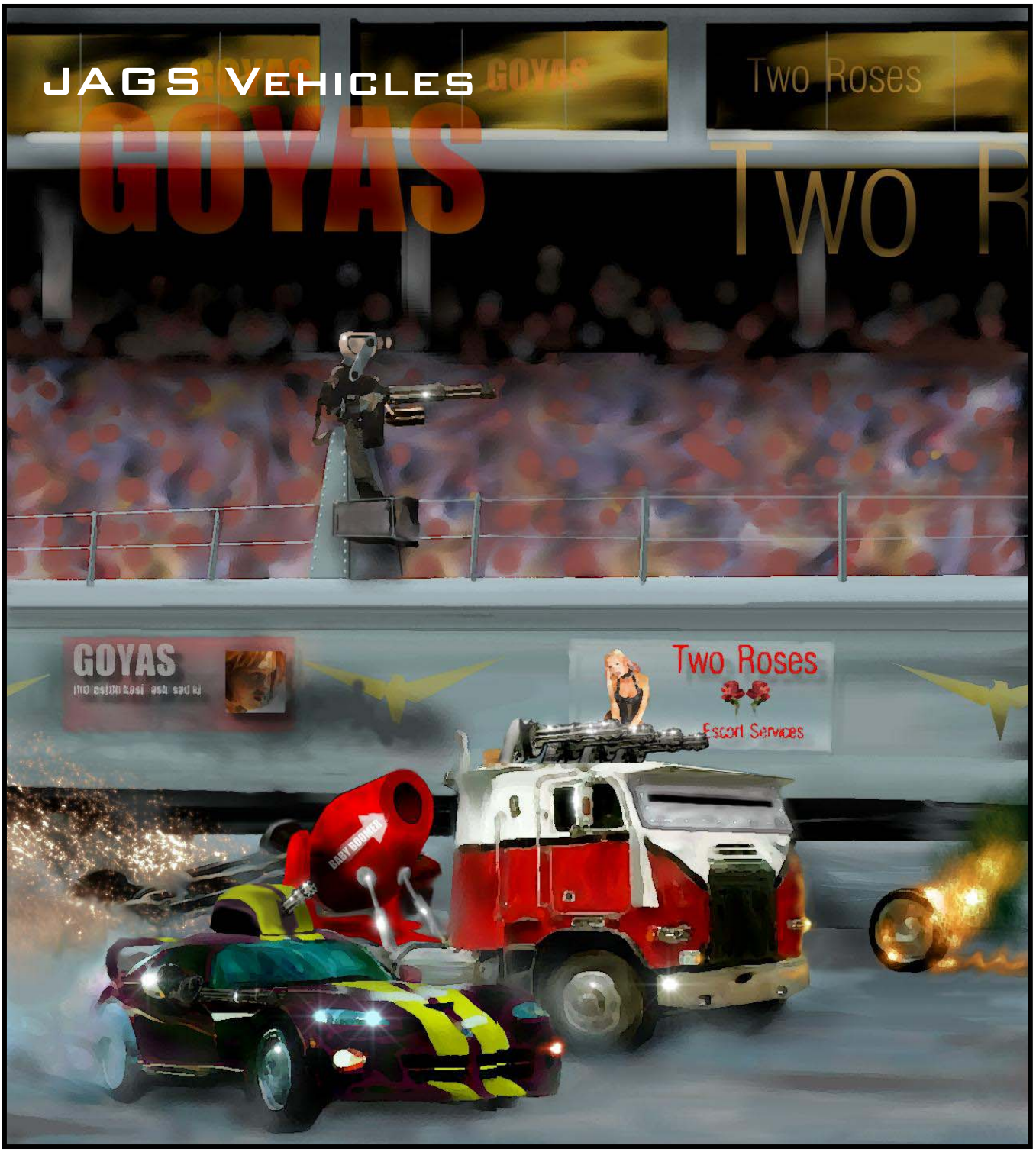


A Night at the 8-Track: Armed vehicular combat, high speed races, armed and unarmed gladiatorial combat, cinematic fatalities political executions, and armed "fans" are just some of the thrills at the world's largest combat arena. It's the premier *night out* in the BoneYard.

Valet Parking is available, specific armed or unarmed garage.

Vehicular Construction

Armed vehicles are a part of JAGS Have-Not: it's part of the style (and far safer than trying to walk or ride a horse through hundreds of miles of mutant infested toxic terrain). These rules let you build a battle-vehicle (they can be used for other genres as well: *Fast Company*, for example).

The model we're using is that of "aftermarket" modification. The rules give you a stock vehicle in several classes and then you modify it. That could mean giving it better brakes, more resistant tires, etc.—in JAGS Have-Not it means putting on armor and weapons as well.

Nobody gonna take my car
I'm gonna race it to the ground
Nobody gonna beat my car
It's gonna break the speed of sound
Oooh it's a killing machine
It's got everything
Like a driving power big fat tyres and everything
-- *Highway Star,* Deep Purple

Vehicle Companies in the 'Yard

There are metal-works and machine shops in the BoneYard: their grinding, burning, factories run day and night working metal, refining armor-steel, and upgrading components. Much of what goes into vehicles, however, comes from the Distro-point. Component pieces, many poorly understood, are used to make engines, fuel systems, and transmissions. Some have lock-in ports where weapons or sensors can be connected. Some have inbuilt computers that seem to be totally unrelated to the function of the piece—the bodies of the vehicles, the outer shells, look much like the systems of centuries ago. They perform like them as well—but they are not the same. Several companies produce gear used by the Arm (the military force of the 'Yard), the civilian police forces, and the private corporate entities. They have names like FENRIS Motors, Aesir Defense Systems, and MARS Core. The people who make cars also make guns. The two are inexorably intertwined.

Who Gets a Vehicle?

Discuss having a vehicle with the group before taking one: they make characters pretty mobile so check out with the GM and the other players to see if it's gonna fit. After that they usually cost some money, archetype points, or (possibly none of the above).

Here are some characters that might normally have vehicles:

Character	Vehicle	Notes
Road Knight	Armed Bike or light armed car	Road Knights cruise the Middle Ring brining their combat skills, their moral virtues (and this can *vary*), and their arms and armor. They tend to be skilled, maneuverable, and fearless. Most die violently.
Freelance Trucker	Armed Truck (small to large)	The big rigs are usually owned by outfits—they travel in convoys and they're decked out with hammocks slung along the sides and all kinds of stuff strapped to the tops. But not every town commands a convoy. Freelance truckers own a truck, maybe have some crew, and are available for a price to haul your goods. They tend to be known by the big outfits—and they have their respect. Anyone who can do this without the host of laser-armed Humvees is the kinda organism that the operators of the big-rigs will drink black coffee with at the road house any time.
Prospector	Junk Truck (unarmed)	In the olden days they'd take mule up in the hills—today the mule has at least four cylinders. The panel trucks that prospectors love are usually unarmed (they usually have an armed cadre inside them though). They're more likely to break down then be raided though.
Transport/Freelance Security	Mid-sized to heavy armed car	Transport takes rich people out and back in at least some kind of style. Often a security outfit will have a biker as a scout and a transport vehicle that's a little further behind. They tend to need heavier com-gear (the package wants to phone home!) and at least a try at a professional attitude.
Atomic Cab-Co Taxi Driver	Mid-sized armed vehicle	In the 'Yard you pay to play and that means you pay to get a pick up from the slum where you wake up shaking off a mean narco-hangover. If you can get bonded (i.e. convince them to trust you) and have an armed vehicle and laugh in the face of danger you can get a job driving for Atomic Cab Co in the 'Yard. Good luck.
Roadside Assistance / Salvage	Armed Tow Truck	The aftermath of battles often leaves valuable vehicles in non-running condition. Call out the mecho-vultures. Armed Tow Trucks are some of the scariest vehicles on the road: powerful, heavily armored, and willing to kill you for looking at them, they're usually in debt to a major bank for the price of their rig. There's a code (first called gets the salvage) but often a secondary battle is fought over the remains of the first.
Bounty Hunters / Biker gangs	Armed Cycles	There's a living to be made taking down people that someone rich wants taken down. This usually involves a) travel and b) a warm welcome when you *do* find them (warm like the melting point of steel).

How do I get a Vehicle?

Vehicles have a cost listed in credits. They can also be purchased with Archetype points—and sometimes the GM may give you one for free (see the sidebar).

Take a Loan
At the GM's option a character can start with a vehicle if they get a loan from one of the Banks. This usually requires L2 Driving skill (they'll run a simulator test!) and a business plan. Often that plan involves running cargo or passengers—if it involves treasure hunting (getting killed) or security (getting the collateral shot up) the bank usually wants some kind of serious control over who the character works for/runs with.

Standard 24 Month "Average Life Expectancy" Loan

Loan	Percent	Monthly Payment
2000c "Starter Loan"	6%	89c
3000c Vehicular Grant	6.3%	133c
6000c Advanced V-loan	6.5%	267c
12000c "Suicide Loan"	6.8%	536c

You Deserve It!
Another option (also at GM option) is to pay Archetype points for the vehicle. This makes sense if your character is a Trucker, you're a specially trained Road Knight and the vehicle is your weapon, etc. This comes with extra character points to spend on vehicular skills (Mechanics, Gunner, Vehicular Operation, etc.).

When the other characters have the money to purchase their own vehicles, the Credit Upgrade is a sort of game-mechanics way for you to improve your Archetype point investment. Traditionally this lands when another character makes a purchase of greater or equal value to your vehicle.

Archetype Points Cost

Archetype Pts.	Vehicular Value	Character pts	Cred Upgrade
1	1500c	2	1000c
2	2500c	4	2500c
4	6000c	6	5000c
8	12000c	8	9000c

Vehicular Construction and Terms

JAGS Vehicles (and this book limits itself to bikes, cars, and trucks) are machines. That means they use the STC rules—but we've added some tweaks here. Let's take it (briefly) from the top.

Total Damage Points and Structure Rolls (STC)
A vehicle has a listed Damage Point Total (this is often quite high) and an STC of 15- (always for an undamaged vehicle). When the vehicle is hit and damaged, it will (probably: see below) have to make STC rolls or "break." This is the basic rule for inanimate objects in JAGS—but we've gone and added some depth. So hang with us:

The Role of Vehicles

How vehicles fit into the game is necessarily going to vary from group to group. Here's the insight we have from our playtests:

Cheap Group Ride
Starting the group with a cranky, cheap, unarmed vehicle can be a good way to encourage travel while keeping a rein on how far the characters go (no one wants to break down in the Inner Wasteland). In our case the first vehicle was a prospector's junk truck that was, over time armored and armed (the group also had a road knight).

All for one and one for—hey! Where'd Sid go!?
Before taking a vehicle, especially a small one like a cycle, we advise talking to the group (we advise this always, anyway). If you plan on hitting the open roads but can't take the gang, make sure everyone's okay with that.

Levels of Power
Military vehicular ordinance basically goes light, medium, heavy (where light is a .50-cal machine gun, medium is, like a 25mm cannon, and heavy is a smoothbore 125mm tank round!) Keep this in mind when making vehicles or designing opposition. We've tried to break up the weapons selection—but vehicular weapons are so deadly that a miss-match can lead to the PC's dying in a smoking ruin after a lucky hit with a HEAP charge gets through the armor. For some groups this is a fine challenge. Others may decide a more nuanced graduated approach to opposition is in order (limit the HEAP shells in use).

The Basic Rules

Each [Total DP / STC] points of damage a vehicle takes will reduce its STC roll by 1pt. If a vehicle has 150 DP and a 15- STC, when it has taken 30pts of damage it will be rolling on a 12- STC roll. The effects of missing the roll are as follows:

Missed by -1 to -4 Crack: STC drops by an additional point
Missed by -5 to -9 Major Failure: Combat is essentially over.
Missed by -10: Critical Failure: Vehicle is *destroyed*

When a vehicle has half or more of it's original DP remaining, it must have been dropped by 1 STC or more to have to make a roll (a massive tank with 15,000 DP that takes 1pt of damage doesn't have to roll, unless it had already taken 99pts and the 1pt pushed it over into a new STC level.

Once a vehicle has taken half or more damage, however, *any* damage forces a roll.

If a vehicle's DP drop to 0 or below, it is destroyed (no STC roll).

Cargo and Core Systems

Now we're getting a little fancier. Most cars are, mostly, cargo space. You could fire a .50-cal M2HB machine gun through the cab and passenger compartments of a Lincoln town car and you wouldn't damage its capacity to *run* (kill everyone inside, sure. Knock out the steering column and the radio—of course—but it'd still *run*). Some vehicles (motorcycles) are almost all "required components" (we wanted to try firing a .357 Desert Eagle Magnum into various makes of motorcycle to see how often a shot would disable the bike—but, hey, we needed the money for artwork).

The Core/Cargo rules work like this: when a shot hits "the vehicle" you'll roll to see if the engine or drive-train or gas tank (or other vital system) was hit (that's *Core*) or if the trunk, passenger section, or cargo area (that's *Cargo*) was hit.

A lot of shots will be *aimed*, of course ("I'm shooting at his tires/I aim for the driver)—and that's okay too.

> **Core Hits:** Core hits are *bad*. Firstly Core doesn't have an STC roll—and it has a lot fewer damage points than the rest of the vehicle. When Core is destroyed, the vehicle is going to stop (or crash). *This makes some vehicles (like small motor-bikes) very easy to disable.*
>
> **Cargo Hits:** Cargo is a lot more likely to get hit for larger vehicles. When Cargo is hit, non-vital systems (weapons, controls, etc.) may be damaged (including people inside): some of that space will be *Cab* (Cabin) space—room for people.

Damage Effect Tables

We've added some damage effect tables beyond what the normal inanimate object rules call for. These add color and some strategy (a hit could degrade handling, for example) but are considered optional rules. It works like this: take damage (even if you don't make an STC roll) roll on the chart. If you *do* blow an STC roll then thinks like weapons getting knocked out or being temporarily off line are possibilities.

The Role of Vehicles

The Trade Game

Something that has worked since the early days of *Traveler* is to give the players a good, long range vehicle on loan from a major bank—and then they have to figure out how to use it to pay it off. One possibility is prospecting—but another (and a surer thing, really) is to become merchants. Travel around, buy low—sell high … get into trouble and have adventures. An outfit that's behind on their payments will be motivated to go all kinds of crazy places for the right price.

Core Damage

What were we thinking about when we did the Core-Cargo thing? It was this:

A motorcycle, by weight, has like 100+ DP. And it will likely fail an STC roll before it takes all of them—but still, a criminal fleeing a cop (or *Fast Company* vigilante) armed with a powerful handgun (or rifle) would have no real chance of taking it out with a single—or even multiple—shots.

Even though Vehicles *do* take Penetrating damage, it'd take a hell of a shot for a .357 to stop a bike—and that didn't strike us as realistic (and the same thing goes for an Rocket Propelled Grenade fired into the engine compartment of a Ford Focus … call us crazy, but we think it'd stop it.)

So we had to either reduce the DP a lot—but we wanted a measure of how hard the multi-ton steel object was to wreck—or have some weird critical hit system. That's what we did—we moved to a critical hit system that we feel works pretty well. Let us know what you think.

Vehicular Stats

Vehicles start with a body type (and if exactly what you want isn't listed, you can choose the closest model). This comes with a stock engine, stock tires, stock breaks, no weapons, no armor, A/C, front wheel drive, AM/FM radio, short-range CB com-unit, 2 year *very limited warranty*, tax, tag and title sold separately, no returns after you drive it off the lot.

Then you upgrade it. It'll have a listed number of spaces: fill them with weapons! To survive you can give it armor. Want it faster? Buy a bigger engine. Long range radios and other such gear is available as well. And there you go: hit the open road.

Stat	Description
Vehicle Name	The common name for the vehicle (small motorcycle). Some are specific. UAV stands for Urban Assault Vehicle.
Size Class	Vehicles have a size class from 1-12 (light cycle to semi-truck). This is used for some calculations (collision damage, forcing people off the road, etc.)
Cost	The cost of the basic vehicle in question (comes with standard stuff).
Base Handling	A plus or minus made to all Vehicle Operations rolls.
Stock Engine	Gives a letter-rating based on how fast the vehicle accelerates. Top speed can also be figured from this.
Collision Mod	Used to determine damage in the case of a collision.
To-Hit	This is a little confusing: people firing non-vehicular weapons get different modifiers to hit—and people firing vehicular weapons at pedestrians are at negatives to hit. This is the modifier for one vehicle to hit another with a vehicular weapon.
Ground Clearance	This is the number of inches of ground clearance the vehicle has. It determines how it handles rough terrain (higher clearance means less of a chance of getting stuck when off-road). Clearance in inches translates to a clearance rating (see the off-road rules). Most modifications change the number of *inches* of ground clearance, so individual modifications may *not* change a vehicle's over-all rating.
Base DP	The Damage Points for the whole vehicle. When reduced to 0 the vehicle is destroyed. Structure (STC) rolls are based on how many of these are left. Hits to "Cargo" come off of these points (although a failed STC roll that stops the vehicle will indicated damage to a vital system like the engine).
Core DP	The amount of damage that must be taken by Core Systems to stop the vehicle.
Spaces	The amount of "space points" a vehicle has to fill up with passengers, weapons, and other gear. By default, space points are empty, uncomfortable space, suitable for cargo, luggage, and equipment. Each cab points represents an available space that has been upholstered and made suitable for passengers. Your vehicle must have at least 1 available space (for the driver).
Cab	The number of people who will fit (a bit tightly) into the standard Cab of the vehicle. Note: A vehicle like a semi truck has a relatively small cab. To turn it into a bus, buy Extended Cab from the options list at

Computing MPG: To compute the MPG of a vehicle, take the Size Class Efficiency Rating and multiply by the vehicle's MPG factor for its acceleration. Note that armor increases effective Size Class and therefore reduces MPG.

Example: A 4cyl Ford Focus (Size Class 5) has an efficiency rating of 1.4. It's acceleration is F. This gives an MPG Factor of 18. This gives a 25.2 MPG (the rating is a cross of city and highway driving)

GT Model: Any car with a (GT) designation comes with a GT Model (a high-performance version). This gets +1 Acceleration (a E acceleration becomes a D), and its Size Class *for purposes of gas mileage* is increased by 1 as well. The cost is doubled.

Example: A character gets an 8cyl GT model car. It's Size Class 5 and cost 700c (goes to 1400c). It acts like its Size Class Six (for gas mileage purposes) and gets a D acceleration (better than the Stock *E*).

NOTE: This system is a gross and inaccurate simplification of real-world vehicles. It makes the erroneous assumption that fuel efficiency and maximum speed are based solely on acceleration and weight (and even worse it assumes that weight is based roughly on size).

Chassis

When creating a vehicle, first start with a body type and based on the size class and stock-engine acceleration, calculate top speed and cruising range.

Vehicle	Size Class	Mass	Cost	Base Handling	Stock Engine	Collision Mod	To Hit	Ground Clearance	Base DP	Core DP
Light Cycle	1	5	100c	+2	C	-2	-1	6"	105	10
Medium Cycle	1	8	150c	+2	D	-2	-1	6"	165	16
Heavy Cycle	2	11	225c	+2	D	-2	-1	6"	225	22
Light Dirt Bike	1	8	150c	+2	D	-2	-1	11"	185	18
Heavy Dirt Bike	2	11	250c	+2	D	-2	-1	12"	225	22
Sub-Compact (GT)	3	28	400c	+1	F	-1	+0	5 ¼"	570	56
Roadster Convertible (GT)	3	29	750c	+1	E	-1	+0	4 ½"	585	58
Dune Buggy/Jeep	4	32	350c	-1	F	-1	+0	9"	645	64
Compact (GT)	4	34	500c	+0	F	0	+0	6"	675	68
Sports Car (GT)	4	35	850c	+1	E	0	+0	4"	705	70
Mid-sized 4cyl	5	37	575c	+0	G	+1	+0	6"	740	74
Mid-sized 6cyl (GT)	5	37	650c	+0	F	+1	+0	5"	750	74
Mid-sized 8cyl (GT)	5	38	700c	+0	E	+1	+0	5"	765	76
Coupe Convertible	5	37	700c	+0	F	+1	+0	5"	740	74
Station Wagon	6	45	725c	-1	G	+2	+1	6"	900	90
Sedan	6	40	850c	-1	G	+2	+1	6"	810	80
Police Interceptor (GT)	6	41	900c	-1	F	+2	+1	5 ½"	825	82
Luxury Sedan	6	48	1100c	-1	F	+2	+1	6"	960	96
Muscle Car (GT)	6	50	1400c	-1	E	+3	+1	5 ½"	1005	100
Pickup Truck	7	60	1200c	-2	G	+3	+2	8"	1200	120
Van	8	75	1300c	-2	G	+4	+3	7"	1500	150
SUV	8	78	1500c	-2	G	+5	+3	12"	1560	156
UAV	9	85	2500c	-2	G	+5	+4	14"	1710	170
Minibus	9	85	1800c	-3	H	+6	+5	9"	1710	170
Small Truck	10	100	1600c	-3	H	+6	+6	9"	2010	200
Humvee	8	114	2000c	-2	G	+5	+3	14"	2100	210
Medium Truck	11	200	3000c	-4	H	+7	+7	14"	4005	250
Semi-Truck	12	800	4000c	-5	I	+8	+9	20"	16005	300

Size Class Table

Size Class	Spaces	Tank Size	MPG Efficiency	Cab
1	2	5	4	1
2	3	6.5	3	2
3	4	12	2	2
4	8	13	1.5	3
5	10	15	1.4	4
6	12	18	1.3	5
7	16	20	1.2	6
8	20	25	1	7
9	24	30	.80	8
10	28	40	.60	20*
11	38	60	.40	40*
12	100	100	.20	60*

Acceleration Table

Acceleration	Example	MPG Factor	Top Speed
A	Indy Car	4	250
B	Fast Cycle	6	225
C	Ferrari Testarossa	8	200
D	Viper	10	175
E	Porsche	14	150
F	Ford Focus	18	100
G	Hummer	27	90
H	Yugo	34	80
I	Semi Truck	89	75
J	[none]	100	70
K	[none]	120	65
L	[none]	160	60

Militarized Vehicles

Note that the vehicles listed above are *civilian* models. They can be (and often are) armed and armored and upgraded *after market*, but they remain (at their core) civilian designs.

Military vehicles (armored cars, Infantry Fighting Vehicles, up through tanks and Main Battle Tanks) are fundamentally different animals. To design a *military* vehicle, select the closest civilian model and apply the following changes

Mass x2 (military vehicles are fundamentally heavier)
Increase clearance by 2" (this assumes the vehicle remains *wheeled* and does not run on tracks)
Decrease stock engine acceleration by 1
Increase base DP by 50%. Core is 10% of the new base DP
Increase cost by 150% (or more)
Use the special military-vehicle armor rules listed in the armor section below)

Note that the Humvee is, essentially a militarized version of the civilian SUV.

APC's (Armored personnel carriers) tend to be military versions of vans or small trucks or mini-buses.

IFVs are *highly* modified versions of medium trucks.

The stock models listed above do not correlate to heavier military vehicles like MBT's, which require specific rules.

Military Armor

Civilian model vehicles are designed to be serviced easily, to give the driver a clear field of view, and so forth. Military vehicles have other priorities. Note that civilian vehicles *cannot* generally be armored this way—military armor represents armoring a fundamentally different vehicle.

- Full coverage plate: Plate coverage goes to 10 for the entire vehicle
- Enhanced DP: DP provided by armor (for both Base and Core) is increased by .8 (multiply values by 1.8)
- Increased weight: Weight is increased by 1
- Cost is increased by .4 (multiply cost by 1.4)
- The vehicle has a distinctly military appearance (no windows, utilitarian finish, etc.)

Stock Components

The standard vehicle comes with many standard options that can be upgraded. Here are the components that come with your car.

Stock Tires

Effects: Handling, Breaking Distance, Core Damage Points
Description: The standard tire is much like todays but with a ballistic weave coating. Tires are considered a Core System for most vehicles (not so for 18-wheel trucks and other redundantly wheeled systems).

Stock Suspension

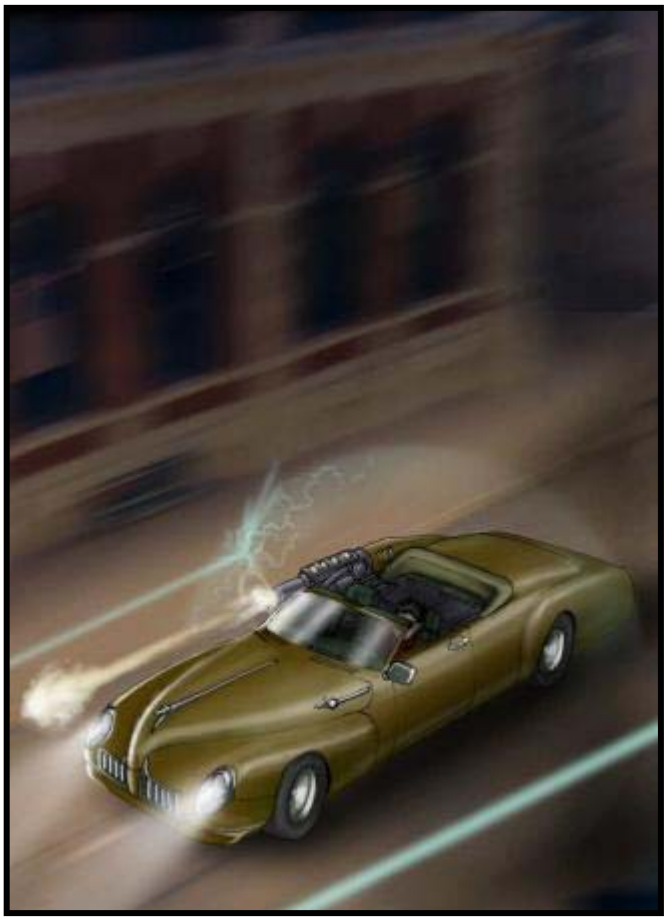
Effects: Handling, Core Damage Points
Description: The suspension determines how well the vehicle handles and how well it navigates rough terrain (an off-road suspension will allow vehicles to operate well on unpaved surfaces, for example). An upgraded suspension can improve Core DP.

Stock Brakes

Effects: Handling, Braking Distance
Description: The braking distance (a measure of how fast it can come to a halt) is important both for handling (especially avoiding collisions) and for the act of stopping itself.

Stock Engine and Exhaust

Effects: Acceleration, Fuel Efficiency, Core DP
Description: A lot can be done to improve the efficiency of an engine and exhaust system. Most of these simply improve the acceleration and top speed of the vehicle. Some make it run "cleaner" (not really a concern in Have-Not) and others improve range on a full tank (which *is* quite valuable).



Introducing the Iridium Engine's *Executive Ride*, fully equipped with energy torpedo, force-field, leather interior, and state of the art sound system. Wave-Cancellation sound-dampers and smart-shocks make for a truly superior driving experience.

Stock Radio

Effects: Communication
Description: In Have-Not every vehicle comes with a built in CB radio with a range of over 25 miles. This radio can be set as a locator (called "turning on the Transponder")—this makes it easier for some systems (especially missile systems) to hit your vehicle—but is usually required when approaching an armed outpost. These transponders also carry ID numbers similar to a vehicle's VIN—these are hard to forge and serve as an electronic "Flag" or "Banner" for the vehicle.

Vehicular Armor

In a dangerous world vehicles will come armored. Armor has several statistics:

Base Cost: This is the "standard" cost for the armor. The Size Class of the vehicle will probably adjust this cost.

Ex: A pickup truck, Size Class 7 purchases armor with a 400c Base Cost. The total cost for the armor is 1.3 x 400 = 520c.

Weight: Each point of Weight reduces the Acceleration Class by one letter (makes it worse)

Ex: The Pickup truck has an ACC of F after all modifications to the engine and everything else. The armor has a Weight of 2. This reduces the ACC of the truck to H.

Vehicle Size Class	Cost Modifier
1	.7x
2	.8x
3	.9x
4	1x
5	1.1x
6	1.2x
7	1.3x
8	1.4x
9	1.5x
10	1.6x
11	1.7x
12	1.8x

Plate and Undercoat: Vehicles have strong armored plates and comparatively weaker undercoats of armor. The Coverage is used when there is a standard hit: if the hit is by the Coverage number or less, the round strikes the plate. If the hit is by *more* than the Coverage Number then the attacker can choose to reduce the amount hit-by by the Coverage and strike around the plate: against the weaker undercoat.

Ex: A vehicle has a Plate coverage of 6. It is hit by 7. The attacker can choose to either hit by 7 and go against the Pate armor *or* hit by 1 and go against the Undercoat. If the attack had hit by 0-6 the attacker would have no choice: the round would just strike the plate.

Core Coverage: Core systems are usually pretty well covered (armored fenderwells, the engine is encased in a block of metal, etc. If an attacker *specifically calls a shot against Core Systems* then the attack must hit by Core Coverage to "shoot around the plates."

DP and Core DP: Being armored adds to the Damage Points a vehicle has. Add the DP to the total DP of the vehicle and the Core DP to the DP of the vehicle's Core systems.

Armor Type	Base Cost	Weight	Plate	Undercoat	Ablative	Plate Coverage	Core Coverage	DP	Core DP
Unarmored	0c	0	4/8	2/4	0	4	6	+0	+0
Light Bulletproof armor	200c	0	8/16	4/8	10	6	8	+50	+10
Welded on Junkyard Steel	400c	2	15/30	8/16	10	6	8	+100	+20
Battle Plast-Armor	500c	0	14/28	7/14	20	6	8	+100	+10
5mm Armor Steel	800c	1	30/60	11/22	30	6	8	+250	+50
Neo-Ceramic shell	1600c	2	100/200	50/100	300	6	8	+800	+150
12mm Composite	3200c	1	250/500	100/200	800	6	8	+1600	+300
15mm Armor Steel	2600c	3	250/500	100/200	1000	6	8	+1400	+200
3mm Neonium Alloy	3800c	0	250/500	100/200	600	6	8	+1600	+300
Ulterion Alloy Shell	8000c	2	500/1000	250/500	1100	6	8	+2400	+500
20mm Composite	6400c	4	500/1000	250/500	1200	6	8	+2400	+500
30mm Composite	12800c	6	1000/2000	500/1000	2000	6	8	+5000	+1000

Force Fields

Force Fields represent the ultimate in high-tech protection. Most of the ones that have survived have done so by virtue of not being attached to a major warlord's vehicle (i.e. that was hit by a nuclear rifle) so they don't represent the most powerful a force field can be. But they're quite impressive.

Vehicular Force Fields are *terrain following* and flow with the vehicle. They wrap the vehicle's form and then "bubble out" around the cab compartment. A convertible with a force filed will be well protected. Weapons connected to the field's computer system can be fired without penalty from within the field but otherwise it acts as a solid wall (if you jump out a vehicle with a field you'll be caught in the field and carried along).

Fields are visible as a faint glow (they show up well on scout sensors too).

Penetrating Damage: Targets cannot be penetrated while they are protected by an active force field. All damage is treated as IMPACT damage when it is applied to the field.

Leak Through: Damage that exceeds the field's power is applied to armor normally (plate or undercoat depending on the accuracy of the shot). Note that the damage is treated as impact damage if the field was active.

Degradation: When Force Fields are hit their power drops. The amount it drops by depends on how much damage was done relative to the *current* power of the field.

Reinforcement: Shields can recover from degradation over time. Each cycle time period (usually 10 minutes) the shield will regain 10% of it's total points.

Power Drain: Shields require enormous amounts of power. Running a shield for one second takes as much energy (fuel consumption) as driving 100 miles. Note that shields are run a negligible power and instantaneously reinforce themselves when damaged.

Cycle Time: the listed cycle time is how fast the force field comes back up. Each *Cycle Time* the field regenerates 20% of its original strength.

Damage is...	Field degrades by
Greater than the current strength field	1/5th damage done
Greater than or equal to *half* of the current strength of the field	1/10th of the damage done
Less than half of the current strength of the field	Nothing. No degradation.

Example:
A car with a 300pt force field is hit with a .50 caliber machine gun 3 times for 115 PEN damage apiece.

- The field is active, so the damage is resolved as impact damage
- Each hit does *less than* ½ of the field's current power so all three rounds bounce off and the field suffers no degradation.

The same car is hit by a 255 HEAP shell.

- The shell is treated as impact damage
- The shell does *more than* half of the shield's current power but not *more than* the shield's power. The shield degrades by 1/10th of the damage done (26 points) and is now at 274 power

The car suffers a second hit from the same weapon (another 255 points)

- The shell is treated as impact damage

- The shell does *more than* half of the shield's current power but not *more than* the shield's power. The shield degrades by 1/10th of the damage done (26 points) and is now at 248 power

The car is hit by a TOW missile for 900 points of HEAP damage

- The shell is treated as impact damage
- The shell does *more than* the shield's current power. The shield degrades by 1/5th of the damage done (180 points) and is now at 68 power
- The vehicle takes 900 – 248 = 652 impact damage (the shield's power *before* degradation) against its armor

In this example, if each hit occurred on a separate second, the car would have used up 13.2 gallons of fuel powering its shield:

- MPG: 30 MPG
- Driving 100 miles takes 3.3 gallons of fuel.
- Powering the field for 1 second takes 3.3 gallons
- 4x3.3 = 13.2 gallons of fuel

Mark 1 Force Field

Power	300
Cycle Time	10min
Spaces	1
Cost	16,000c

Mark 2 Force Field

Power	500
Cycle Time	10min
Spaces	1
Cost	30,000c

Mark 3 Force Field

Power	1000
Cycle Time	10min
Spaces	1
Cost	100,000c

Mark 4 Force Field

Power	2800
Cycle Time	10min
Spaces	1
Cost	---

ECM Modules

Electronic Counter Measures are of greater use the more sophisticated your opponents are. Against guys with guns and rocks, they're useless. Against highly automated, integrated defenses, they can be devastating.

Stealth Finish — ECM

Description: The car is painted with radar-absorbing and deflecting material. This can be combined with any armor, and gives the car -4 to be spotted with radar.

Cost 300c **Effect** -4 to radar perception rolls **Space** 0

Screamer Module ECM

Description: This is a radio transmitter designed to "blind" active and passive radar sources. They'll know you're coming but not exactly where they are or how many of you there are (radar blinded by the "noise" cannot distinguish targets within 100 yards of the screamer module)

Cost 300c **Effect** -4 to radar perception rolls of all radar targeting the car **Space** 0

Wild Weasel ECM

Description: This is the more powerful, military version of the screamer module.

Cost 900c **Effect** -6 to radar perception rolls of all radar targeting the car (150 meters) **Space** 0

Active Response Laser Array (ARLA) ECM

Description: A lot of weapons systems like to bounce lasers off their targets. Active Response Lasers are an array of low-powered lasers that fire back and "pulse" in ways that confuse the sensors that intend to use the targeting laser.

Cost 2500c **Effect** -4 to laser-guided weapons **Space** 0

EMP missile defense ECM

Description: Guided missiles and robotic weapons rely on complex and somewhat fragile computer systems to track and hit their targets. Even "dumb" missiles can sometimes be detonated by the right set of electromagnetic signals.

Cost 3400c **Effect** -4 for self-guided missiles (*not* wire-guided missiles like the TOW or Dragon) to hit. 9- chance of detonating self-guided missiles. 6- chance of detonating "dumb" missiles). Missiles must be *armed* before they can be auto-detonated (the EPM unit will *not* detonate missiles in the magazine). **Space** 0

IR Headlights and HUD ECM

Description: The car is equipped with a night-vision (infrared and light magnification) view finder and "headlights" that shine a light that is invisible to unaided humans. This allows normal night driving (the same quality you'd get with regular headlights) without giving your position away to un-equipped vehicles.

Note: vehicles (and people) equipped with IR or night-vision devices can spot the beams normally.

Note: The standard cost upgrades weapons with night-sight as well. Weapons fired "open turret" (that is, without targeting systems) are not aided by the IR / HUD system.

Cost 60c **Effect** Normal night operations **Space** 0

Vehicular Weapons

Vehicles were outfitted with weapons almost from the day of the collapse. Many of the working distro-points wouldn't produce combat vehicles—but they would build weapons. Moreover, the distro-points did produce "defensive" modular armor and would upgrade existing civilian designs for "survivability." Some of these upgrades were comparable to what a 20th century tank would have for armor (and some of the distro-points that *did* produce militarized vehicles, by contrast, built things that would survive almost anything short of a barely sub-nuclear blast. The continents of Europe and Asia were therefore blanketed in nuclear fire in the ensuing battles).

These vehicles were in some cases almost exact analogues of 20th and 21st century war machines (the Urban Assault Vehicles, for example) and in other cases were nearly absurd parodies of what a "suburban army" might use (recreational vehicles outfitted as command posts, monster trucks with heavy rocket launchers, and station wagons with wire-guided rocket launchers atop them).

Despite their appearance, they were—and still are—extremely effective. They were not, however, the complete and integrated fighting force the *Have* technology *could* have theoretically provided (some of that *was* seen in Europe—and details are sketchy: not many records remain--only scraps of short-lived broadcast video footage showing floating battle tanks over hoards of robotic infantry and reinforced by high-altitude tactical nuclear artillery). Thus, things like targeting systems were often whatever the designers could coax out of their (often rapidly failing) Distro Point and not the best the technology had to offer.

Ammo Types

The weapons that were produced used a bewildering array of calibers, shells, and energy sources. Over the decades of ceaseless and hopeless war these were whittled down to just a handful of different munitions.

Chemical bullet	**Cost Per Unit:** 10c / 200 rounds
Feed Mechanism: Belt fed from a Box Magazine	**Damage Type:** Standard PEN damage
Notes: Chemical rounds are steel or lead bullets with cased or caseless chemical propellant. They are the most common form of ammunition in the world.	

Chemical HEAP Shell	**Cost Per Unit:** 15c/100 DMG per shell
Feed Mechanism: Manual load (4s) or auto-loader (2s)	**Damage Type:** PEN damage. Base damage is 3x if Penetrates
Notes: The High Explosive Armor Piercing munition is a shaped charge in a projectile casing. It's one of the preferred weapons of the 20th and 21st century armies and rightfully so: if it penetrates the armor of a vehicle or installation the results are usually terminal.	
Chemical Blast Shell	**Cost Per Unit:** 5c/100 DMG per shell
Feed Mechanism: Manual load (4s) or auto-loader (2s)	**Damage Type:** IMP Explosive damage

Notes: Blast shells create a large explosive that damages an area in a spectacular fashion. The damage decreases by the square of the distance each 2 yards. If the attack misses by 1, it hits for ½ damage (otherwise the shell falls further than 2 yards away—the GM must determine how far). Finally because the attack is explosive it will hit for a minimum of +4 damage modifier. A Blast hit will *not* hit Core unless the shell itself hits Core.

Concentrated Energy	**Cost Per Unit:** 10c/100 damage per 10 shots.
Feed Mechanism: Fuel Cells	**Damage Type:** PEN or IMP based on weapon type.
Notes: Energy weapons are rarer than projectiles—they can't be manufactured with the 20th century technology the world has developed. They aren't exactly *rare*, however. They were produced in massive quantities during the Age of War and their construction techniques mean they've lasted in excellent condition for some time.	

Chemical HE AP Rocket	**Cost Per Unit:** 25c/100 DMG per rocket
Feed Mechanism: Manual load (6s) or auto-loader (3s)	**Damage Type:** PEN damage. Base damage is 3x if Penetrates

Notes: Chemical rockets work as shells but have four basic guidance systems. Missiles are slower than machine gun shells (not to mention lasers) and may need to be guided in for several seconds.

- **Ballistic Trajectory**: the missile is simply a powered projectile. It has no guidance system. The attacker must lead the target in order to hit.
- **Wire Guided**: The firer launches the missile and then keeps it tracking.
- **Radar Guided**: The missile follows a homing signal from the attacking vehicle. This is good in that the missile operates as fire and forget—but can be jammed.
- **Laser Guided**: The rocket is directed in by a laser from the attacking vehicle. It is not susceptible to jamming.

Weapon Targeting Systems

The most basic targeting system is the gun-barrel: if you're behind the gun, firing it, you can kind of see where it's pointed. The laser-guidance system is perhaps the most complex, where the attacker uses a video screen to position crosshairs and then the vehicle's onboard computer and telemetry system tracks and destroys the target by itself.

In the middle are all kinds of things. Most of them are not very accurate. How a weapon is mounted and how it is aimed can have all kinds of effects. The .50-caliber machine gun on the modern day M1A2 Abrams tank is considered (according to our sources) less accurate against infantry than the 7.62 co-axial gun. In Have-Not this problem is even worse.

Basic Sights

Description: Basic Vehicular Weapons sights involve a *Fire Control* computer and a weapons mounted RRAT sensor (Radar Ranging And Tracking). The effect is as follows:

- The weapon is fired at +0 to hit normal sized vehicles (modified by the vehicle's body size).
- There is *no negative modifier* to hit if the Driver has not blown a control roll. The car may be rolling at -8 but if the driver makes it all gunners (including the driver if he's firing) simply roll against their weapon skill.
- All gunners are at -4 to hit Pedestrian sized targets

Cost: 0

Effect: +0 to hit vehicles, -4 to hit pedestrian sized targets.

Aim: All aim is a 5 REA Medium action giving +1 to hit.

Open Turret Aiming

Description: If the gun is being fired from an exposed position (i.e. the hatch is open and the gunner is sticking part-way out) then normal to-hit modifiers apply.

- Weapons are at -2 to hit if the vehicle is moving (firing from a moving platform)

- Weapons get an additional -1 to hit for every point of Control Modifier the vehicle is undertaking during the turn *whether the driver makes his or her control roll or not*: if the driver blows a control roll there may be even more severe modifiers.
- Pedestrians are at no special negative to be targeted.
- Rolls to hit vehicles are at +1 per 2 full size classes (Size Class 5 is at +2 to be hit).

Furthermore, if a vehicle is hit with a blast rocket, the gunner takes half damage. If the vehicle's cargo is hit, *even if no damage gets through the armor,* a gunner will be hit directly on a 7- roll (if random). Aiming at the gunner is at -1 in addition to any negatives to hit pedestrians and the gunner gets 4 Coverage from the vehicle.

Cost: 0

Effect: +1 to hit vehicles per 2 full Size Classes, +0 to hit pedestrians

Aim: Aim is normal.

Improved Sights

Description: Standard Sights allow for good aim and better targeting against small targets.

Cost: 100c x Size of Weapon

Effect: +0 to hit vehicles, -2 to hit pedestrian sized targets.

Aim: Aim may be taken for 5 REA (+1 to hit) or 8 REA (+2) to hit.

Advanced Sights

Description: Advanced Sights include a scope, range meters, and light "night vision." They make a weapon valuable against small targets as well as large ones.

Cost: 300c x Size of Weapon

Effect: +1 to hit vehicles, -1 to hit pedestrian sized targets. Normal Aim may be taken

Laser Guided Auto-Tracking

Description: Who needs a gunner? Hit once with this and the computer will keep trying with a 13- Heavy Weapons skill until it misses twice in a row.

Cost: 1500c x Size of Weapon

Effect: +0 to hit vehicles, -4 to hit pedestrian sized targets.

Weapons Link

Description: Two like weapons, identically mounted may be linked so that when one fires on a target, both fire (both use the same roll to hit and Damage Mod roll but are applied separately vs. armor). The Link may be disabled—but this takes 10 min and a mechanics roll.

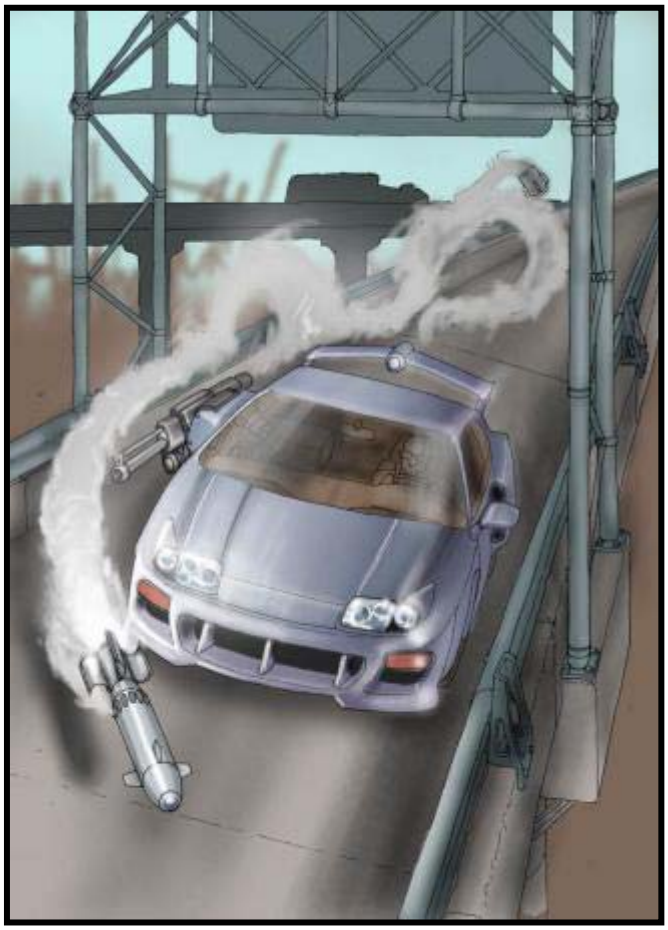
Cost: 100c

Effect: Doubles weapon fire.

Weapon Mounts

Finally the question of how a weapon is affixed to the vehicle comes up. Weapon mounts determine arc of fire of the weapon, how it is targeted, and how much, if any, space inside the vehicle it takes up.

NOTE: Many of the weapons from the character book are suitable for mounting on vehicles. Those weapons are not generally given sizes. As a rule, anything that is described as HEAVY or MOUNTED takes up 2 points of space when mounted. Anything else takes 1 point of space.



Fixed Mount	
Description: The basic mount is to build the weapon into the vehicle so that the driver aims by maneuvering the vehicle. This is very cheap, allows the driver to use Combat Driver (the Vehicle Operations skill paid for as a combat skill) to hit with the weapon. It also limits the weapon's arc to 90-degrees on whichever side the weapon is mounted (usually the front)	
Cost: Free	**Space:** 0
Effect: 90-degree arc, must use Combat Driving to hit with the gun.	

Swivel Mount	
Description: The weapon is affixed to the vehicle in such a way as to have some degree of freedom (but not as a turret). This gives it a 180-degree arc of fire along whatever side it is mounted. It also allows the use of the Gunner Skill.	
Cost: 50c per Size of Weapon	**Space:** 0
Effect: 180-degree Arc, may use either Combat Driver or Gunner (Heavy Weapons) skill to hit with the weapon.	

Turret	
Description: The weapon is on top of the vehicle giving a 360-degree arc of fire.	
Cost: 150c per Size of Weapon	**Space:** 1 per size of weapon
Effect: 360-degree arc. May use either Combat Driver or Heavy Weapons skill to hit with the weapon.	

Light Weapons

.50 Cal Belt Fed MG	Size	Cost	Dam	ROF	Control	Range	Reload
Chemical Bullet	2	800c	115 PEN	3x [8]	-3	-1/225y	Belt

The .50 Cal is the standard heavy machine gun seen on vehicles. If fixed it has a -1 control roll. However if swivel mounted its Control is -3.

.40 Cal Belt Fed MG	Size	Cost	Dam	ROF	Control	Range	Reload
Chemical Bullet	1	400c	60 PEN	3x [8]	-2	-1/100y	Belt

A common and economical choice of vehicular weapon, the .40 Cal is heavy enough to damage lightly armored vehicles substantially while being cheap enough to qualify as a secondary weapon. It's Ctrl is -1 if mounted Fixed.

.30 Cal Belt Fed MG	Size	Cost	Dam	ROF	Control	Range	Reload
Chemical Bullet	1	200c	30 PEN	3x [8]	-1	-1/100y	Belt

The .30-cal MG is, perhaps the most common weapon either emplaced or vehicular mounted. Sometimes gun pods will include several.

.30 Cal Rotary Minigun	Size	Cost	Dam	ROF	Control	Range	Reload
Chemical Bullet	1	600c	30 PEN	9x [32]	-.5	-1/100y	Belt

Designed with a servo-controlled tripod, the .30-cal Minigun is highly controllable and has a high rate of fire.

Light Plasma Cannon	Size	Cost	Dam	ROF	Control	Range	Reload
Concentrated Energy Weapon	1	500c	90 IMP	3x [8]	-1	-1/150y	160

A black long-barreled weapon the Light Plasma weapon is the energy equivalent of a medium machine gun.

Light Auto-Laser	Size	Cost	Dam	ROF	Control	Range	Reload
Concentrated Energy Weapon	1	600c	40 PEN	9x [32]	-0	-1/500y	320

The light Auto-Laser fires a barrage of laser beams (32 per second). It is long ranged and has no kick at all. It uses fuel cells that fire for 10seconds before being replaced.

MLRS HE Rocket Pod	Size	Cost	Dam	ROF	Control	Range	Reload
Chemical Blast Rocket	1	800c	150x IMP	4x [4]	-1	-1/50y	[16] 0s

The Multi-Launch Rocket System High-Explosive Rocket Pod is a product of the Age of War. It fires a burst of 4 "Micro-Rockets." These are not shaped-charge rounds, but rather High Explosive blast shells with a RAD of 2 yards. The pod-tube holds 16 rockets (4 shots) and must be reloaded manually after expenditure. The rockets still "hit" if they miss by -1. If they miss by -2 they hit for ½ damage. In any event, the Damage Modifier for an explosive attack is a minimum of +4.

Tri-Barrel Laser Battery	Size	Cost	Dam	ROF	Control	Range	Reload
Concentrated Energy Weapon	1	1500c	3x60 PEN	1	--	-1/500y	0s

The tri-barrel laser battery fires three concurrent beams. Each has a PEN value of 250 (although it only does 60 damage). It uses a fuel cell that holds 200 shots (each shot being 3 beams—the trigger can be pulled 200x before reload). All shots hit with the same roll and damage modifier and are applied separately against armor.

Napalm Inc. Urban Flamethrower	Size	Cost	Dam	ROF	Control	Range	Reload
Inflammable Chemical Spray	**1**	**200c**	**300 IMP**	**1**	**-**	**-1/10y**	**0s**

The Urban Flamethrower is a short range weapon (mostly seen in the BoneYard where short range weapons may be practical). When it hits, it burns for full damage next turn (on Initiative Phase 0), and then half damage the turn after, and then goes out (the GM can use the rules for setting things on fire optionally, but it's not required and most vehicles don't burn all that well anyway).

Disposable Joe's Junkyard Nail Gun	Size	Cost	Dam	ROF	Control	Range	Reload
Railgun	**1**	**100c**	**30 PEN**	**4x [12]**	**-.5**	**-1/25y**	**1s**

The Nail Gun is a weapon of last resort. It has an ammo-feed that looks like a meat grinder, the barrel is an electromagnetic rail gun that accelerates the ammunition (usually nails) that is dumped into it. It isn't accurate but it is scary.

Slide-Winder Missile	Size	Cost	Dam	ROF	Control	Range	Reload
Chemical Blast Rocket	**2**	**100c**	**300 X**	**1**	**-**	**-1/80y**	**30s**

The Slide-Winder (not *side-winder*) is a surface to surface guided missile. Each missile gets essentially 1 shot in combat (and they take about 30s to reload) but they're cheap and do lots of damage if they hit. The 100c buys the launcher and 2 missiles. Extra missiles are 15c each. The missile is guided: it gets a +2 to hit (does not add to damage mod). It tends to weave crazily as it keeps its lock on.

Slide-Winder Swarm Launcher	Size	Cost	Dam	ROF	Control	Range	Reload
Chemical Blast Rocket	**2**	**500c**	**300 X**	**1**	**-**	**-1/80y**	**30s**

A Swarm-Launcher is a hexagonal launcher that fires six Slide-Winder missiles in a mad swarm at the target. When fired roll 1d and subtract 1. That number of missiles will seek other targets in the same direction as the original target (roll randomly) and lock on with a 12- to hit.

Plasma Lance	Size	Cost	Dam	ROF	Control	Range	Reload
Chemical Blast Rocket	**1**	**500c**	**200 IMP**	**S**	**-2**	**-1/100y**	**V1/200**

Mounted weapon with dual-fire mode. It can target for 150 IMP with an explosive effect (a miss by 1 is a hit by 0, minimum Damage Mod of +4, RAD of 2 yards). It is usually fed off a V1 Power Cell.

Advanced Recoilless Rifle	Size	Cost	Dam	ROF	Control	Range	Clip
Mass Driver	**1**	**700c/10c**	**300 PEN**	**S**	**-.5**	**-1/300y**	**V1/10**

Sometimes crew served, the ARR also sees duty as a vehicular weapon. It fires a true APDS (discarding sabot) shell at hyper velocities.

Medium Weapons

75mm Recoilless Rifle	Size	Cost	Dam	ROF	Control	Range	Reload
Explosive HEAP Shell	**3**	**1200c**	**225 HEAP**	**1**	**--**	**150y**	**4s**

The Recoilless Rifle fires an explosive, armor piercing shell. As an HE-AP shell, if it penetrates its base damage is multiplied by 3.

25mm Cannon	Size	Cost	Dam	ROF	Control	Range	Reload
Chemical HEAP Shell	**2**	**900c**	**125 HEAP**	**1**	**-.25**	**-1/100y**	**1s**

A light cannon. As an HE-AP shell, if it penetrates its base damage is multiplied by 3.

Medium AV Rocket Launcher	Size	Cost	Dam	ROF	Control	Range	Reload
Chemical HEAP Rocket	**4**	**1000c**	**300 HEAP**	**1**	**--**	**-1/200y**	**0s**
The launcher fires a light, Anti-Vehicular radar-guided missile. As an HEAP shell, if it penetrates its base damage is multiplied by 3. The pack holds 8 rockets and can fire 1 per turn.							

Heavy Pulsar	Size	Cost	Dam	ROF	Control	Range	Reload
Concentrated Energy Weapon	**3**	**1800c**	**600 IMP**	**1**	**--**	**-1/200y**	**2s**
The Heavy Pulsar is a basic plasma energy weapon.							

Industrial Cutting Laser	Size	Cost	Dam	ROF	Control	Range	Reload
Concentrated Energy Weapon	**2**	**2800c**	**300 PEN**	**1**	**--**	**-1/1400y**	**0s**
The Laser has a PEN value of 1500 (even though it only does 300 PEN damage).							

Gauss Cannon	Size	Cost	Dam	ROF	Control	Range	Reload
Railgun	**2**	**3000c**	**250 PEN**	**4x [12]**	**-0**	**-1/300y**	**Belt**
The Gauss Cannon is a long, black barreled gun with a prominent firing yolk. It uses tungsten steel shells accelerated to hyper-velocities by micro busts of electromagnetism.							

Particle Lance	Size	Cost	Dam	ROF	Control	Range	Reload
Concentrated Energy Weapon	**3**	**2500c**	**500 IMP**	**3x [-]**	**-1**	**-1/200y**	**1s**
The Particle Lance fires a continuous beam of white-hot lightning. It may be swept across several targets or concentrated on one. Unlike the normal autofire rules, each hit that is applied to the same target *adds* together before being applied against armor. If the Particle Lance is fired at a single vehicle and all 3 shots hit the damage is 1500 IMP, not 500 three times.							

Plasma Cannon (Phase)	Size	Cost	Dam	ROF	Control	Range	Reload
Concentrated Energy Weapon	**3**	**2500c**	**300 IMP**	**1**	**--**	**-1/400y**	**1s**
The Phase Plasma Cannon fires a blast of energy that ignores 200pts of armor, and degrades force fields by double normal amounts. The cannon has a 2 yard Explosive radius (but the explosion doesn't get the listed effects). If it misses by 1 it still hits and if it misses by 2, it hits for half damage. The minimum Damage Mod for the explosive splash damage is +4.							

Boomerang Rocket	Size	Cost	Dam	ROF	Control	Range	Reload
HEAP Rocket	**3**	**1400c**	**350 HEAP**	**1**	**--**	**-1/150y**	**1s**
The Boomerang Rocket launches from a tube in the *rear* of the vehicle and then arcs around front, following the guidance system to its target. The pack holds 8 and it can fire 1 per turn. It's also hard to see from a distance.							

Heavy Weapons

Spherical Torpedo		Cost	Dam	ROF	Control	Range	Reload
Homing Blast Shell		**1800c**	**1200 IMP**	**1**	**--**	**Special**	**--**
The Spherical Torpedo launcher goes on the back of a vehicle. When fired, it releases a robotic homing sphere with a rubber outer coating and directional jets. It tracks the targeted vehicle, bouncing and rolling towards it. It has a RAD of 2 Yards (it produces a huge explosion). A miss by 1 still hits, a miss by 2 hits for half damage, it has a 14- self-guided chance to hit or the gunner's skill, whichever is better. It can be shot down on the way in (it's at -9 to be hit by vehicular weapons but 30 damage points will destroy it). It's fire is							

an 8 REA long action so long as the target is within 8 car-lengths.

TOW-1 Missile	Size	Cost	Dam	ROF	Control	Range	Reload
Chemical HEAP Rocket	3	4000c	900 HEAP	1	--	-1/400y	10s

The TOW Missile is a heavy guided missile. If the vehicle is penetrated, Base damage is 3x listed.

Dragon Missile	Size	Cost	Dam	ROF	Control	Range	Reload
Chemical HEAP Rocket	2	2600c	730 HEAP	1	--	-1/400y	6s

The Dragon Missile is a medium guided rocket. If the vehicle is penetrated, Base damage is 3x listed.

Shrike 4 Rocket Pod	Size	Cost	Dam	ROF	Control	Range	Reload
Plasma Explosive Rocket	2	2600c	600 PEN	2	-2	-1/200y	--

The Pod holds 12 rockets and can fire 2 per second. They have an Explosive Splash damage of 200 IMP. The struck vehicle will take both hits (if it missies by 1, it still hits for half damage with the explosive damage, minimum Damage Modifier is +4).

125mm Smoothbore Shell	Size	Cost	Dam	ROF	Control	Range	Reload
Chemical HEAP Round	5	4800c	1400 PEN	1	--	-1/400y	10s

Fires a tank shell. Explosive chemical round. If the vehicle is penetrated, Base damage is 3x listed.

40 Gun	Size	Cost	Dam	ROF	Control	Range	Reload
Chemical HEAP Shell	3	2400c	800 PLAS	S	-2	-1/120y	2xV2/100

The 40 Gun is a moderately heavy plasma gun that traditionally sees service as a backup to a far heavier weapon.

105mm Mortar	Size	Cost	Dam	ROF	Control	Range	Reload
Chemical HEAP Shell	4	2400c	1200 X	S	--	-1/880y	4s

The 105mm Mortar is a computer-aimed system that fits onto the back of a vehicle (it's quite large, like a small cement mixer). It requires a computer targeting system to range-find and is "indirect" (the shell flies in an arc). In game terms that means that each 200y away gives an extra 1 second of flight time after being fired.

Super Heavy Weapons

TOW-2 Missile	Size	Cost	Dam	ROF	Ctrl	Range	Reload
Chemical HEAP Rocket	3	110000c	2000 HEAP	1	--	-1/400y	10s

The TOW Missile is a heavy guided missile. If the vehicle is penetrated, Base damage is 3x listed.

100 Gun	Size	Cost	Dam	ROF	Control	Range	Reload
Heavy Plasma Gun	3	9000c	3800 PLAS	S	-2	-1/120y	4xV2/100

A heavy-duty plasma gun that despite a fairly short range has a high rate of fire for a Heavy Weapon. It is traditionally fed off of 4 V2 Power Cells.

Vehicular Upgrades

The standard list is for industrial manufactured vehicles. That wasn't the case for many of the designs that rolled out of the Distro Points.

NOTE: When several upgrades affect acceleration, the upgrades with the *lowest* maximum are applied *first*. This gives the car the full effect of the (generally cheaper) improvements.

Example: A stock sports car (ACC E) gets the following upgrades
- Carotid High-Performance Fuel Injection (+1 ACC, Max D)
- Turbo Charger (+1 ACC, Max C)
- Scram Jet Performer Intake (+1 ACC, Max E)

The scram jet is lowest. It applies first, but because the car's ACC is *already* E, it only adds 4 points (a fractional acceleration).

The Carotid HPF Injection system is the next lowest Max (D), and improves the car's ACC from E to D (the full acceleration)

The Turbo Charger has the *highest* ACC maximum, and is applied last, increasing the car's ACC from D to C.

The car's final acceleration is C + 4 (for the scram jet).

Engine Upgrades

Scram-Jet Performer Intake Engine Upgrade Max E (or +4)
Description: Your stock air intake is designed to be *quiet*—silence is golden but the Scram-Jet is evolved-chromium for howling performance!
Cost 600c **Effect** +1 ACC up to Max, +1.5x Core DP **Space** 0

"Afterburner" Sports Exhaust System Engine Upgrade Max E (or +6)
Description: High performance cannon-styled full high-volume exhaust system (.1% Neonium Alloy).
Cost 750c **Effect** +1 ACC up to Max, +1.5x Core DP **Space** 0

Carotid High-Performance Fuel Injection System Engine Upgrade Max D (or +5)
Description: Performance fuel systems are a good way to take your street machine to the next level.
Cost 800c **Effect** +1 ACC up to Max +.5x Core DP **Space** 0

Turbo Charger Engine Upgrade Max C (or +7)
Description: Forced induction system (exhaust gasses power a system to force compressed air into the engine).
Cost 1200c **Effect** +1 ACC up to Max +.5x Core DP **Space** 0

Super Charger Engine Upgrade Max C (or +12)
Description: A power-driven forced induction system (air is compressed by a motor!). Can't be combined with a Turbo-Charger.
Cost 1500c **Effect** +1 ACC up to Max +.5c Core DP **Space** 0

Air Breather Engine Upgrade Max C (or +12)
Description: Comes up from the hood—looks a bit like a rocket launcher—it's an air intake for a turbo or super-charger. This give +1 ACC or double the amount of improvement given to ACC.
Cost 800c **Effect** +1 ACC up to Max +.5 Core DP **Space** 1

Evolved Nitrous Engine Upgrade Max A
Description: The switch that makes all the difference—tanks hold 8 seconds of charge each.
Cost 300c **Effect** +2 ACC **Space** 0

Engine Rebuild Services
Most of aftermarket modifications above are improvements on the stock engine. It is possible to *completely* rebuild the engine using higher quality parts. Industrial and military vehicles are typically armored to the point where the stock engine won't move them.

Predator Hyper-Drive Engine Rebuild Engine Upgrade Max C
Description: Evolved Chromium and N-alloy parts make up this over-charged heavily gunned racing engine. With over 350hp at 7600 RPM it's the punch you're looking for on the open roads or the combat track. Round up for spaces taken.
Cost 1500c or 1.3x Body (whichever is higher) **Effect** +2 ACC up to Max +1x Core DP **Space** +2 spaces (or 20% of total, whichever is higher)

Titan-Overlord Sports Engine Rebuild Engine Upgrade Max A
Description: Roaring at over 700 hp the Overlord eats up the road and the competition. Round up for spaces taken.
Cost 2500c or 2x Body (whichever is higher) **Effect** +2 ACC up to Max +1x Core DP **Space** +2 spaces (or 20% of total, whichever is higher)

Harvester Overdrive Engine Rebuild Engine Upgrade Max E
Description: Rebuilding the engine for power over speed, this aftermarket mod is usually designed to provide over-land power for armored or heavy-frame vehicles. You won't win any races, but it'll get you there.
Cost 1000c or 1.2x Body, whichever is higher) **Effect** +2 ACC up to Max +1x Core DP **Space** +2 spaces (or 20% of total, whichever is higher)

Industry IIV Engine Rebuild Engine Upgrade Max H
Description: The Industry IIV is used for war machines and battle monsters. Are built to move big rigs and heavily armored vehicles. Candidates for the Indy IIV are just worried about moving.
Cost 800c or 1x Body, whichever is higher) **Effect** +3 ACC up to Max +1x Core DP **Space** +2 spaces (or 20% of total, whichever is higher)

Suspension and Handling

Note: Terrain can have varying (mostly negative) effects on a car's handling and agility. Rules for getting stuck and taking damage (driving into a rock, for example) are given below. Typically off-road modifications can have the following effects

1) Increase ground clearance. This increase is given in *inches*. For game purposes, ground clearance is handled as an over-all rating. Simply buying one or two modifications *may not* increase a car's clearance rating.
2) Reduce driving control modifiers. Road conditions such as rain, oil, and rough terrain may modify driving rolls *made for purposes other than determining if you got stuck*. Having nice tires can reduce these modifiers.

Arc-Blade Wing (Spoiler) Handling Stacks
Description: Improved handling and control at high speeds, the Arc-Blade looks stylish if you're just standing still.
Cost 50c **Effect** +1 Control at 90+ mph **Space** 0

Anaconda Coil Shocks Handling Stacks
Description: An auto-balanced smart-suspension for improved handling and control.
Cost 900c **Effect** +1 handling. +.25x Core DP **Space** 0

Mk 3 ARS Break System Handling Stacks
Description: Magnetic calipers, smart break-pads, and fiber-optic cabling for light-speed response time
Cost 1600c **Effect** +1 handling, reduces -2 negative modifiers from braking (*the +1 handling still applies too*). **Space** 0

Nu-Chrome Disk Breaks Handling Stacks
Description: Improved control and extra "stopping power!"
Cost 250c **Effect** Reduces negative modifiers -1 during braking. **Space** 0

Sports Tires Handling (not with other tires)
Description: Ballistic weave protected, hyper-treads for extra control and handling.
Cost 30c x Size Class **Effect** Reduces -1pt of negative modifiers for braking. +10 Core DP **Space** 0

Armor-Steel Radials (Run Flat tires) Handling (not with other tires)
Description: Good thing the highways are self repairing—these ultra-wide tires are the ultimate in protection and control. Uses smart-polymers for better grip!
Cost 90c x Size Class **Effect** Reduces -2pts of negative modifiers for braking +30 Core DP **Space** 0

Strider Improved Suspension Handling (no other suspensions)
Description: Off-road suspension takes the shock out of bad roads and gives you better control when the going gets *rough*.
Cost 150c **Effect** Ignore -2pts of terrain mods. +1.5” Clearance. **Space** 0

Strider Off Road Max Traction Tires Handling (not with other tires)
Description: Built for the most rugged terrain out there. Nuclear wasteland, acid river, plague mud—go anywhere and look good doing it. Their high-strength tie-in construction combines three full dura-weave body plies, two high-tensile neonium alloy cord belts and a full tungsten-fiber cap for outstanding resistance to on- and off-highway hazards.
Cost 25c x Size Class **Effect** Ignore -2pts of terrain mods; increase ground clearance by 1.2” **Space** 0

Morphic Off-Road Suspension Handling (no other suspensions)
Description: Low for the street, high for the valleys, the Morphic Suspension can handle it all.
Cost 350c **Effect** Ignore -4pts of terrain mods. +2" clearance when active. **Space** 0

All Wheel Drive Handling
Description: Each wheel gives motive power separately. Great for getting out of tight spots off-road.
Cost 150c for Cars, 0 for Size Class 7 and up **Effect** Remove -2 "stuck" modifier **Space** 0

Industry IIV Shock System Handling
Description: Improved shocks not only give a smoother ride over rough terrain but increase the rise of the vehicle as well.
Cost 40c **Effect** Add .5" ground clearance and reduce to-hit modifiers from rough terrain by 2pts **Space** 0

Lowrider Handling (no height increase)
Description: The vehicle is lowered to 2" for a Size class 1-6 vehicle or 4" for a size-class 7+ vehicle.
Cost 200c **Effect** +1 Handling, +1 Speed Class Top Speed **Space** 0

Power Systems

Putting in a new engine means replacing the stock engine entirely. The size of the stock engine is 1/3rd the space of the vehicle. To calculate the space available after an engine replacement, find the difference between the size of the new engine and the size of the stock engine. Note that in some cases, the new engine may actually be smaller than the existing engine and yield *more available space* after the replacement.

Example: So a sports car (size class 4, space 8) has a stock engine that is 8/3 or 3 (round normally) spaces. Replacing the stock engine with a nuclear engine costs 10 (the new engine) – 3 (the stock engine), or 7 space points, leaving 1 space left for the driver.

Nuclear Engine Power System Extremely Rare
Description: Why refuel when you've got a nuclear core under the hood? The thing runs forever, is fairly clean (but if Core is destroyed everyone takes 500 RAD pts explosive 2 yard RAD). Nuclear engines generate a lot of power and acceleration. Nuclear powered vehicles have accelerations in the top end of the spectrum (A car with a nuclear power plant *cannot* have other modifications that affect performance).

The limiting factor is the gear-ratios and the stress that the frame can withstand, not the weight of the car. Weight for armor or other modification (military vehicle, for example) will *not* reduce the acceleration of the vehicle.

10K – Acceleration D
20k – Acceleration C
30k – Acceleration B
40k – Acceleration A

Note that a nuclear power plant provides a tremendous amount of surplus power that can be used to power small towns, recharge electric vehicles, or for other purposes.
Cost 10K+ **Effect** never needs fuel, +250 Core DP **Space** 10

Electrical Engine Power System Medium

Description: In the 'Yard you can run your car on electricity. It's not fast, it's fairly cheap, and it is small. Electrical engines can recharge over time with solar panels (sold separate) or quickly with access to an electric generator (middle ring) or a power station (bone yard). They are typically about as efficient as gas engines (their "tank" lasts as long), but are less powerful (reduce ACC by 1). It's also quiet and produces no exhaust.

Cost No Charge **Effect** no need to re-fuel so long as you're in the Yard. **Space** 80% of the original engine

Tesla Antenna Power System Rare

Description: There used to be a world-spanning power-grid … now only ghosts of it remain—but you can still pick some up. The Tesla Antenna runs the car for free in an area with Working Broadcast power—however even outside that, it yields *something*. It will refuel the car of the equivalent of 1 gallon per day.

Cost 400c **Effect** suck "1 gallon" per day of fuel out of the atmosphere. **Space** 1

Fuzzy Dice

Halo Rack Lights Upgrade

Description: For night driving, a bunch of high intensity lights can make the difference between a safe trip home and running off-road into a cybernetic T-Rex. The Halo system removes all vision negatives up to 150 feet in front of the car in a 60 degree arc.

Cost 20c **Effect** Night Driving **Space** 0

Air Supply Upgrade

Description: Out in the wastelands, the wind can be toxic. An Air-Supply creates a "sealed" cab in the vehicle—this is not the same thing as submersible (and often the cab leaks air—but can be "pressurized" so air from the outside won't come in). The tanks come with a compressor that will refill the system over time. The air supply is bought in terms of passengers/hour of air. Each hour of air (for one person) takes ¼ of a space and costs 25c. The compressor will refill the tanks at a rate of 1 person-hour per 30 minutes (and it will purify the air, allowing the vehicle to sustain its environment so long as the engine runs). The 100c startup cost includes the cost to seal the vehicle.

Cost 100c +25c per person hour per space **Effect**: negates environmental toxins when in use, 40 min per space (of cab) per space of supply. **Space** 1+

Sleep Deck Upgrade

Description: A lay-down climate controlled sleep chamber with external 'sanitary unit.' This makes long road-trips *much* more palatable. Comes with cheap vid-unit for viewing before dozing off.

Cost 30c **Effect**: Internal bedroom. **Space** 4

Sound and PA System Upgrade

Description: The "Rock and Roll Hurricane" sound system gives you both internal and external soundtracks (and public address mechanisms). It comes with a memory deck of over a thousand mp16's (that's sound file's son).

Cost 20c **Effect**: Play *loud* music **Space** 0

Vehicular Medi-Cocoon Upgrade

Description: A field hospital in a tube (a *big* tube) with robotic surgeons and diagnostic computers. It can perform field medical procedures for toxin and radiation poisoning. It can heal 12pts of damage in 15 minutes. It can stabilize a dead or dying patient on a 17- roll (-1 if at Injured condition, -4 if at Serious condition, but roll three times over 15 seconds). After each major surgery (for NBC hazards or after 10

healings it needs a 200c re-charge and re-fill).
Cost 1520c **Effect**: Medical healing **Space** 10

Electric Generator Industrial Upgrade
Description: Industrial strength generator (7700 Watts) with a 5.5 gal tank and all the luxury features that make life in the field a walk in the park including brushless alternators, fail-safe oil warming engine shutoff, automatic decompression, and full wraparound chrome frames.
Cost 11c **Effect** Generates power for tools, lights and weapons (7 hour run time) **Space** 1

Towing Winch Industrial Upgrade
Description: When you absolutely need to come unstuck, turn on the wench. It's your best chance of getting your wheels back on the ground and your trip back underway. Also great for getting friends out of high places!
Cost 19c **Effect** 14- chance of un-sticking a car, -1 per point it was stuck by **Space** 1

Police Lights and Sirens Upgrade
Description: Shrieking sirens! Flashing lights. The lower cost is a "traditional" top-set. The higher cost is a hidden "behind the grill" set. Sirens have several tones (as well as lights different frequencies).
Cost 50c/120c **Effect** Get someone's attention **Space** 0

Custom Paint Job Upgrade
Description: Whether understated flames on the running boards or dragons attacking a burning castle, a custom paint job tells *your* story to the world. This invariably seemed like a good idea at the time.
Cost 6c-10c **Effect** Not going there. **Space** 0

Sensors

Earth Station Sensor
Description: Satellite up-link, short-wave and CB radio, and computer link allows you to be in constant contact with people with similar uplinks anywhere on the planet. It also allows you to send a very accurate fix on your location (and get one).
Cost 400c **Effect** World-wide communications **Space** 0

Proximity Detection Sensor
Description: When "active" the vehicle will detect and signal any mass greater than 1 within 30 yards of the vehicle. It can sound alarms, make radio or (in the 'Yard) phone calls. It can be programmed to detect only things getting *closer* or even touching the system. It can detect forced entry as well.
Cost 90c **Effect** Security System **Space** 0

Auto-Nav Sensor
Description: Not as nice as one might hope considering that the maps are almost always woefully out of date—but it does show major routes and beats having to fold a piece of paper. It has very accurate satellite positioning software so even though you may not know what's around you, you can find out *where you are*.
Cost 60c **Effect** electronic mapping system **Space** 0

Ground Radar Sensor

Description: A cool phased-radar array system will track and relay any vehicular objects within range. In this case range is usually 15 miles on open ground and down to a half mile or less in rocky or mountainous regions. It'll show Identity Transponders if they're broadcasting. The system has a 12- Perception roll, +1 per 10mph of speed (up to -12 for terrain mods but even moderately flat ground is -0).

Cost 250c **Effect** vehicular detection system **Space** 0

Mine Sweeper Sensor

Description: This has a 15- Perception roll to detect mines at 30 yards range (and it has a 12- roll to detonate them—some types of mines are at negatives). It gets a -2 for each 10mph over 21 miles per hour (so 31mph is at 13- and 41mph is at 11-).

Cost 25c **Effect** mine-safety **Space** 0

Body and Frame

Alloy Frame Body Upgrade

Description: A .5% neonium alloy fame can take a *lot* more abuse than the standard metal. It's lighter too.

Cost 800c + (100c x Size Class) **Effect** Increase Base DP and Core DP by .2 (calculate increase off of *stock* values, *before* armor and other equipment adds). Uses gas like it was 1 Size Class lower. **Space** 0

Armor-Steel Frame Body Upgrade

Description: Not as snazzy as the neonium alloy—but plenty tough and plenty hard … but not as light.

Cost 500c + (45c x Size Class) **Effect** Increase base DP and Core DP by .2 (calculate increase off of *stock* values, *before* armor and other equipment adds). **Space** 0

Aerodynamic Body Styling Body Upgrade

Description: Reduce drag and improve fuel efficiency—it takes up some of the interior space, of course—but that's the sacrifice.

Cost 50c **Effect** x1.5mpg rating, +20mph top speed. **Space** ¼ Vehicle

Backup Fuel Tank Body Upgrade

Description: The vehicle has increased tank capacity or a spare tank. This can be purchased multiple times. Round normally for total space. One level of Backup Fuel Tank is, effectively, space 0. Between two and five levels of backup fuel tank takes 1 space.

Cost 10c **Effect** +10 gallon to tank **Space** ¼ space

Extra Axels Body Upgrade

Description: Vehicles can have extra axels for more tires. This essentially just adds to the Core damage (since tires are considered a Core component). If the total number of axels are increased by 50% above "standard" (one extra for a normal car, 9 extra for an 18-wheeler) the vehicle is also capable of carrying more weight and receives an *effective* +1 ACC for vehicles with an ACC below H.

Note: When a *motorcycle* purchases extra axels, it becomes either a tricycle or a 4-wheeled cycle (like an ATV). In this case, the cycle will be have like a car for crash purposes.

Cost 150c per **Effect** +10% Core **Space** 0

Luxury Vehicle Body Upgrade

Description: The quality of the passenger experience (i.e. how comfortable the seats in “cab” are) is determined by the vehicle model. Working vehicles (school busses, pickup trucks, military jeeps) are

assumed to be Spartan and fairly uncomfortable). Street cars and most commercial, civilian vehicles are assumed to be moderately comfortable at no charge above stock. You can improve the comfort of your ride by buying up the quality of passenger space. Typically *all* of the cab spaces in a vehicle are bought at the same level of luxury.

Luxury Level	Example	Cost
Spartan	School bus (no air conditioning, poor seats)	0
Moderate	Station wagon (seat belts, air conditioning). Access to radio and temperature controls. Individual bucket seats are positional.	0
Good	Luxury styling. Features include personal access to temperature and radio controls, more comfortable coverings and ergonomically sophisticated belt configurations. Displays (speed, fuel, etc.) will also be more sophisticated and attractive. Improvements include better sound and entertainment systems as well.	30c / space
Luxury	Luxury cab space is very comfortable with reclining, over-stuffed chairs and personal privacy screens and workstations. Individuals have their own entertainment displays and consoles. Larger vehicles will include intercom and telecom to communicate with the driver.	60c / space

Cost as per space **Effect** Fit more people in the vehicle **Space** 0

Treads / Tracks Body Upgrade

Description: Instead of wheels the vehicle has treads. This reduces ACC by 2 classes and top speed by 2 Speed Classes but makes the vehicle truly all-terrain. Except for extreme cases, the ground might as well be flat. Clearance counts as 20 inches. There are no terrain modifiers for targeting or

Cost 200c **Effect** Increases "ground clearance" to level 5 (technically 14" or more, but treads can navigate *much* higher barriers) **Space** 0

Skimmer Body Upgrade

Description: The vehicle float about a yard above the ground! If the vehicle flies over something it will be as though a strong wind is pushing down (but not the full weight of the vehicle). The Skimmer uses some sort of "ground effect" (and there is a definite magnetic filed in the area). The vehicle will go over water and can climb hills—but it will fall if driven off a cliff or taken down too steep of an embankment (treat as tires for those purposes). The *state* of the ground, however, has no effect on the skimmer. The cost here is fairly hypothetical—these devices are no longer made (and actual flying hover-craft are a different thing altogether)—but the cost is what they could be bought for when available.

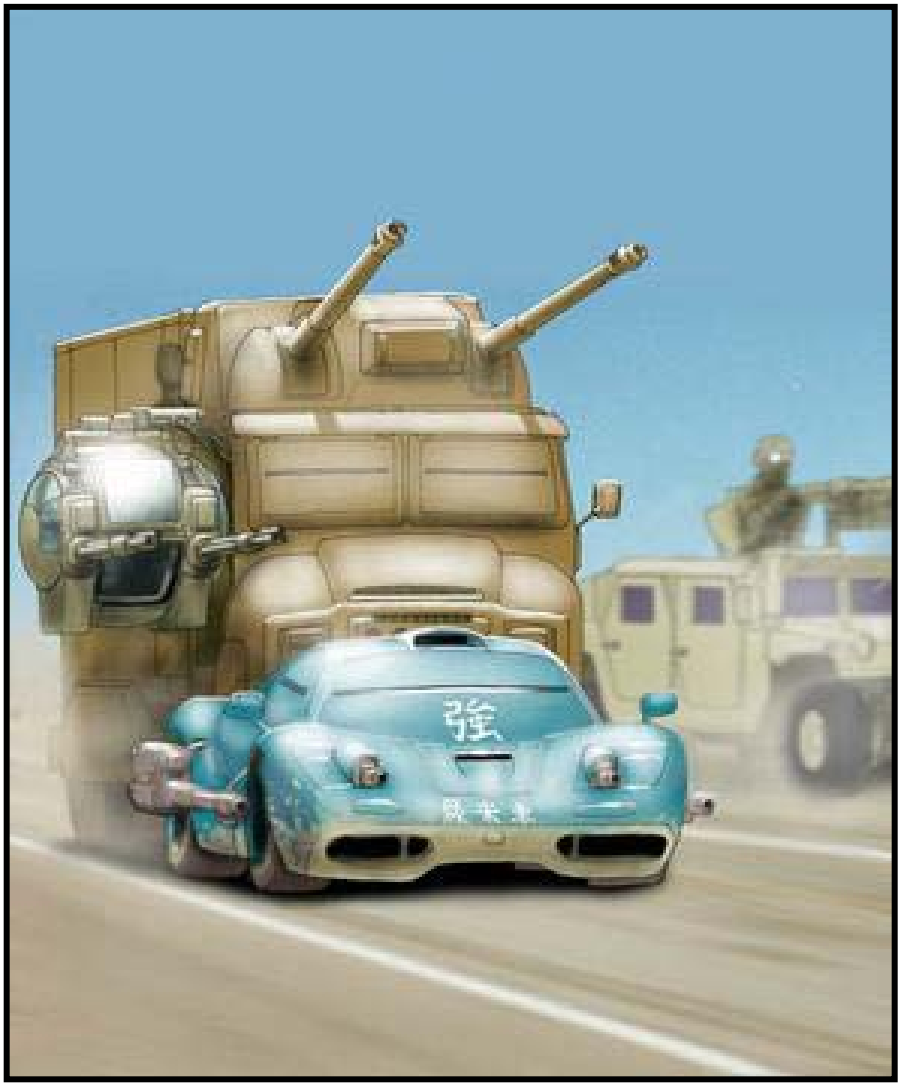
Cost 200c / Size Class **Effect** -1 ACC, -1 Handling, 2x MPG Factor **Space** 0

Expanded Cab Body Upgrade

Description: Some vehicles (like a bus) turn spaces into "passenger" spaces. Each size class has a listed Cab Size. Buying an Extended Cab will double the spaces available (or, for larger vehicles, give the listed number). The appointments are as follows:

Cost 10c per Space Converted **Effect** Turns Space into Passenger Space **Space** 0 per seat

Vehicular (Automotive) Combat



Let's get ready to rumble. Here's the lowdown on JAGS wheeled vehicle combat. Suitable for Have-Not. Suitable for *Fast Company*. Suitable for anything—but geared towards armed cars. Let's ride.

The Basics

Vehicular combat is handled similarly to normal combat with a few modifications. When you are engaged in combat, everyone involved will still roll initiative normally—and take their turns in order—but when the *cars* move and what moves a driver can make are specially detailed. **Note:** We use the term 'car' here to mean any land vehicle.

When do you have to make Driving Rolls?

If you apply the rules we've got here to everyday driving, most people wouldn't reliably make it to the grocery store. The general rule is this:

In combat you always roll
It's stressful; the moves are sharper and not telegraphed. Your full attention isn't on the road.

In case of surprise, make a roll
If you *are* going to the grocery store and suddenly a tree falls in your way you make a roll at the listed negatives to avoid it. Same if someone cuts you off aggressively or you see a *really wild sale on that outfit you wanted!*

If you're not paying attention, the GM can call for a roll
Putting on makeup, talking on your cell phone, or otherwise doing unspeakable things can call for a roll.

When impaired
Even if you aren't wasted, driving impaired can call for rolls that you wouldn't normally have to make. You already knew this though, right?

When being risky
Tailgating, driving to cut people off—even if you're just coming home from work and trying to get the hell out of the freakin' *High Occupancy Vehicle* lane because you're by yourself and you see a cop ahead can call for a roll. This also applies to *any* sharp curve, hard drift, move etc. even out of combat.

Measure of Speed and Distance

The JAGS Automotive Combat System measures speed in Speed Class (which *does* convert to Miles per Hour—but groups speeds for simplification purposes). Speed Classes go 100, 200, 300, etc. It rates distances from one vehicle to another in Car Lengths (which is 4 yards per CL, but is, we think easier to visualize).

Vehicular Initiative

All moving vehicles move during +4 Initiative (as though they had made their Initiative rolls by 4). During the +4 Initiative phase, faster vehicles move first (there are few notable exceptions noted, such as if you are declared *following* a slower vehicle). During the movement of vehicles, no one fires.

Collision Value

If your car hits something, this number and the Mass number (weight) of the vehicle are used to compute damage. There are rules for ramming and collisions at the end of this chapter.

Control and Handling

Vehicles get harder to control as their speed goes up and the moves they're making become more aggressive. In stressful driving conditions Vehicle Ops (also called Driving here) rolls will be called for. Failing one can result in rolls on the crash or even collision tables. Each point of Control or Handling for a given move adds or subtracts from the operator's Driving roll.

Driving Skill	Notes
No Skill	Coordination is rolled at double negative modifiers.
Level 1	Increase difficulty of any negative modifiers by 1.
Level 2	Roll at Skill +/- handling mods
Level 3	Can ignore up to -3pts of negative modifier
Level 4	Can ignore up to -6pts of negative modifier

Negative To Be Hit

Fast moving vehicles are harder to hit than ones that are standing still. Your Speed Class gives you a negative To Be Hit. You can get more by taking Evasive Maneuvers.

Master Vehicular Speed Chart

Speed Class	Dist / Sec	MPH	-TBH	Collision Value
000 – 099	4 CL	0 – 30	-0	15
100 – 199	8 CL	31 – 60	-1	30
200 – 299	11 CL	61 – 90	-2	45
300 – 399	15 CL	91 – 120	-3	60
400 – 499	19 CL	121 – 150	-4	75
500 – 599	23 CL	151 – 180	-5	90
600 – 699	26 CL	181 – 210	-6	105
700 – 799	30 CL	211 – 240	-7	120
800 – 899	34 CL	241 – 270	-8	135
900+	38 CL	271 – 300	-9	150

Order of Combat

When you are in vehicular combat, here's how things will work:

1. Everyone rolls initiative (this is most important if there's shooting involved—or other actions that a driver might take dependant on what someone else is doing. If it's just a street race, this can often be skipped). All decelerations are made in *reverse order* (the best Initiative roll declares *last*).
2. Each player declares Acceleration or Deceleration (and by how much). If a car is accelerating or braking hard, this gives a negative Control Modifier for that turn: keep track of these, they'll add up.
3. Each driver (still in reverse initiative order) declares a Basic Maneuver or a Driving Action. An example of a Basic Maneuver is "I make a T*urn move* to Follow the curve of the Race Course." An example of a Driving Action is "While following the curve of the race track (a *turn Maneuver*) I try to *block* the guy trying to pass me." The difference is that an Action is usually a Basic Maneuver plus some other rules for interacting with other cars (another example is "I ram him").
4. Pre-Move Fire Phase. Before anyone moves (in a given Speed Class) you can choose to fire for that turn.
5. Then, for each Speed Class, all cars in that class take their moves in Initiative order. A character who won initiative can choose to wait—but *must* move in that speed class. If everyone's "waiting" conduct moves in reverse initiative order.
6. Post Move Fire Phase: after everyone has moved for a given speed class, anyone who wants to can declare fire.

Speed Class Explained

What the heck is speed class for? JAGS treats each 30mph difference in speed as a different class. The table below shows how these speed classes translate into negatives to be hit, modifiers to control rolls, and so-forth. JAGS doesn't recognize a measurable difference between a car going 89 miles an hour (Speed class 3) and one going 61 miles per hour (also speed class 3...)

So why the funky numbers?
It was either weird, 3-digit speed classes... or fractions. If your car accelerates 2.2 miles per hour, you can do the math and add 2.2 to your speed each second. But it's decimal math, and it made people's heads hurt. So we translated speeds (and accelerations) into simple, integers (speed class 350 is half-way between speed class 3 and speed class 4, or half way between 60 miles per hour and 90 miles per hour. A car traveling at SC 350 is going... 75 miles per hour!)

The funky numbers make people's heads hurt too, but a little less (some of our play testers *hate* real numbers...) At the end of the day, if you absolutely hate all these numbers, you can do things like round all accelerations to round mph's and just do it that way. You'll lose some of the detail and balance, but you won't need a calculator as much

Here's a table of accelerations (which is what gets added to your speed class and where the actual math comes into play)

	Acceleration in						
Speed Class	MPH per second	Speed Class	MPH per second	Speed Class	MPH per second	Speed Class	MPH per second
100	30	73-75	22	46-48	14	19-21	6
97-99	29	70-72	21	43-45	13	16-18	5
94-96	28	67-79	20	40-42	12	13-15	4
91-93	27	64-66	19	37-39	11	10-12	3
88-90	26	61-63	18	34-36	10	7-9	2
85-87	26	58-60	17	31-33	9	4-6	1
82-84	25	55-57	17	28-30	8	1-3	0
79-81	24	52-54	16	25-27	8		
76-80	23	49-51	15	22-24	7		

The Order of Combat

Vehicle combat poses special problems: firstly cars are always moving—even if the driver isn't controlling them. Secondly: cars of the same Speed Class move (in "reality") at the same time—not "in order of initiative." Finally, the opportunity respond to a sudden move belongs to the car with the driver who "has the initiative"—so if the fastest driver were to always move first, he or she wouldn't be able to respond. So: some new rules are in order here.

Accelerate or Decelerate

In reverse order of Initiative, every driver declares if they are accelerating or braking for the turn. A car accelerating or braking hard gets negative control modifiers that'll add to any maneuver or damage modifiers for the turn—so note them. When this is done, the new speed is marked on the Vehicular combat record sheet and determines how far a car will move that turn.

NOTE: The amount a car can accelerate or brake is described below—it is related to the car's engine, brakes, and maybe tires. Also: if you want to be *tricky* about it, you can use an emergency braking or emergency acceleration move *during* the turn—but that has a greater risk of crashing.

First Fire Phase

Each blast of weapons fire is a 5 REA action (either on the part of the driver or a gunner). "First Fire Phase" takes place at the start of a vehicular turn and occurs in normal initiative order for everyone involved (drivers, gunners, pedestrians, etc.) If you wish to shoot before any vehicles move—you get to do so.

NOTES: The rational for this is as follows: a vehicular move is a Long Action, to which people can respond. Since *all* the movement between vehicles is long, then, according to the rules, everyone could respond to the vehicle's movement by taking a shot—so it makes sense to get any wish to fire out of the way first.

When counting down people's initiative, people may choose to *wait*—If there are three drivers involved (and no gunners) and guy A (fastest initiative says "no fire" and then guy B says "I fire," resolve B's fire first—but then A can return fire during the First Fire Phase. It doesn't end until everyone who wants to shoot has.

Vehicular Movement

All vehicles of a given Speed Class now move, starting with the highest first. Vehicles *cannot* wait outside of their Speed Class: all vehicles in, say, the 400-499 Speed Class must move before *any* vehicles in a 399 or lower class move. The exact Speed number *within* a speed class is not important, however: A car with SC 451 whose driver made a better initiative roll than a vehicle going 422 can "wait" and move after the slower driver. This usually means that within a Speed Class cars will move in Reverse Institutive order: the driver who made their initiative roll by the most moves last.

Under the basic rules, a person cannot declare fire during the movement phase. This can create some weird situations (a car begins and ends a move under cover—and can't be shot at as it goes across the field of fire)

The Theory of JAGS Vehicle Combat

Let's talk a second about why we did what we did here. It'll help it make sense.

In vehicle combat, unlike normal pedestrian combat, everyone is, usually, always moving. What's more, everyone is moving simultaneously. The same applies in human-on-human combat too—but the JAGS round/turn system breaks down all the movement pretty nicely into "segments." So if you go and then Joe goes, you can run up behind him and grab him before he gets to run—and it doesn't (usually) create a massive lack of credibility ("How'd he catch me!?")

But with vehicles that run at a steady pace, that's not so simple. If you're right behind another car moving the same distance and "you move first:" WHAM. You just hit him, even though he's technically moving at the same speed.

Worse, with armed cars, and segmented movement, there's a huge "when do I get to fire?" problem.

Leap Frog Fire

Let's say you're behind a car with a front mounted gun. You're going faster—but not much faster—just enough to get a little closer—but the rules say you *gotta* move first—so you do—and now you're barely in front of him. Now, as soon as he gets to move, he'll be back in front of *you*—but if he gets to fire then he can hit you before he takes his move and something that shouldn't be remotely possible "in reality" happens: he shoots you in the back.

but there are rules to deal with that. The standard rule: you don't fire during movement.

NOTES: This means that if I am "following" someone (trying to anyway) and I'm of a *higher* Speed Class, if I move straight, I will possibly pass them for a time—even if their move, which comes later in turn puts them past me again. This *would* allow them to engage with their front weapons—even though at the end of *their* movement, you are behind them again. Since this isn't realistic (in reality the cars would never pass each other) there are some rules (like the Following Move) that prevent this from happening.

Declare Actions

Drivers declare actions in *reverse* initiative order: that is, for all vehicles of a given Speed Class (all the cars going "the same speed") the driver who got the best roll declares his move last. Why? Because that driver "has the initiative" and therefore is presumed to "wait" until they see what other drivers are doing. All actions/basic maneuvers cost the driver 5 REA.

NOTE: If a driver who lost initiative (and therefore declares first) says "I'm ramming you" you (whose vehicle goes just as fast—but you had a better initiative roll) can say "I pull away, opening the distance." If your cars are positioned so that's possible, that will work.

Declare Reactions

Just because you have declared an action doesn't *necessarily* lock you into it—not *exactly*. There are a list of moves called "Reaction Moves" that you can declare in response to another action even if you didn't win initiative. A classic example of this is hitting the breaks to avoid a crash or dodging gun-fire. Even if you declared "I drive straight" and then a driver of the same Speed Class who beat your initiative roll says "I try to zip past him" you can React: "Okay, I'm blocking his car." Blocking is a reaction move if someone tries to pass. All Reactions cost the driver 5 REA.

NOTE: You can always take a Reaction Move to dodge incoming fire if you (as the driver) have the un-spent REA left.

Resolve Moves

Each person has declared and paid 5 REA for an action. Any legal Reaction has been declared. Now resolve the moves. Usually this means Reactions first (see the specific rules). All cars move and make Control rolls. At the end of this, record the new positions of the cars.

NOTE: Cars that "waste" forward movement due to maneuvers like driving erratically or trying to pass will move out to the side and back, during their move. If, for example, there's a race taking place in a 1-lane channel with concrete walls, this would result in a crash. The GM is responsible for resolving these situations.

Resolve Crashes, Speed Changes, etc.

If a driver fails his control roll there will be a roll on the crash table. The car may not wind up going where the driver wants it to.

Post Move Fire

After all the movement has happened, it's all over. If anyone wants to take a shot before the turn ends, do it now.

Note: Just like the pre-fire phase.

Theory Continued

There are a few other "gotchas" in the works.

From-To-Cover-Moves

If we don't allow you to fire during movement, only before and after (which we do under the *standard* rules) that means that a car moving from a place of cover to a place of cover can't be hit by another vehicle, even if it was stationary and waiting. That's not realistic either. So we have to do something.

Initiative Poaching

One of the first problems we ran into was trying to "tail" someone with these rules. Here's the deal: if you're ahead of them (they're tailing you) but *you* win initiative—or they're a little faster—the *have* to move first. You can take advantage of that: you see their move. They go straight? You turn. They turn, you go straight. This is most effective if their move will put them *past* you—but it can apply other times as well.

So, what did we do? Read on—we have a few simple solutions to these problems.

Vehicular Combat Example
It's a dusty desert highway. Two cars are screaming down it at 90mph (Speed Class 3): a hopped-up Toyota Supra and an after-market Honda Accord (both heavily modified!). Both drivers have front-mounted sub-machine guns and no armor! (This isn't Have-Not—those brands don't exist—it's just *weird*).

Both cars have L3 drivers. The Supra is 17-. The Accord's driver 15-. The Supra is 6 Car Lengths (CL) ahead of the Honda. Both cars move at 11 CL per second (that's Speed Class 300-399).

Speed Change Phase
The supra declares *last*—he's the better driver. The Honda, not wanting to wind up in front, says "I do whatever the Supra Driver does." The Supra Driver, wanting to get the speed up—because he's a better driver and higher speeds mean more dangerous control rolls says "I accelerate."

Acceleration values are added to each vehicle's Speed (that's explained below) but all that really matters on this turn is whether any of the vehicles improves or loses a Speed Class (a whole 30mph). Neither does—so they're still treated as being the same speed for this turn.

First Fire Phase
Before any movement can take place, both vehicles can fire—and both want to. However, there is one move that can always be declared out of order: the Vehicular Dodge (a desperate kind of erratic driving). The front mounted SMG on the Supra can't fire at the Honda that's behind it, so the Supra driver declares a Vehicular Dodge and the Honda driver opens fire (a hit for minimal effect). That has cost both drivers 5 REA (the Honda on fire, the Supra on Dodge).

Movement
The Honda Driver declares first: he wants to stay behind the Supra and keep chewing him up with the machine gun. He declares that he is "following" the Supra. This means he's gonna try to stay behind it.

The Supra driver declares Evasive Maneuvers—he's driving all over the road wildly. Not only does this make it more likely one car will crash (and will make him harder to hit next turn) but if the Honda driver *didn't* declare himself to be "following" the Supra and just moved (more or less) straight ahead, the movement the Supra "expends" going left and right all over the road could mean the Honda would *shoot past it*! And into firing arc! He declares himself to be swerving, which costs 1/5th his movement in swerving (or 2 CL, whichever is higher). He will only go 9 CL "forward."

Reactions
The Honda driver isn't as good. He bites his lower lip: as the cars keep accelerating and the driving gets wilder, the odds are in the Supra's favor. He doesn't have the REA left to declare an emergency breaking maneuver—although he kinda think's he'd like to.

REA Spent:
Honda: 5 REA for Fire, 5 REA for "follow car"
Supra: 5 REA for Vehicular Dodge, 5 REA for Evasive Driving

Control Rolls
Both drivers make Control Rolls. Their maneuvers are (pretty much) "Drive Straight." At SC 300-399, the control modifier for the 'go-straight' move is +1. Because both drivers have their pedals to the floor the modifier is -4 (they're both *fast* cars). The swerving supra is at another -2. The total is -5 for the Supra and -3 for the Honda. Because both drivers are Level 3 the Supra Driver rolls at -2 and the Honda driver rolls at no negative. Neither misses the roll.

Resolution: Movement
Both cars advance. The Honda driver goes 11 CL forward, the Supra driver goes (11-2 for swerving = 9). The Honda driver, having declared a *Follow* action can choose to close by 2 CL or hold the distance. He chooses to close.

Hitting the Gas and Braking

A car that is accelerating is harder to control than one that's holding steady. Same with one that's riding the brakes. Here is an acceleration chart with some real-world cars in it. Note: the numbers came from the Internet and we weren't always able to get the year and make of the car in question (so when we say Viper we don't necessarily mean the Venom or any specific model. This is just for *eyeball* purposes.)

Column	Meaning
0-60	A rating in seconds of the 0-60 of the car. Not really important for game play.
Speed Class	Your speed is rated in Speed Class. A second of Acceleration will add this to your present Speed Class.
Grade	A measure of how fast your car accelerates.
Cntrl	The Control modifier you take when flooring it.

Sample Vehicle	0-60	Speed Class Improvement	Grade	Cntrl
Indy Car	2.0s	+100/s	A	-6
Super Bike	2.5s	+100/s	A	-6
Fast Bike	3.0s	+75/s	B	-5
McLaren F1	3.2s	+75/s	B	-5
Medium Fast Bike	3.5s	+50/s	C	-4
Jaguar XJ220 Prototype	3.5s	+50/s	C	-4
Bugattti	4.3s	+50/s	C	-4
Ferrari Testarossa	4.7s	+50/s	C	-4
Lamborghini Diablo VT 6.0 SE	3.9s	+50/s	C	-4
Slow Bike	4.9s	+40/s	D	-3
Viper	5.0s	+40/s	D	-3
Porsche 911 Carerra	5.0s	+33/s	E	-2
Infiniti G35/1998 Mustang/ Corvette	6.2s	+33/s	E	-2
Stealth	7.0s	+33/s	E	-2
Focus	7.6s	+25/s	F	-1
Jeep Cherokee	7.6s	+25/s	F	-1
Honda Civic	8.0s	+25/s	F	-1
Fast Police Interceptor(Crown Victoria)	8.4s	+25/s	F	-1
1982 Trans Am 305 Cross-Fire	8.8s	+25/s	F	-1
Lincoln	9.4s	+20/s	G	-0
Police Sedan	9.4s	+20/s	G	-0
Hummer	10.5s	+20/s	G	-0
Yugo	15.4s	+10/s	H	-0
[none]	16+s	+08/s	I	-0
Moped	?	+05/s	J	-0
[none]	?	+01/s	K	-0
[none]	?	+.5/s	L	-0

Braking Category	Reduction of Speed Class	Control
Hard Braking	-60 SC	-6
	-50 SC	-5
Standard Braking	-40 SC	-4
	-30 SC	-3
Soft Braking	-20 SC	-2
	-10 SC	-0

The Theory of JAGS Vehicle Combat

Solutions

Here's what we did.

1. **GM arbitration**. The vehicles are all moving simultaneously—because it's hard to make that work in a pencil and paper RPG, do things in segments—but when there's a conflict (Leap Frog Fire), the GM should step in and prevent that.
2. **No Fire During Move.** For each Speed Class there is a pre-fire phase and a post-fire phase. You can't fire during movement save as a GM call to prevent From-To-Cover-Movement. This does simplify things a lot.
3. **Special Moves**. There are a few special moves. *Following* is a move you can declare. *Pull Away* is another one. Both of these allow vehicles to act "out of segment" in some way. They make certain things that were a little difficult easier to handle. For example: *Ram* applies if the vehicles are within 2 Car Lengths of distance (you don't have to be at distance 0 because the system won't be *that* exact)—but the Ram move only takes "effect" at the *end* of the movement of all vehicles—so if the vehicle you "hit" gets to move, it'll be gone by the time you got there (unless you have enough movement to catch it).

We've done our best to note what rules are used where—but if you keep the theory in mind, it'll probably make more sense.

How this works: George is a rich man with a Ferrari. He is cruising down the highway at a cop-avoiding 65mph. Suddenly, in the rear-view mirror, he sees a giant glowing blue blob the size of a three story building ooze out of the bushes and *race towards him absorbing slower cars at it charges!* He floors it.

Looking at the Speed Chart we can see that 65mph is Speed Class 300 (the bottom of it). The simplified rules for speed are in effect and the GM declares him to be exactly at SC 300 (that would be 61mph). At the start of the turn (before any actions are taken) he says "I floor it."

This means the following:

- He is at Acceleration Grade C for having a Ferrari.
- This means that he improves his SC by 50 (he's now at 350 SC—and uses the same stats he had at 300: car lengths moved, negatives to be hit, and Control Mods).
- He floored it and that gives a -4 to his Control Rolls (in addition to anything else he does that turn). Let's hope he's a good enough driver to handle that car!
- **NOTE:** Being at in the SC 300 - 399 range is a -1 to Control Modifiers. That puts him at -5 to any Driving rolls before choosing a maneuver.

Optional Acceleration Rule (Drag Racing)
If you are playing a game with lots of racing, you may want to let better drivers accelerate faster due to fancier clutch work and knowledge of the car's power curve. If this is the case, a Driving skill roll made by -5 (-2 for L3, no negative for L4 drivers) will improve the car's acceleration by one letter. This can be done *only* once every Speed Class. If you blow the roll, you don't get to try again for that Speed Class.

Optional Rule: Vehicular Size in Braking
How large a vehicle is has a real bearing on its stopping distance (you don't want a fully loaded semi on the road behind you when something goes bad up ahead—you'll probably stop long before it does!). To represent this in game terms, each Size Class above or below 4 subtracts (if above) or adds (if below) to the amount of speed decreased by a braking action.

Small Vehicles: Size Class 1-3: For each point of Size Class below 4, add 5 to the amount of speed lost per braking action. For a Size 1 motorcycle, a -10 light braking action reduces Speed Class by -25/sec.

Medium Vehicles: Size Class 5 – 8: For each point of Size Class above 4 (but less than 7) subtract 2 from the amount stopped (so a 7 Size Class Hummvee brakes by -4 Speed/sec instead of -10 Speed/sec for -0 Control.

Large Vehicles: Size Class 9-12: For Size Classes 9, 10, 11, and 12, the amount lost by braking is applied every 3rd turn (but apply as above). So for a -0 Control roll, a semi-truck reduces its speed by 10 Speed Class each 3 seconds.

Acceleration

"You almost had me? You never had me - you never had your car. . . Granny shiftin' not double clutchin' like you should. You're lucky that hundred shot of NOS didn't blow the welds on the intake!"
--Dom, *The Fast and the Furious*

What the heck is he talking about?
How you shift, with a manual can make a moderately substantial difference in how fast you accelerate. What was Dom talking about? Here are some guidelines!

- **Granny Shifting –** This is how you were (probably) *taught* to drive. Wiggle the stick to make sure it's in neutral—if you're running, and downshifting let the engine's RPM's die down some—then push the stick into gear and slowly let the clutch out. Give it a little gas—let it out! Let it out! Don't burn the clutch! Okay. Good. Secret: this is how hot-shots will drive if they want to protect their transmission. Sounds like "*waaaahhhhh* <moment of silence> *waaaaaahhhh*"
- **Speed Shifting –** A little more advanced. Lightly let up on the accelerator and *stab* the clutch and slam the car into gear. No waiting, not much deceleration. Sounds like "*waaaaahhh* <tiny delay> *waaaaaahhhhh!!*"
- **Power Shifting –** Sometimes called Double Clutching (although that also refers to a trucker's method of shifting). Pull on the stick to get ready! Mash the accelerator to the floor—never let up! Then, when you're ready, *kick* the clutch, *slam the stick into position* and let the clutch out. Sounds like "*waaaaaaah WAAAAAHHH waaaaahh*" (the RPM's go *up* between gears!)

Basic Maneuvers

Positioning the vehicle might mean making a hard turn to head down a side street to escape police. It might mean a sharp drift to get behind an armed vehicle with side-firing weapons. Whatever the case, here is the basic Maneuvers list.

Maneuvers
These maneuvers are taken as part of an action (often the "Drive" action, although a common alternate example could be a Hard Drift taken to ram someone). Here is what they mean:

Basic Driving Maneuver	Safe Speed	000 - 099	100-199	200-299	300-399	400-499	500-599	600-699	700-799	800-899	900+
	MPH	00-30	31-60	61-90	91-120	121-150	151-180	181-210	211-240	241-270	271-300+
Drive Straight	55mph	+5	+3	+1	+0	-1	-2	-3	-4	-5	-6
Hairpin Turn	15mph	-6	-8	-10	-12	-14	-16	-18	-20	-22	-24
Sharp Turn / Hard U-Turn	25mph	-4	-6	-8	-10	-12	-14	-16	-18	-20	-22
Turn	35mph	+0	-2	-4	-6	-8	-10	-12	-14	-16	-18
Soft Turn	55mph	+0	+0	-2	-3	-4	-5	-6	-8	-10	-12
Banked Turn	75mph	+1	+0	+0	-1	-2	-3	-4	-5	-6	-8
Soft Drift	55mph	+0	+0	-1	-2	-3	-4	-5	-6	-8	-10
Hard Drift	45mph	-2	-4	-6	-8	-10	-12	-14	-16	-18	-20
Hard Swerve	None	-4	-5	-6	-8	-10	-12	-14	-16	-18	-20

Basic Maneuver Explanation
As JAGS is not *quite* a tactical war-game (at least not yet) the GM is responsible for managing several things during movement. Here is an explanation of each Basic Driving Maneuver.

Maneuver	Notes
Drive Straight	Even going straight, a vehicle can be very hard to control at high speeds, hence the negatives at 150+ mph.
Hairpin Turn	The car negotiates a greater than 90-degree turn in "its lane" (this might be encountered as a very hazardous turn on a country road). If the roll is failed it will drift out of that lane (or worse)
Sharp Turn / Hard U-Turn	The car makes a 90-degree turn within its lane (as on a standard city street). If the roll is failed it will drift out of that lane (or worse)
Turn	The car makes a 60-degree turn within its lane (a tight curve on a flat race course, a moderately tight suburban curve with a 35mph speed warning). If the roll is failed it will drift out of its lane (or worse).
Soft Turn	The car makes a 30-degree turn within its lane (a curved stretch of highway, a lazy, wide bend in a suburban road, standard a curve on a flat race course). If the roll is failed it will drift out of its lane (or worse).
Banked Turn	The road is sloped (higher to the outside of the turn, so the car will ride up it). This is a curve found on high-speed raceways and is quite safe to negotiate at high speeds (in fact, lower speeds may slip down to the bottom). If the roll is failed it will drift out of its lane (or worse).
Soft Drift	A lane change over several car lengths of driving. Using a merge lane to get onto a highway. If the roll is failed the vehicle might be sliding for fishtailing (or impact a car in the merge-lane)
Hard Drift	A lane change to cut someone off/cut into traffic. Getting onto a highway without a merge lane. If the roll is failed the car may be sliding or fishtailing (or perhaps impacting a car in the merge lane)
Hard Swerve	A sudden change of lane made to miss something. This move usually only happens with either very aggressive driving (cutting off an expert driver on the highway) or because of an emergency (seeing something in the road). If the roll is failed, it's likely that the car will hit whatever was in front of it.

Driving Actions

Driving Actions are really no different from Maneuvers in theory—but in practice they affect other drivers directly. A swerve to get behind someone is a Maneuver. A swerve to hit someone is a Ram Action. The GM is the final arbiter of which is which, but in combat many things that could be Maneuvers are often Actions.

Action Table

Action	Notes
Racing	On a race track there's a concept of whose ahead. For races use these rules.
Ram	Direct collision
Escape	Lose a pursuer.
Sideswipe	Force off road/bump
Break hard	Emergency deceleration.
Evasive Driving	Weaving to be hard to hit
Following	Declaring that you are staying on the tail of a car in front.
Sliding 90	Stunt to turn the car 90-degrees in a controlled skid
Sliding 180	Stunt to turn the car 180-degrees in a controlled spin.

Race

Description: One of the more classic uses of the vehicle system is a Race. A race focuses on the concept of "forward movement" (towards the finish line) and position between cars. Here's how they work:

Rules	When you are engaging in a Race, it's important to know who's ahead in terms of movement towards the finish line (or a certain number of laps). This brings us to the concept of "Forward Motion." Imagine two cars on a six lane 1-mile road. One car is driving at 60mph straight towards the finish line. He'll arrive in 1 minute. The other car is weaving from one lane to another, driving at a stead 60mph as well, but in a serpentine fashion. Each car is going the same speed. Each car moves the same number of Car Lengths per turn—but the first car will arrive well ahead of the second. The second car is "wasting" movement changing lanes and direction. This is important in racing because when a car fails a Control Roll, even if it doesn't crash, it'll drift and lose some "forward motion:" that is, it doesn't cut the corners or "drive the line" as expertly as a car at the same speed whose driver made their control roll. So the driver who made his roll will *pass* the car that missed it—even if both are going at the same speed. A race track should give distances to the finish line in terms of Car Lengths and each vehicle's rating should be tracked along that course. When a car drifts, skids, or otherwise "loses" Car Lengths of forward motion, it will have fallen behind one that didn't and was at the same speed and at the same point along the track. Whoever drives the listed number first wins.
Who may React?	When cars are declared to be racing, essentially *everyone* reacts. The Action is declared because it's noted that "driving the course" will be made up of a bunch of Basic Maneuvers (go straight on the straightway, a series of turns (banked, sharp, or otherwise) and the issue that's often of primary importance is determining whose ahead.
Difficulty	The difficulty is determined by the nature of the race-course (which might be a city street with obstacles such as other cars). The GM should lay out the race course before hand and, most of the time, the drivers will know what to expect up ahead and can plan their speed accordingly.
Example	We have an example of racing. See the appendix.

Following/Tailing/Closing

Description: The tailing move is taken when you are behind someone and either wish to stay there or to get closer (a police chase is an example of this). Because of the way the initiative system works, the car ahead could win initiative and wait, "forcing" the tailing car to move straight or otherwise commit to a move and then turn, losing pursuit. In real life, because cars move simultaneously, it's not that simple. This move simulates how staying behind someone works.

Rules	When you declare a following action you must be behind and further than 1/5th of your move (in Car Lengths) from the vehicle you are tailing (drop fractions). Within 1/5th move you will be unable to react to their actions. Thus if both vehicles are moving 23 CL, a vehicle more than 4 CL behind the lead car can declare a following action. This action *must* be declared at the start of the round. Once declared, the vehicle's driver may always wait for the lead car to declare a move even if the forward driver wins initiative and even if the tailing vehicle is one Speed Class higher than its target. This is an exception to the rule that states that a vehicle *must* move within its own speed class. Your move—the move you waited on must be taken immediately following the move of the tailing vehicle. When a tailing vehicle gets too close to a target to continue *Following*, it gets +4 Initiative on the roll next turn (the one where it may no longer follow). After that, however, initiative happens normally.
Who may React?	No one may react to the declaration. Evasive actions are expected, however. If, at the start of any turn the lead car is facing the chase car or perpendicular to it, the Follow is broken (although if it was the intent of the chasing car to get closer to the car in front, that will probably happen). One exception is the Emergency Braking action. If the lead car hits the brakes and the tail car doesn't respond fast enough, it may miss the opportunity to take a braking move (see Emergency Brake).
Difficulty	There is no inherent difficulty in declaring a Tailing Move. However, if the tailed vehicle declares *Evading Moves* you must match them or fall back further. If you fall back too far, you have lost them.
Example	A police cruiser gunned up to 85 mph (speed class 200) pulls on to the interstate 30 Car Lengths behind a blue Honda containing a fleeing group of criminals doing (at this moment) 55mph (speed class 100). The criminal's car is near an off ramp and, at the start of the turn the police car is declared to be *following* the criminals. Because of the order of initiative the police car must move first—however, because it is *following* the lead car and is more than 2 CL behind it (the police car moves 11 CL per turn—if it is within 1/5th of that distance—1 or 2 Car Lengths—from the target vehicle it is too close to follow) the police car waits. When 100-199 Speed Classes get to go, the criminal's car must move—and it does—turning off down the exit ramp. The police car moves to follow. **NOTE:** The GM is allowed to rule that following is inappropriate in conditions where it's being taken simply to delay a move. The rule exists to prevent certain illogical things from happening (a slower vehicle ahead being able to "surprise" a faster vehicle from some distance behind)—if the situation is not a chase, the GM may disallow it.

Ramming

Description: Moving so as to cause a direct collision with another vehicle (as opposed to a bump or side-swipe—an indirect collision). If you manage to keep moving, you can plan to hit more than one. Declare all of them at the start of the move and then keep going until you fail a collision roll.

Rules

1. You must terminate your move and any reaction move they take at 2 CL or less distance (ending a move at 2 CL will be assessed as a Ram if the mover declared that intention).

2. You make a Driving skill roll to hit the target at:

+2 for getting within 2 CL.
+1 per point of positive handling modifier your vehicle gets (and -1 for negatives).
+1 for each full 4 size classes of vehicle involved (so a Size Class 12 truck trying to hit a bike (Size Class 1) gets +3. Trying to hit another truck of the same size is +6.
+/-2 per difference in Driving skill *Level* (if they're a better driver, it's against you—if you are the superior driver, it's in your favor).

3. The targeted vehicle may attempt:

Moving away: the ram will not be assessed until the movement phase is *finished*. **NOTE:** When you reach a target vehicle that has not yet moved, that vehicle must take the *Pull Away* move—and make their move. Then you must move to follow them (they get their move and then you impact them).
A Vehicular Dodge (in which case the evading vehicle gives up 2 CL worth of movement due to maneuver).
To ram the incoming vehicle. Use the Side-Swipe maneuver (or ram for head on collision). If a targeted car responds to a rear impact by hitting the brake (so as to make the effective speeds higher) perform the emergency braking move and then use the lower speed for the forward car.

4. Damage is as follows
   a. Determine aggregate speed (add for head on, subtract for a hit from the rear, use attacker only for a T-bone collision, and if both vehicles are *kinda* moving in the same direction subtract ½ to 3/4 of the target's speed). If speed difference is 0 or less, treat as 10mph.
   b. Each vehicle takes damage based on Speed Collision Value (use speed chart) x Mass of other vehicle divided by 6 (divide by 2 for a head-on collision).
   c. The ramming vehicle takes 75% of that save in head-on collisions (100%)
   d. Damage for both vehicles is modified by the attackers to-hit roll (in the case of head-on use *higher* value if both drivers try to ram each other.).

5. Each vehicle makes a Control roll based on the relative sizes. This may be at further negatives dependant on damage taken (see damage rules). If the roll is failed the Control then add the Collision Modifier of the other vehicle to the roll on the Collision table. The Ramming vehicle gets +3 to its control roll.

Difference in Size Classes	Negative to Control Roll
-6 or more	-10
-4 to -5	-8
-2 to -3	-7
-1	-6
0	-5
1 to 2	-4
3 to 4	-2
5 to 6	-1
7 +	-0

Who may React?

Any of the vehicles that are targeted (usually a Dodge, an Emergency Deceleration, or a Reaction Ram!)

Difficulty	Based on any necessary maneuver to get within range and modifier for the collision.
Example	A 6-cylinder mid-sized car rams a town car from (mostly) behind—it begins the turn (roaring off an entrance ramp) 4 car lengths behind the town car. 1. The mid-sized car is going Speed Class 400 (120 mph) the Town car is going SC 300 (90mph). 2. The Town Car is within 1 SC of the Mid-Sized so it can get a reaction move—and it does, swerving around other traffic to add some negative modifiers to be followed. It goes 11 CL and makes its control rolls. The Mid-sized goes 15 CL and makes the rolls too. The mid-size closes 3 CL and was only 4 away to start with. That's within 2: close enough to hit. 3. Both drivers are L2 14-, and the roll to hit gets +2 because the move is a ram. The attacker rolls a 10, a hit by 6. 4. Base damage done to the Town car is [37 (Mass) x 15 (Speed Value)]/6 = 93pts. The damage Mod is +2 for 111pts of damage. The Town Car takes that. The damage the Mid-Sized takes is 75% of [(40 x 15) / 6= 100pts = 75pts of damage with the +20% damage modifier = 90pts total. 5. Both vehicles make Control rolls: -6 for the Town car and -4 for the Mid-size (which has an effective size class of 7 since it's ramming).

Evade Pursuer

Description: It's a chase scene like in the movies. You move normally, however, you may declare hazards (driving through a fruit stand). A pursuer must either match those hazards or fall back.

Rules	When it is your turn you may declare various moves to try to lose your opponent. They must match your moves or lose 1 CL per point of difficulty (or point they don't match in the case of maneuvers). When the number of Car Lengths of distance between you open between you gets to a certain number (based on terrain) you're free. **Terrain** / **Escape Distance** City — 25 CL Suburb — 40 CL Rural — 60 CL Super highway — 100 CL Salt Flat — 200 CL These distances are halved at night. The GM is the final arbiter of what hazards are available to gain ground—but the players and GM are expected to work together and be reasonable in assessing what can be done to shake a pursuer)
Who may React?	Any pursuing vehicle. They must take a Follow move. If they do not, they fall back by 1 CL per point of difficulty bid (you are weaving between other vehicles or otherwise taking risks they are not). Usually this only *makes sense* to apply to vehicles that are within 1 turns move of each other (i.e. if the front car were stopped, a move by a rear car would catch or pass the lead vehicle). However, the GM may interpret as the group feels is best for the game (i.e. it may be more abstract).
Difficulty	Maneuver: A car may engage in moves to throw the pursuer off (e.g. the lead car declares a hard turn and the chase car assumes a softer turn: the chasing car will automatically lose 1 car length). The amount a roll is made or missed by (see the Driving table) can make up this auto-loss, however. Hazards: A lead car may attempt to increase hazards (driving through a fruit stand) to shake an opponent. In this case the lead car declares a hazard and the chase car may choose to meet it or not. The GM may allow a pursuer to *partially* meet a hazard (i.e. take a -3 hazard instead of a -6) but usually hazards are all or nothing.

Example	A get-away driver is 15 CL in front of the cops and doing 35 mph (Speed Class 100) in crowded city streets. The driver declares a Turn (-2 to his Control Roll at that speed) and adds a -2 Hazard by driving up on the sidewalks. This gives a total of -4. Other vehicles within a turn's move of the get-away car must choose to either meet the -4 Hazard or, if they don't, lose 4 CL.

Sideswipe/Bump

Description: An attempt to force someone off the road using your car to "persuade" them. From watching Fox's *World's Scariest Police Chases* we have come to the conclusion that (yes, we made the ultimate sacrifice and watched and took notes!) a decent hit to the rear or side of a car results in the necessity of making a Control roll that *often* results in a crash … or damage so that the car cannot continue. It is not the same as Ram in that it doesn't do as much damage but has similar control issues.

Rules

The rules for hitting a target the same as a Ram attempt. The difference is that speed is not such a factor: two vehicles can be moving side-by-side at the same speed and still side-swipe each other. The Speed number for a Sideswipe at identical speeds is 6. If the difference in speed of vehicles is more than 1 Speed Class, half it.

The difference is in the damage done and the control-roll forced. The bumping car gets an effective +2 to its size class for this as well.

Difference in Size Classes	Negative to Control Roll
-6 or more	-6
-4 to -5	-5
-2 to -3	-4
-1	-4
0	-3
1 to 2	-3
3 to 4	-2
5 to 6	-1
7 +	-0

If the roll is missed the roll on the crash table is at Collision Modifier -2.

Damage is divided by 8 instead of 6.

Who may React?

As per ram.

Difficulty

As per ram.

Example

A police cruiser (Size 6) is trying to force a Mid-sized car (Size 5) off the road. Both are moving 50 mph. The Speed Modifier is 6, the Mass of the Cruiser is 41. Calculation is [(6 x 41) / 8] = 30 damage. The effective difference is size calls is 8 vs. 5 (+2 due to ramming) = -3 against the mid-sized, +3 against the cruiser. This is -4 and -2 respectively. If the Mid-sized blows its roll, it'll roll on the crash table at +2.

Emergency Break (Emergency Stop!)

Description: If you're being chased, there's a chance they'll go right by you … if you see something *bad* happen up ahead it might be prudent to stop … and stop fast!

Rules

During a turn a vehicle may declare an emergency braking action. This may improve any normally declared braking but can't double it (you can't declare a full braking action and then follow it up with a second "emergency brake").

The Control Modifiers are doubled for the amount of improvement: if the vehicle declared a -2 Cntrl mod Soft Brake during the normal declaration turn and then declares that the driver is upping the move to a -3 Standard brake, the difference is a -1 modifier. This reduces speed by 30pts (Standard Brake) and causes a control roll at -4 (-2 for the originally declared Soft Brake and –(1 x 2) for two-times the difference).

If the driver has already rolled once in a turn and then spends another 5 REA to declare an emergency Braking action, all the former modifiers are applied to the roll as well as the braking ones.

If the Emergency Braking is for -10 SC, the control modifier is a -1

The car's movement is computed for the new speed class (if there is one) and, if it does drop a speed class the driver can choose to move during *that* initiative.

Who may React?

A car that's Following may respond with their own Braking action, however, there is an exception case: the driver of the car declaring the Brake must declare the brake and how severe it is. Then the braking driver makes an Initiative roll. The driver of any car following must also make an Initiative roll. Any Following driver not within 5 Initiative of braking driver may not choose a braking action that turn (the GM may allow exception cases un-related to following the lead car such as things in the road, however).

Difficulty

Braking Category	Reduction of Speed Class	Control
Hard Braking	-60 SC	-6 x 2 = -12
	-50 SC	-5 x 2 = -10
Standard Braking	-40 SC	-4 x 2 = -8
	-30 SC	-3 x 2 = -6
Soft Braking	-20 SC	-2 x 2 = -4
	-10 SC	-0 + 1 = -1

Example

During a street race a car at Speed 420 (around 130mph) sees a collision dead ahead. The driver had declared "holding steady" that turn—but now knows he better stop—*fast*. The blockage is 15 CL ahead and the driver's gonna move 19—he'll hit it! He needs to lose 30 Speed Classes—and slams the brakes on (note: he could also turn or maybe drift to "lose" a bit of distance—but this is a narrow street with no turns). The turn calls for a -6 Control Roll in addition to any other modifiers (if he'd accelerated this turn he'd add the control negative for his acceleration in as well!).

Evasive Driving

Description: The rules allow you to try to "dodge" a collision (or even ranged attack) but a prudent driver will weave unpredictably when under fire.

Rules

Weaving cost Car Lengths of movement in exchange for negatives to be hit (and takes a control roll). The "cost" in CL's of movement always uses the higher value and rounds fractions up.

NOTE: Firing from a vehicle engaged in Evasive driving gives the same negatives to hit targets as there are to hit the vehicle (all shots from a vehicle that is Weaving are at -1).

Severity of Evasion	Car Lengths	Negatives to be hit	Difficulty
Evasive Weaving	1/10th total or 1	-1	-2
Evasive Swerving	1/5th total or 2	-2	-4
Erratic Weaving	1/4rd total or 4	-4	-6
Wild Swerving	1/3rd total or 5	-6	-8

Who may React?

No one, probably.

Difficulty

Based on the chart.

Example

A sedan carrying an executive comes under Rocket Propelled Grenade attack. The driver is moving at 80 MPH (Speed Class 200-299). This speed is 11 Car Lengths per second. The driver opts for Evasive Swerving. This costs him 2 CL of "forward movement" per move, gives him a -2 to be hit but gives a -4 on his Driving rolls. The -2 CL of motion due to swerving is only truly important if there is a measure of how far the car must go to reach cover or the car is in a race.

Sliding 90/180

Description: In the movies you'll see a car take a sharp turn, skid sideways, come to a stop or near stop, and then take off in a different direction—or—even more impressively, turn a whole 180 degrees with a single sliding maneuver. These stunts are handled here.

Rules

A sliding move involves a controlled skid—meaning the vehicle is, for a time, moving in a direction other than the one it is facing. This is always dangerous. During any of these moves, the vehicle's speed will either be reduced to 0 or it will be Out Of Control next turn (that is, if the driver doesn't decelerate enough, the vehicle will *continue* moving in a direction other than the one it is facing).

Steps for a Sliding Move:

- Declare the move as a Sharp Turn (90 degrees) or Hairpin Turn (180 degrees). Indicate that you are attempting a "Sliding move."
- Make a Driving Roll at the listed negative. If this turn is made, the car successfully begins to skid in a controlled fashion. If the Driving roll is missed half the negative (round up) is added to the Control Difficulty next turn.
- The vehicle loses 75 Speed Points during the slide. If this brings the car to 0, the car is considered stopped at the end of the turn and can accelerate at the beginning of next turn in the new direction. If it doesn't, treat as Out of Control.

Who may React?

No special reaction may be taken.

Difficulty	As per a Sharp or Hairpin turn with the caveat that if the car doesn't shed all of it's speed, it's out of control.
Example	An ace valet driver decides to show off and "park a car sideways" with a sliding-90, brining the car to a halt between two other vehicles. He's at Speed Class 40 when he tries it (about 20mph). The modifier for a Sharp Turn is -4 and he'll come to a stop (40 is less than 75). He's Level 3 14- so he's only rolling at a -1. He rolls a 16, blowing his roll by 3—and rolls a 16 on the Crash Table!! The car does indeed move sideways but not in the way he intended. The table says there's a Standard Chance of Collision and the GM rules there are a lot of things to hit. Crash! … Oops!

Reaction Moves

Move	Notes
Reaction Sideswipe	Hit them as they come by. Ram? Both.
Block (racing)	Move to prevent a racing roll.
Dodge	Dodge an attack or Ram
Emergency Baking	Brake hard—target winds up in front
Follow/Tail	Stay behind (or to side) of target
Pull Away	Put distance between yourself and another car!

Pull Away

Description: When someone moves up behind you, even if you are of a Lower Speed Class and do not get to move yet, you may take a Pull Away action to simulate the fact that your car is moving simultaneously to theirs, even if not as fast. This is a special 0 REA Move.

Rules	The way initiative works in vehicular combat is that if two vehicles are moving at the same Speed Class, they move in order of driver initiative. That would mean that if the guy behind you (2 Car Lengths) gets to move first (faster driver) he could hit you—since you haven't got to go yet. That doesn't make sense (both of you are moving at the same time). Any time a car of a given Speed Class moves, any other vehicle that would be hit by it can take a Reaction Move. In the case of Pull Away, that means you take *your* move in response. This move is taken to open distance *or avoid a collision*. If you are using it *to* collide then use Reaction Sideswipe.
Who may React?	If *your* move takes you within 2 CL of the car *you* are responding to, they can try a Reaction Side Swipe. If you are trying to beat someone around a corner, that's Racing (Reaction Racing if they declared first).
Difficulty	If you have to dodge around the person you are reacting to, take a -2 Control modifier in addition to any others.
Example	You are passing a car on a 2-lane road (he's going north, you're going south). You are both at the same Speed Class (2).

Vehicular Dodge

Description: A Vehicular dodge is an attempt to avoid incoming weapons fire or a ram. At Level 3 Driving Skill a driver may, once a session, declare a Dodge roll *after* a shot has hit if he has the REA.

Rules	A dodge roll is a Driving roll made vs. a To-Hit roll. It will do the following: 1. Avoid a side-swipe or a ram entirely (but not a Reaction Sideswipe … although against *that* you automatically get a roll to avoid the attack anyway!) 2. Reduce the hit-by value of a weapon shot by -3 if made by 0-3 more than the attack roll. 3. Avoid weapons fire altogether if made by 4+ Motorcycles dodge at +2. **Advanced Rule:** A vehicle that has declared a dodge is at -1 to be hit regardless.
Who may React?	No one can respond.
Difficulty	A dodge has no intrinsic difficulty or control roll.
Example	A vehicle with Coverage 5 Plate armor is hit by 6 by a HEAP shell. The driver is Level 3 and has not taken their "survival" dodge yet—so the player chooses too. The attack hit by 6 so the roll would need to be made by 10+ to avoid the hit altogether but the roll is made by 7. This is enough to turn the hit from a hit by 6 (which could go *around* the armor) to a hit by 3 (which will hit the plates—and the vehicle will probably survive).

Reaction Sideswipe

Description: A reaction sideswipe is a move that you take when someone moves past you or you move past someone and they have already moved. Unlike a Ram or Sideswipe, you need not end your turn within 2 Car Lengths of the target, merely come within two Car Lengths during your turn.

Rules

You must be within 2 CL of the target vehicle some time during your or their move. Often this will be a GM call—but it usually applies to someone who is trying to pass you unless they "expend" several Car Lengths of movement to go wide around you (and even then this may be prevented by the road). If the target vehicle is the one moving, you must be within 3 Speed Classes of their speed in order to have a chance to hit them. You must either not yet have moved or be in the process of moving. If you've already taken your move, you can't reaction-sideswipe.

You make a Driving roll to hit them. If they are trying to block you, they get no defensive roll. If they are otherwise engaged in maneuver, they get a Driving roll against yours. Here are the modifiers:

- The better driver gets +2 per difference in Skill Level.
- The faster car gets +1 per difference in Speed Class (a car going 199 and another going 200 is still a difference of 1 in terms of Speed Class).
- The vehicle's handling modifiers.
- -2 for taking this move as a reaction.

If the attacker's roll with modifiers doesn't come out positive, you miss and must make a Control roll at -1 per point you missed your roll by (not the difference—trying to ram a better driver doesn't make you more likely to lose control).

Roll Difference	Results	Notes
-1 or more	Miss	If you missed *your* roll make a control roll at -1per point *you* missed by.
0 to +2	Ram	You wind up ramming them.
+3 or more	Choice	You may either Ram or bump.

Who may React?	The targeted vehicle may take a Pull Away move if it hasn't already moved. If this is done then, if you can still move and catch them, you can Ram or Sideswipe (this isn't a *Reaction* Sideswipe anymore). A car *being reaction-sideswiped* can choose to return the favor. In this case, instead of each car making a Driving roll to be missed, each party makes their roll and if both succeed, both *hit* (and if anyone misses treat as a miss). In that case, work damage as a Ram.
Difficulty	If you miss your roll, you must make a driving roll at -1 per point missed by. **NOTE:** This rule is irrespective of whether or not you *hit* the target. If the ramming car misses by -3 and the target car misses by -5, the ramming car did hit the target, but must make a control roll at -3. When you hit someone both vehicles must make Control Rolls as per the Sideswipe chart. The attacking vehicle gets +2 to its Control roll.
Example	

Block

Description: A vehicle ahead of another may try to prevent the rear-vehicle from passing. This move usually results in both vehicles "expending" movement (CL's of movement) trying to get around each other—even if a vehicle coming from behind does pass a blocker, it may find it didn't get as far as it liked due to lost distance due to maneuver.

Rules

The blocking vehicle must be ahead of the vehicle being blocked and this really only makes sense if both are going in the same direction. The blocker can declare a block even if he is not moving in the same Speed Class as the passing vehicle—a slower vehicle can pass a faster one. Both drivers make driving skill rolls and compare.

Pay to Pass: This number is the number of CL's of movement it will cost to pass the blocking vehicle. If the original distance to the blocking vehicle plus the Pay to Pass number is more than you move that turn, you are stopped right behind the blocking vehicle and must make a driving roll.

Depending on what you make your driving roll by, you may be very close to the car in front of you, you may hit it, or you may wind up a few CL back. Note:

Cost to Block: This is the amount of CL's of movement the *blocker* expends to block the passer (if you are blocking you will have to drive off course to keep the other car behind you).

Blocker Success	Pay to Pass	Cost to Block	Control Roll
Missed -4 or worse	None	4 or 1/3rd (use larger, round up)	Blocker makes roll at -3
Missed -1 to -3	1 or 1/10th (use larger, round up)	3 or 1/4th (use larger, round up)	Blocker makes roll at -2
Made 0 to +4	2 or 1/5th (use larger, round up)	2 or 1/5th (use larger, round up)	Blocked car makes roll at +0
Made +5 to +9	3 or 1/4th (use larger, round up)	1 or 1/10th (use larger, round up)	Blocked car makes roll at -2
Made by +10	4 or 1/3th (use larger, round up)	None	Blocked car makes roll at -3.

Who may React?	A vehicle who is being blocked may opt to ram, going for a Reaction Sideswipe.
Difficulty	There is no difficulty associated with blocking per se. Often a very close roll will result in the blocked vehicle making a control roll, however.
Example	Two race cars are going into a turn at Speed Class 400-499 (up to 150mph, moving 19 CL per second)

Blown Control Rolls and Terrain

When you blow your control roll you may very well crash. This can especially be true if driving in stiff terrain. These rules cover what happens when you blow a control roll—and conditions under which you might have to make some especially hard ones.

Terrain/Traffic Conditions

The danger of a blown control roll is, usually, directly proportional to the amount of things you are likely to hit. If you're by yourself on a salt-flat and fishtailing like crazy at 90mph … so what? If you're in rush hour traffic doing the same thing: multiple collisions are likely! Road conditions are broken up into three categories: Minimum, Medium, and Heavy.

Road Conditions

Condition	Example
Minimum	Country road at night. 4 Lane super highway at 3 in the morning. Suburbia at 2 AM. There might be another car—but you're just as likely to hit a road-sign or something.
Medium	Light traffic. A few clusters but space between 'em. Standard highway driving off rush hour, standard suburbia driving when there are other cars on the road but not many.
Heavy	City driving, rush hour, etc.

Off-Road Rules

Taking your car or motorcycle off road is a good way to get where you're going, but it can be hazardous. Namely, it can involve getting stuck (or, in the absolute worst case, flipping over). Under normal circumstances – driving your vehicle where and how it's designed to be driven – no rolls or checks are required. Things only get hairy when you take it away.

Off-Road Design

Cars designed for off-road travel have a higher ground clearance, better shocks and gear differentials that can help them navigate and overcome obstacles. Cars built for the street, don't. All vehicles have a ground clearance rating.

CLEARANCE TABLE

Ground Clearance Rating	Clearance in inches	Example
0	2" or less	A modified (lowered) street car
1	3" – 6"	An average street car
2	7" – 10"	A "street" SUV
3	11" – 13"	A "serious" 4x4 SUV
4	14" – 16"	A hummer, a jacked-up SUV
5	17" – 20"	Monster truck territory and up

Shooting From Unstable Ground

When the car is bouncing around like crazy it's not so easy to fire from.

Here are the modifiers:

1. If your clearance level is *higher* than the ground there is no negative.
2. If your clearance level is *equal* to that of the ground then you are shooting at -2 in addition to any other modifiers.
3. If your clearance level is *below* that of the ground then you are shooting at -4 in addition to any other modifiers.

Water and Mud

Really wet, swampy, or otherwise soft ground (desert sand dunes count) can raise the effective level of the terrain. Muddy and swampy terrain can count as level 3 and 4 for vehicles not equipped to handle it. Cars with extra power and all-wheel or 4-wheel drive treat infirm ground that is otherwise flat as terrain levels 1 and 2.

If your vehicle's rating is equal to or higher than the terrain rating, no roll is required. If you're driving in terrain rated higher than your vehicle's clearance, then you have to make a driving roll to see if you become stuck.

Control Modifiers on Bad Ground

Driving off-road or firing from a vehicle that's bouncing around like crazy is more difficult than normal. The rule is:

- **Control Modifiers are:** -1 x Ground Clearance rating x Speed Class. So a vehicle going 50mph over rocky ground (Level 1) gets -1 x 1 x 2 = -2.
- **Rolls to hit without RATT Sites:** equal to Control Modifer. With RATT, -1.

TERRAIN TABLE

Ground Clearance Rating	Example
0	A well maintained highway road
1	A dirt road, a gravel shoulder, etc.
2	A really bad road (big rocks, pot holes, etc),
3	Dirt and grass and rocks
4	Steep inclines, deep pits, rivers and streams
5	Really rough terrain

DRIVING ROLL MODIFIER

Terrain – Car's Clearance Value	Driving roll modifier
0 (or less)	No roll required
1	Roll required; No modifier
2	-4 to driving roll
3	-8 to driving roll
4	-12 to driving roll
5	-16 to driving roll

WHEN TO ROLL: In general you roll once per second if you're traveling more than 10mph.

GOING SLOW: If you're going less than 10mph and being careful, you get advantages:

- **Spotting Terrain**: If you're driving 10mph or less, you can probably avoid the tough terrain. Not definitely (if you want to cross that river, you still gotta try to drive through it…), but probably.
- **Avoiding Hazards:** If you're going slow, you probably don't become stuck. You might, but chance are, you simply fail to get where you wanted to go and you can try again. Going slow means under 10 miles per hour. A roll is required every 100 yards.

Blown Driving Rolls

If you blow your driving roll you will probably take some damage and may even get stuck. What happens depends on how badly you blew your roll.

Roll Blown By	Effect
0 -3	Minor Damage
4 – 5	Standard Damage
6 – 9	Stuck
10+	Collision and Stuck

Stuck

Once you fail your roll, you're some kind of stuck. How bad it is depends on what the roll was blown by. If you really screwed up, all four tires are *off the ground* and you're not going anywhere until help arrives (or you un-stick yourself with a wench).

Getting unstuck requires several seconds (at least 10 or 20 seconds, maybe more than a minute) and a successful driving roll at driving – the amount missed by – an additional 2pts. Subsequent attempts are made at additional -2.

Example: A character drives a race car (clearance level 0) off the road (terrain level 3). To do this successfully, the driver must make a driving roll at -8 for each combat turn or 100 yards (if out of combat) he travels. He is an L3 driver with 15- driving, and can navigate in off-road terrain (avoiding obstacles) on a 10- roll (15 – 8 *but his L3 skill ignores -3 points of the modifier so it's only -5*).

He rolls a 14, failing his roll by 4 and becoming stuck. To un-stick himself, he must roll 15 (base driving skill) – 4 (the amount he missed his terrain maneuver roll by) – 2 (additional "stuck" modifier) + 3 (for being level 3).

This comes out to 15 – 6 +3 = 12-.

After 10 seconds of gunning his engine and cranking the wheel around he rolls a 10, and backs off the obstacle.

Collision

When the roll for going off-road is blown, the odds are that the vehicle has sustained some damage. An off-road collision does Mass x Speed / 8 damage (where Mass is the Mass of the vehicle). This damage is done to Core. A vehicle going off-road and failing a roll will suffer collision on a single die roll of a 1-4.

Stuck

On a roll of a 5-6 the vehicle is stuck. The driver must roll at -2 to "unstick" and only gets 2 rolls. After that, you need a tow or a winch or some other way to move the vehicle. If the ground is wet or muddy (see the special modifier) then this goes to a 2-6 roll instead of a 5-6.

Blown Control Roll: Loss of Control

When you blow a Driving Control roll index how badly you blew it against a roll on the table. That tells you what kind of danger you are in (from Minor to Extreme+).

Crash Table

Amount Driving roll blown by	Crash Table Roll	0 – 5	6 – 10	11 – 14	15 - 20
	-1	Minor	Minor	Minor+	Standard
	-2	Minor	Minor+	Standard	Standard+
	-3 to -4	Minor+	Standard	Standard+	Major
	-5 to -6	Standard	Standard+	Major	Major+
	-7 to -8	Standard+	Major	Major+	Major+
	-9 to -10	Major	Major+	Major+	Extreme
	-11 to -12	Major+	Major+	Extreme	Extreme+
	-13 or more	Extreme	Extreme	Extreme+	Extreme+

Results Table

Speed / Result	000 - 099	100-199	200-299	300-399	400-499	500-599	600-699	700-799	800-899	900+
Minor	Minor Drift	Major Drift	Minor Swerve	Major Swerve	Minor Skid	Minor Fishtail	Major Skid	Major Fishtail	Spin out	Flip
Minor+	Major Drift	Minor Swerve	Major Swerve	Minor Skid	Minor Fishtail	Major Skid	Major Fishtail	Spin out	Flip	L-Flip
Standard	Minor Swerve	Major Swerve	Minor Skid	Minor Fishtail	Major Skid	Major Fishtail	Spin out	Flip	L-Flip	L-Flip
Standard+	Major Swerve	Minor Skid	Minor Fishtail	Major Skid	Major Fishtail	Spin out	Flip	L-Flip	L-Flip	L-Flip
Major	Minor Skid	Minor Fishtail	Major Skid	Major Fishtail	Spin out	Flip	L-Flip	L-Flip	L-Flip	L-Flip
Major+	Minor Fishtail	Major Skid	Major Fishtail	Spin out	Flip	L-Flip	L-Flip	L-Flip	L-Flip	L-Flip
Extreme	Major Skid	Major Fishtail	Spin out	Flip	L-Flip	L-Flip	L-Flip	L-Flip	L-Flip	L-Flip
Extreme+	Major Fishtail	Spin out	Flip	L-Flip	L-Flip	L-Flip	L-Flip	L-Flip	L-Flip	L-Flip

Description of Results

Below is a table that describes the result and what it means. Here are the values.

Regain Control: If it's YES then it means after the result is applied, you're still in control and going about your merry way. If it says NO then you are still *out* of control and must roll to regain control at the beginning of every turn. If out of control the attempt to Regain Control is made on the Turn Chart (as per your speed), unless flipping or rolling (in which case you get control back when the vehicle stops). If there's a negative number, roll as though making a Turn at the additional negative.

Move Lost: This pertains to racing and the concept of Forward Motion. The movement isn't really "lost" but if you are in a race and swerve and

move several car lengths in some direction other than that of "toward the finish line" another racer who doesn't lose control will be ahead of you. The table after this shows how to turn the number into Car Lengths.
Speed Lost: This amount of Speed is lost when the crash is rolled.
Collision Danger: How many rolls on the collision table you'll need to make.
Fire: The negative you take for fire coming from the vehicle due to being out of control. If Regain Ctrl is YES, as soon as the turn is over the negatives go away. If it's NO, then only after a regain-control roll is the

Result	Regain Ctrl?	Move Lost	Speed Lost	Collision Danger	Fire	Description
Minor Drift	YES	-1	-10	None	-1	Unplanned lane change (1 lane). Driver may revert to own lane by end of move.
Major Drift	YES	-1	-20	1 roll	-2	Unplanned lane change of 2 or more lanes. Driver is in another lane than the one he started in at the end of the move.
Minor Swerve	YES	-2	-25	1 roll	-2	Car changes direction somewhat during move (driver recovers control and is going in same direction at end of turn).
Major Swerve	YES	-3	-50	2 rolls	-4	Car makes a major change in direction and continues in that new direction for some distance. Driver recovers.
Minor Skid	YES	-4	-75	2 rolls	-3	Car is moving in direction other than the one it is facing.
Major Skid	NO -1	-6	-100/s	4 rolls	-6	Car turns sideways, continues skidding.
Minor Fishtail	NO -2	-3	-75/s	2 rolls	-4	Tail end of car is moving back and forth. Control must be regained.
Major Fishtail	NO -3	-4	-150/s	4 rolls	-8	Tail of car is moving back and forth, flip is quite possible.
Spin Out	NO -5	-6	-175/s	4 rolls	-10	Car is spinning. Flip is quite possible.
Flip/Roll	NO --	--	--	4 rolls	-15	Car has flipped and is rolling.
L-Flip	NO --	--	--	4 rolls	-25	Car is flipping end over end.

Forward Movement Loss Amount	Amount Lost
1	1 CL or 1/10th total movement for that second (use higher value)
2	2 CL or 1/5th total movement for that second (use higher value)
3	3 CL or 1/4th total movement for that second (use higher value)
4	4 CL or 1/3th total movement for that second (use higher value)
5	6 CL or 1/2th total movement for that second (use higher value)

Collision Table

If the loss of control (and the road conditions) calls for a roll on the collision table that means you may have hit targets in the road. The number of rolls you must make is determined by your loss of control. Your skill level has an effect on how you choose results on the Collision Table.

Skill Level	Effect
Level 1 or 2	No effect
Level 3	Roll at -2
Level 4	Roll at -4

No Collision: The vehicle evades any obstacles.
Minimal: The vehicle takes [Mass x Speed Factor] / 8 Damage with a +0 Damage Modifier. The vehicle loses 1 Speed Class.

Partial: the vehicle takes [Mass x Speed Factor] / 6 Damage with a +2 Damage Modifier. The vehicle loses 2 Speed Classes.
Total: The vehicle takes [Mass x Speed Factor] / 2 Damage with a +4 Damage Modifier. The vehicle comes to a stop.
Aggravated: The vehicle takes damage as above with a +6 Damage Modifier. An aggravated result could mean pedestrians were hit or that some other additional problem (gas pumps at a gas station) has been added to the crash. The vehicle stops.

Environment	No Collision	Minimal	Partial(+2 DM)	Total (+4 DM)	Aggravated (+6 DM)
Minimal	0 – 9	10 – 12	13 – 15	16 – 20	20?
Medium	0 – 8	9 – 11	12 – 14	15 – 18	19 – 20
Heavy	0 – 4	5 – 8	9 – 12	13 – 15	16 – 20

What you hit table (Optional)

If it is not clear what was hit, roll 1 dice. This can be used to distinguish between crashing into pedestrians and ramming another vehicle. It's an optional table—but the situation came up in gaming so we're including it here.

1 – 2	Debris
3 – 5	Large object (other vehicle)
6	Worst possible

Vehicular Damage

When a vehicle takes damage, it takes it as an inanimate object—with some special rules for vehicular systems. Let's review those rules here:

The vehicle has Damage Points and STruCture (STC) which functions like CON. Let's say that a car has 705 DP and an STC roll of 15- (which all undamaged vehicles start with). The number to keep track of here is -1 STC per X DP where X in this case is 47 (705 / 15 = 47). This means that if the vehicle takes 47pts of damage, it must make an STC roll at 14- (not 15). And if it takes 470pts of damage, it must roll at 5-.

How it makes or misses that roll will determine what happens to the vehicle and those inside it—and if it takes all it's DP then it's destroyed (no roll needed).

The result of an STC roll is determined as follows:

Result	Effect
Made	Minimal Failure: Roll on Successful STC table
Missed -1 to -4	Minor Failure: "Crack" -1 STC additional to damage taken Roll on Minor Failure Table
Missed -5 to -9	Major Failure: "Crack" -1 STC additional to damage taken Roll on Major Failure Table
Missed -10	Critical Failure: Vehicle is "destroyed" and roll on Critical Failure Table

Vehicular Damage Notes

In addition to those basic rules, here are two others:

1. Vehicles *do take* Penetrating Damage modifiers (like living beings).
2. An advanced/optional rule is that a vehicle only need make an STC roll when it either a) drops 1 STC or b) takes *any* damage when it is at half DP or less. This rule would be invoked so that a vehicle with 1 million damage points wouldn't have to make 1 million rolls every time it takes a minor hit. But mostly this can be ignored.

Those are the basic effects—however there are several specific systems on vehicles that could be taken out or targeted specially. These are Core Systems (movement and power), Crew Compartments (or Cab), and Weapons.

There are one of two ways that these specific systems can get hit. The first is by a 'called shot' ("I shoot at the tires" or "I shoot the engine up") the second is by Internal Damage Effects (a random roll made every time the vehicle takes damage).

Core Damage

All vehicles have a certain number of DP listed as Core. This is usually a considerably smaller number than the number of Damage Points the actual vehicle has. These represent systems like pieces of the engine, timing belts, and other vital components. When Core takes damage there is no special STC roll for it—when it's gone (reduced to 0 or less the vehicle is coming to a halt very quickly and will not move or accelerate until repaired).

- Called shots to: the engine, the tires, or a power-system are considered Core Attacks (see the Called Shots section below). A character "firing into the grille" of an oncoming car could be considered a Core attack (but usually the player must declare it to be such).

Critical Failure Rules

When a vehicle suffers a critical failure, this is what happens.

1. All CORE is destroyed (the vehicle is decelerating and out of control)
2. If the vehicle is an NPC vehicle it is cinematic to have it suffer a fuel explosion. We had some complex rules for killing off PC's that way. If there's a real call for them, we'll include them. Otherwise just distribute internal damage as per the Internal Damage Table. It should be sufficient.
3. The re-sale value of the vehicle is badly damaged.

- When Core is destroyed the vehicle decelerates at 40 Speed Points per second and has an additional -3 to all Control rolls.

Crew

Unlike Core, Crew (also called Cab) doesn't have "damage points"—instead everyone inside has damage points (this counts for Cargo space too). When vehicles get hit and damage is done to Crew space, the people inside take the damage.

- Under the standard rules, any damage done "to crew" is simply done to each character (armor applies, as do negative damage modifiers—but there is no "roll to hit"). In the case of an internal explosion (as with a HEAP round) this more or less makes some sense. The damage Modifier is assumed to be +4 in all cases. See the sidebar for optional rules concerning this.
- Vehicles that are open in some way ("Open Cab") will take Crew hits when hit with an explosive weapon even if the vehicle was undamaged and the crew was not specifically targeted. Driving around with open vehicles when someone may fire HE shells at you is dangerous.
- Crew is not "destroyed" per-se. If everyone is killed but the vehicle is still driveable then under the standard rules someone else could get in and take over. Damage to controls per-se is outside the scope of these rules but the GM is encouraged to make a call.
- Crew hits are done when someone says "I'm shooting at the driver" or "I fire into the cab of the truck" or something like that.
- A special 'Crew Hit' is a case where the cab is open or a gunner is firing from an open toped vehicle—essentially *outside* the vehicle. In that case, the shot is still handled as a "called shot" but the target simply has about 5pts of *Cover*. If the shot hits, but not by 5, the vehicle was hit (assume a hit to the plate armor). If the shot hits by 5 or more, the attacker will choose to hit around the armor—all of it—and hit the gunner directly. Splat.
- If the driver of a vehicle is taken out, the vehicle is treated as Out of Control and will decelerate at 20 Speed Points per second. Each turn roll against a Skill of 8- for crashes (if someone is reaching for the wheel, it still decelerates but they get a Driving roll at -3). Taking command takes 4 seconds or 2 with an Acrobatics roll.

Weapons Systems

Many vehicles in Have-Not are armed. When they are hit, weapons may be damaged. The way the rules work the player owning a vehicle may choose to "declare" a weapon hit (see the rules) for a better die modifier on the damage roll (see Internal Damage Effects). Thus a player might declare "I lose the turret" as a damage effect and then (hopefully) get a better roll because of it.

- Under normal rules weapons are not lost any other way.
- Weapons "lost" this way are usually not destroyed—but just damaged.

Open Cabs (Crew Hits)

If you have an open vehicle and are hit with a blast weapon (one that does Explosive damage—not HEAP—which is concentrated) then crew members will probably take damage even if the vehicle's armor isn't breached. Here is the table:

Cab Type	Damage
Partially Open (Battle Bike, convertible)	¼ Full Damage
Fully Open (old army Jeep, standard motorcycle)	½ Full Damage
Open Turret	1/8th Full Damage

NOTE: All damage is treated as Explosive: +4 Damage Modifier, no roll to hit, Impact.

Designer's Notes: These rules are a) somewhat "realistic" in that one would expect a vehicle that's totally open to be vulnerable to explosives.

But that may not be so good for gaming. In some games it might be fun to waste entire cycle gangs with a plasma beam. In others, though, it might be fun to *be* the cycle gang—with real old-style bikes. And if that's suicide that isn't gonna happen.

So what do you do? Well, you (all of you—the GM, the Players, whoever) discuss that ahead of time—and make the call. You can choose to dial these rules down and say that bikes and open cars give cover against explosions—or maybe give cover if the character spends 3 REA (short) to "duck down" or "to the side."

Either way, decide what you're looking for. When we say "realistic" we just mean "meets our expectations" anyway.

Okay, those are the systems the vehicle has. How do they get hit, exactly? There are two ways: Called Shots and a roll on the Internal Damage Effects table. Let's look at Called Shots first.

Called Shots

Called shots happen when someone says "I'm shooting at the tires" or "I take out the driver." Called Shots have the following modifiers.

- If they are coming from Heavy Weapons (Crew Served, Emplaced Guns, Mounted Weapons, etc.) then they get a -5 to hit automatically.
- If they are shooting at a specific crew member (a human sized target) they get a -1 for size modifier (they can choose to target the "whole crew area" at no modifier though).
- If they use the Basic RATT (Radar Targeting and Tracking) systems they get an *additional* -5—the systems are designed to lead the vehicle and hit "center mast."
- If firing from an open-turret position, they take all modifiers for the vehicle's speed and the vehicles negative to Control.

If they hit then the following rules are in effect:

CORE HIT: All damage that gets through armor is applied to both CORE and to the vehicle. The vehicle makes an STC roll if necessary and rolls on the Internal Damage Effects chart—however CORE damage from this roll is ignored (but apply damage to Crew).

CREW HIT: If a specific crew member (gunner or driver, for example) is targeted and the roll to hit is by 4+ then *all* damage after armor is applied to the target person. If the roll to hit is by 0-3 then roll on the Internal Damage Effects Table as normal (based on how the damage done effects the vehicle) but the damage total is shifted 1 column to the right and all crewmembers automatically take half of that damage. NOTE: The vehicle and still takes the full damage as well and a roll on the Internal Damage Effects table can be made for explosive weapons to see if CORE is damaged.

WEAPON HIT: Under the standard rules, weapons cannot be targeted. They are only lost at the option of the character owning the vehicle (see Internal Damage Effects Table).

Spall and Internal Damage

When a high velocity shell (or worse, a High Explosive Armor Piercing shell) penetrates a vehicle the interior is flooded with super-heated gases or high velocity fragments of metal (or both). This is called Spall and it's what kills the crew (unless, say an ammo magazine is hit or the fuel explodes).

Under the basic rules all internal crew damage is treated like an interior explosion: no roll to hit, just +4 Damage Modifier and Impact damage.

But … if the vehicle was shot up with a .50-caliber machine gun that system doesn't make a whole lot of sense. So here are some optional/advanced rules.

1. Bullets and Beams: these weapons do PEN damage and hit on a 14-. Most targets in a vehicle get *no* AGI bonus (although characters with negative damage mods get those). When damage penetrates, treat as PEN damage and roll randomly to see if a character was hit. Roll twice for each round that hit (each "attack" represents more than one bullet). Once a character is hit, stop rolling.
2. Everything Else (blast shells, HEAP, explosive energy beams) all are treated normally (explosive IMP damage).

Internal Damage Effects

Below is the Internal Damage Effects Table. The type of failure is indexed against a random roll. The roll is modified as follows:

VEHCILE LOSES A WEAPON CHOSEN BY OWNING PLAYER: -3 to the roll.

ATTACKING PLAYER CHOSES A WEAPON THE TARGET LOSES: -5 to the roll. The attacking player can choose to have the roll be as standard though, declining to take a weapon. If declined the player can choose the above option.

HOW TO USE THE TABLE

The listed D number is *Damage that got through armor*. That number is applied directly to CORE and, on a random roll to Crew.

Vehicle Type	Roll to damage Crew	Amount of damage
Standard Car	1-2 on 1d	½ what CORE took
Extended Cab (SUV)	1-3 on 1d	½ what CORE took
Expanded Cab (Bus)	1-5 on 1d	½ what CORE took

Roll	0-5	6-8	9-11	12-14	15-17	18-20
Minimal	None	None	D/20	D/10	D/5	D/3
Minor	None	D/20	D/10	D/5	D/3	D/2
Major	D/20	D/10	D/5	D/3	D/2	D
Critical	D/20	D/10	D/5	D/3	D/2	D

Example: A vehicle is hit for 173pts of damage after armor is applied. The vehicle suffers a Minor Failure on its STC roll. The owning player declines to lose any weapons and a damage roll is made: a 14. This, under Minor Failure is D/5. This is 35pts of damage. This is subtracted from CORE. The vehicle is a standard car and a roll is made to see if Crew is hit (one die is rolled and on a 1 or 2 crew is hit). The roll is a 1: crew is hit. Each crew member takes 17pts of damage. The driver is knocked unconscious and the vehicle goes out of control into a crash.

Note: if the owning player had chosen to lose a minor weapon, the result would have been an 11, which would have been only 9pts of damage—far more survivable.

The real specter of damage in Have-Not though is the need for repairs—and getting stuck out in the wasteland. How far you can go with a damaged car depends on how badly it was damaged.

Core Repair Costs and Damage Effects

Core At	Range	Repair Roll	Notes
80%	60 miles	-2	Using standard spare parts
50%	25 miles	-4	Requires Cost of Car / 10c worth of parts
25%	12 miles	-5	Requires Cost of Car / 5c worth of parts
10%	4 miles	-6	Requires Cost of Car / 3c worth of parts

Weapon Repair Cost

Weapon repair costs is based on how well the roll is made to repair it (yes, this is sort of backwards).

Mechanics Roll	Cost
Missed	Weapon Cost / 2
Made +0 to +4	Weapon Cost / 4
Made +5 to +9	Weapon Cost /10
Made 10+	Weapon Cost / 20

Armor Repair

Each point of Ablative Armor costs .5c to replace up to a maximum of half the cost of the armor.

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Each point of vehicular DP costs 1c to replace up half the cost of the vehicle.

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When a vehicle takes damage, it takes it as an inanimate object—with some special rules for vehicular systems. Let's review those rules here:

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In addition to those basic rules, here are two others:

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Below is the Internal Damage Effects Table. The type of failure is indexed against a random roll. The roll is modified as follows:

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HOW TO USE THE TABLE
The listed D number is *Damage that got through armor*. That number is applied directly to CORE and, on a random roll to Crew.

Vehicle Type	Roll to damage Crew	Amount of damage
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Extended Cab (SUV)	1-3 on 1d	½ what CORE took
Expanded Cab (Bus)	1-5 on 1d	½ what CORE took

Crashing (Wear Your Seatbelt)

If the vehicle is in a substantial collision the characters inside will take damage. This is treated as Impact damage that hits on a 15-. It does not miss (if the roll is higher than 15, treat the Damage Modifier as 0). Note: AGI bonus does not apply but negative DM's from Fast, Quick, or other powers do. Damage is:

- 8pts per Speed Class if the character is *not* wearing a seatbelt.
- 4pts per Speed Class if the character *is* wearing a seatbelt.
- 2pts per Speed Class if the character is in a 5-point harness.

Half (50%) of all Crash damage is done directly to CORE (after armor). 100% of it is done to the vehicle. Note: this assumes a front end collision. The GM may make a 1-4 roll on a single die to damage CORE if the collision is a rear-end or side-swipe.

Roll	0-5	6-8	9-11	12-14	15-17	18-20
Minimal	None	None	D/20	D/10	D/5	D/3
Minor	None	D/20	D/10	D/5	D/3	D/2
Major	D/20	D/10	D/5	D/3	D/2	D
Critical	D/20	D/10	D/5	D/3	D/2	D

Example: A vehicle is hit for 173pts of damage after armor is applied. The vehicle suffers a Minor Failure on its STC roll. The owning player declines to lose any weapons and a damage roll is made: a 14. This, under Minor Failure is D/5. This is 35pts of damage. This is subtracted from CORE. The vehicle is a standard car and a roll is made to see if Crew is hit (one die is rolled and on a 1 or 2 crew is hit). The roll is a 1: crew is hit. Each crew member takes 17pts of damage. The driver is knocked unconscious and the vehicle goes out of control into a crash.

Note: if the owning player had chosen to lose a minor weapon, the result would have been an 11, which would have been only 9pts of damage—far more survivable.

The real specter of damage in Have-Not though is the need for repairs—and getting stuck out in the wasteland. How far you can go with a damaged car depends on how badly it was damaged.

Core Repair Costs and Damage Effects

Core At	Range	Repair Roll	Notes
80%	60 miles	-2	Using standard spare parts
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Mechanics Roll	Cost
Missed	Weapon Cost / 2
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Made 10+	Weapon Cost / 20

Armor Repair

Each point of Ablative Armor costs .5c to replace up to a maximum of half the cost of the armor.

Vehicular DP

Each point of vehicular DP costs 1c to replace up half the cost of the vehicle.