the device works. The turbo timer I have has an On-off button, a

3-digit red LED display, a Select button, and a Program button. If yours is different, then the following documentation may not be strictly applicable to your model.

When you first turn your ignition on, the Turbo Timer 'wakes up,' and goes into its default mode. If you press the on/off button at any time, the timer shuts itself off, and will stay off until you re-enable it. The Turbo Timer has two 'settings,' which allow you to store two idle-down settings (P-1 and P-2). Pressing the select button briefly allows you to switch between these two settings.

While in either of the two modes, pushing the program button briefly increments the time remaining by 10 seconds. If you hold down the program button, it increments the time remaining by 1 minute. Once you get the idle-down period you want, pushing and holding the Select button 'saves' the program setting into memory. If you continually increment the time remaining over 9:59, the timer 'rolls over' and starts again at 10 seconds.

The Program button is also active when the turbo timer is 'idling down' your car. For instance, if decide you want your car to idle for 2:00 instead of the 1:00 that the timer's set for, just hold the Program button for about 2 seconds, and the time will jump up in 1 minute increments.

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