When Nissan introduced the new 300 ZX in 1984, they raised the performance level of their top of the line sports coupe another notch. Gone was the inline six cylinder L-series engine that had powered all of the previous 240 Z, 260 Z, 280 Z and 280 ZX models. In its place was an all-new V6 engine with three liters of displacement (hence the 300 ZX model designation). The same basic engine design (in turbo and normally aspirated versions) saw duty in the 300 through 1989. It has also been the standard engine in the front wheel drive Maxima series that was introduced in 1985. A special pocket rocket 200 SX also received a slightly detuned version of this engine for 1988.

This single overhead cam engine (one cam per cylinder bank) uses one very long rubber timing belt to keep both cams in time with the crankshaft.
Another Notch

single tensioner between the right camshaft and crankshaft sprockets makes sure that everything stays tight. This is not a self-adjusting tensioner, so the timing belt must live (or die) with its original tensioner adjustment.

Such a long belt inevitably stretches as the miles start to add up. No belt tension readjustment is specified in the vehicle maintenance literature. However, a 60,000 mile replacement interval is recommended. We have seen many of these belts go well beyond the recommended replacement interval without breaking. This reputation for timing belt longevity can give some owners (and technicians) a false sense of security. While these timing belts don’t often break of their own accord, there can be disastrous consequences when one does. This engine is a valve-bender and it will do some very expensive damage to itself if the cams and crankshaft are allowed to go their separate ways.

There’s also a chance that the belt may break through no fault of its own. There have been reports of broken head bolts on these engines. It seems inevitable that the broken bolt heads would wedge themselves under the camshaft lobes, bringing everything on that side of the engine to a screeching halt.

The timing belt is obviously the weakest link in this chain and will usually break under these circumstances. If you’re repairing a timing belt that has broken under mysterious circumstances, be sure to check for broken head bolts or other valve train damage. There’s no sense putting a new timing belt on an engine that has a bunch of bent valves.

Belt Tightening

Since the new timing belt receives a one-time only adjustment, the correct initial adjustment is especially important. Variations of the initial adjustment procedure have been suggested since this engine was introduced, and we’ll give you some of the highlights of each:

- Remove the valve covers and loosen all four rocker shafts. The idea behind this was to take the influence of the valve springs out of the equation. With all of the valves closed, none of the valve springs would be pushing on the camshaft and possibly moving the cam sprockets.
- Some later models call for the use of a feeler gauge and a push/pull fish scale. After exerting the prescribed amount of pressure on the timing belt between the right camshaft and the tensioner with the fish scale, the feeler gauge is inserted between the timing belt and the tensioner pulley before the tensioner locknut is tightened. This defeats the automatic adjustment feature of the tensioner spring and introduces a controlled amount of initial belt looseness into the equation.

While both of these variations would result in a very precise initial timing belt adjustment, using the procedures we describe in our photo captions will do the job just fine.

The main thing to remember is that you must trust the tensioner spring. The tensioner spring will set the proper belt tension, with very little outside help from you. Make sure the tensioner and tensioner spring are in good condition and are able to move freely before installing the new belt. Exercise the tensioner spring with a hex head driver to assure full tensioner mobility.

Resist the temptation to give the tensioner an extra little nudge or to back it off slightly. Loose belts will cause a distributor knocking noise. Tight belts will sing and wear out prematurely. This is one case where one notch more or less can make a very big difference.

— By Karl Seyfert

We used a 1990 Maxima for the majority of our photos. Accessibility is a little worse on pre-1989 Maxima models and you’ll have to deal with the radiator shroud on 1984-89 300 ZX models. To make things interesting, some 1989 and later Maximas have an ABS actuator (arrow) in the way.

Unless you like standing in a puddle of antifreeze, start by draining the cooling system. This will also keep coolant off the new timing belt. There are two upper cooling system hoses to remove on our Maxima. A third cooling system hose attaches below the upper timing cover on all models.
An A/C pipe bracket is bolted to the right frame rail on our Maxima. While it's possible to work around it, removing one mounting screw (arrow) allows the pipe to move slightly. This will prevent damage to the aluminum pipe if we happen to accidentally lean on it during the belt removal.

The A/C compressor belt tensioner bracket straddles the upper timing cover on Maxima and 300 ZX models. Loosen the tensioner pulley mounting bolt, then use the threaded adjuster to loosen the belt tensioner. Remove the tensioner bracket, noting the location of the two long mounting bolts.

The alternator and power steering belts must be removed from below. We removed the right front tire and plastic inner fender to access the tensioner pulleys and lower part of the engine on our Maxima. A large plastic under panel must be removed on 300 ZX models.

The position of the alternator varies, although the adjustment mechanism does not. It's most often found on the left side of the engine, but moves to the right side on 300 ZX turbo models. Loosen the alternator mounting bolts, then use the adjusting screw to loosen and remove the alternator belt.

If it's time for a timing belt, be sure to figure a new set of accessory drive belts into the estimate. As you can see, this cracked power steering belt (arrow) has had the course. Pivot the pump to remove the belt on 300 ZX models. Turn the tensioner bolt clockwise to remove the belt on Maximas.

We're taking things a little out of sequence here. If you're working on a 300, you've probably already removed the fan, fan clutch and water pump pulley to get them out of your way. The transverse Maxima engine has a single pulley, but we'll still need to remove it to remove the upper belt cover.
Another Notch

This lip at the base of the distributor cap (arrow) may snag the upper timing belt cover as you remove it. Remove the cap if you want more room, but take a look at the mounting screws first. The very small and soft screws frequently rust in place, making cap removal a real chore.

We laid the upper cover out to show the location of the eight mounting bolts. All mounting bolts are the same size and length. The rubber mount grommets may stick to the cover as the bolts are removed, so count your bolts and grommets before tossing the cover in the parts cleaner.

This old belt was very loose, and was causing quite a bit of noise at idle. The loose belt causes the distributor driven gear to knock against the drive gear on the left camshaft. This produces a rattling, knocking noise that diminishes as RPM increases. A too-tight belt will sing.

Lining up the timing marks now will save us a lot of jockeying around later on. The crank pulley timing mark and pointer are easy to see on this 300, less so on the Maxima. There are several marks on the pulley, all ahead of TDC. We’re only concerned with the TDC mark that follows the advance marks.

We put a dab of paint on the edges of the old belt, then used a flashlight so we could see the position of the cam sprockets from below. Don’t even think about turning either of the cams or the crank after the belt is removed. You can bend a valve by turning any of them separately, even by hand.

I know it looks crude, but there is no way to mount a puller to remove the Maxima’s cast crank pulley. Two screwdrivers resting gently on the lower cover should remove the pulley without damage. Removing the stamped outer pulley allows the use of a puller on 300 ZX models.
Another Notch

We asked for advice on replacing the water pump as "insurance." While pumps on earlier models often leaked prematurely, later model pumps usually outlast the first timing belt. If the pump is leaking, replace it. If not, give your customer the option. It's about $100 extra now, or a lot more later.

There are six sets of bolts and grommets securing the lower belt cover. The bolts are the same, except for a longer one that goes into the threaded water pump mounting bolt (arrow). These bolt heads are very small. Make sure you've got a good grip, especially if you're using air tools.

After removing the lower timing belt cover, temporarily reinstall the crank pulley bolt. Use a spacer nut behind the bolt to take the place of the pulley and keep the bolt from bottoming out in the crankshaft. This allows us to turn the engine over when we adjust the new timing belt tension.

Removing the crankshaft pulley bolt and pulley may have moved the timing marks out of position. Both sprocket timing marks should be lined up with the embossed marks on the rear timing covers. If so, loosen the tensioner nut, turn the tensioner clockwise, tighten the nut, then remove the old belt.

This has got to be one of the easiest belts to line up. Three lines on the new belt indicate the proper location of both cam sprockets, as well as the crankshaft sprocket. The belt lines can be hard to see from some angles, so we extended the marks to the front side of the new belt with a dab of paint.

Make sure the sprockets are still properly lined up with the embossed notches on the rear upper timing covers (arrow) before installing the new belt. The belt installation arrow points away from the engine. Gently slide the belt into position, keeping the slack on the tensioner side.
Here's where the dab of paint on the belt comes in handy. The crank sprocket lines up with a notch in the oil pump casting. The line on the flat side of the belt is partially hidden by the casting. Use an inspection mirror or raise the car to confirm the alignment of the lower timing marks.

The tensioner spring doesn't like to have its picture taken. The bottom of the spring indexes in a notch in the tensioner (left arrow). The top of the spring indexes on a stud that sticks out of the block (right arrow). The tensioner pivots counterclockwise on an eccentric mounting bolt to remove belt slack.

Different tensioner adjusting methods have been suggested throughout the life of this engine. This one worked for us. Loosen the tensioner nut, then use a hex wrench to rock the tensioner back and forth several times. This assures that the tensioner and spring are able to move freely.

With the tensioner nut still loose, slowly turn the crankshaft clockwise using the crankshaft bolt. The tensioner spring will push the tensioner toward the belt, removing any slack and setting proper belt tension. While turning the crankshaft, retighten the tensioner nut.

Turn the crankshaft through two complete rotations, then recheck the timing marks. Check it for dents, then reinstall the lower belt cover. Install the stamped metal timing belt guide, then the balancer. A minute with some emery cloth and spray lube will make balancer removal easier the next time.

We won't take you through the reassembly procedure, since most of it is a mirror image of disassembly. Use the cooling system bleeder screw on the engine to remove trapped air. Add coolant until coolant flows from the bleeder, then replace the bleeder screw and top off the system.