IMMEDIATE

David J. Buchko
BMW Product Communications Manager
201-307-3789 / dave.buchko@bmwna.com

Gordon B. Keil
BMW Product Communications Specialist
201-307-3790 / gordon.keil@bmwna.com

BMW M3 FOR 2002: NEW SEQUENTIAL MANUAL GEARBOX AND DETAIL REFINEMENTS

Woodcliff Lake, New Jersey, November 15, 2001...For enthusiasts of ultimate automotive performance, it's a magic name: **BMW M3**. Combining the all-around excellence of the BMW 3 Series with the spectacular performance and handling prowess that could only come from BMW M, the M3 is the formidable BMW sports car that has won – again and again – the accolades of the world's motoring critics while providing its buyers with real performance and equally real practicality. Less than a year ago, BMW M, creator of all things M, brought forth a new M3 – an all-new generation of this legendary sports car.

As has been traditional with the M3, it was the coupe model that appeared first; a convertible variant followed soon thereafter. Predictably, the independent experts took notice. In a June 2001 comparison test of the M3 coupe and a key competitor, *Car and Driver* declared the M3 the winner. "Incredible engine, sweet steering, silky gearbox, hi-fi driving experience" was how the magazine characterized BMW M's new ultra-performance coupe.

In another comparison test, pitting the M3 against two key rivals, *Automobile Magazine* (May '01) gave the BMW the edge and characterized it thus: "The BMW is a more tactile car, more responsive and fractionally quicker. It's a bigger challenge to drive, and that, ultimately, makes it a more rewarding purchase."

In August '01, *Motor Trend* compared the M3 coupe with two sports-car competitors and concluded, "It's ironic that the M3 can do all that it

does so extremely well and still be a four-place machine with a useable back seat and a real trunk."

And in its July 23, 2001 issue, *AutoWeek* found that the M3 convertible would outperform BMW's own 0-60-mph time (5.1 seconds, vs. BMW's claim of 5.4 sec.). "But numbers can't measure the grins this car elicits. We're talking ear to ear. Toss it around a turn or through some cones and you're in danger of grinning the whole top of your head off. Around here, we call the M3 simply 'The Car.' Says a lot, no?"

For 2002, these new-generation M3s begin a second model year with several evolutionary changes and a revolutionary new transmission option:

- The optional Xenon headlights, now Bi-xenon, encompass low and high beams, vs. just low beams before.
- Also optional is a new automatic control that switches on the headlights and related lighting according to ambient light conditions.
- An in-dash CD player is newly standard.
- Radio-station presets are now included in the Vehicle and Key Memory system. When a particular user unlocks the M3 with his or her remote, the presets last set by that user are re-captured.
- Also new inside is Titan Shadow trim, with a graphite-like color appropriate to the M3's high-technology character.
- The available BMW Onboard Navigation System, encompassing GPS navigation and many other useful functions, has been updated with a larger, easier-to-read color monitor and optimized controls.
- Topaz Blue Metallic, has been added to the exterior color selection, Fern Green Metallic discontinued.
- The biggest news is the Sequential Manual Gearbox, offered as an option on both M3 models. Building on technology that is now virtually universal in Formula 1 racing cars, SMG affords sports-oriented drivers a means of absolutely optimizing performance – or making driving more effortless, according to the driver's wishes. Details follow.

As in 2001, two M3 models are offered: coupe at $46,545, convertible at $54,545. Both base prices are up a nominal $500 from '01, reflecting the increased standard equipment; both include destination charge.

A BRIEF HISTORY OF THE M3

The **1st-generation M3** was essentially a racing car tamed for road use. Offered in the U.S. from 1988 through 1991, it was based on the then-3 Series generation (internal platform designation E30) and was a winged, spoilered 2-door sedan powered by a raucous BMW M 4-cylinder engine of 2.3 liters and 192 hp. This was a race-bred engine, with 4 valves per cylinder at a time when no regular-production BMW had more than 2; an individual throttle for each honed cylinder; and other racing-style engineering finery. That M3 certainly wasn't for everyone, but it was a hearty and dynamic performance machine; even today it has a devoted following.

The **2nd-generation M3** is better known. Based on the then-current E36 3 Series and making its debut for 1995, this M3 had a mission beyond BMW M's usual dedication to great performance and handling: to bring BMW M and its great driving machines to a wider spectrum of U.S. buyers.

This was accomplished by powering the M3 not with a traditional, highly elaborate BMW M engine, but rather with a specially developed version of now-standard BMW practice: an inline 6-cylinder engine with dual overhead camshafts, 4 valves per cylinder and a single throttle. Taking this approach, they created an engine, of 3.0 liters, a solid 240 horsepower and every bit BMW M. The strategy was perfect: Within the range of speeds American drivers experienced, this engine provided thrilling performance, yet cost thousands less to produce. The rest of the car was very much the same M3 that Europeans could buy.

In 1996 the engine grew to 3.2 liters and delivered more torque. In either form, it was loved by America's enthusiasts and critics alike. "The BMW M3 has it all," raved *Car and Driver* in December '94. "Scintillating speed, brilliant handling, a utilitarian package." This 2nd-generation M3 was offered through 1999; a convertible and a 4-door sedan joined the original coupe model along the way, extending M3 virtues to buyers with differing priorities.

THE NEW-GENERATION M3:
3 SERIES PERFECTION, M MUSCLE

As universally acclaimed as the 1995-99 M3 was, progress never stops at BMW – nor, more particularly, at BMW M.

At any point in time, the diligent people who conceive, design and engineer BMW vehicles are always striving toward something even better. So it is with the 3 Series, a core BMW product. *Car and Driver,* naming the new 3 Series to its 10Best list for the 10th consecutive year in January 2001, put it this way: “The BMW 3 Series has been on each of the last 10Best lists...BMW clearly does not rest on its laurels because the 3 Series has gotten better each year.” Indeed, the current 3 Series, first seen as a ’99 model, has been treated to an updating for ’02, and the ’02 M3 partakes of the functional side of this freshening.

Thus based on the 3 Series, the M3, too, could be, and has been, brought closer to perfection. Yet the new M3 is more than just a “3 Series plus”: Like all M Cars, it is very much its own machine, a true and gifted sports car, whether in coupe or convertible form.

A NEW APPROACH TO POWER CREATES NEW CAPABILITIES

As multi-talented as any M Car is, its heart is always the engine. The new M3’s heart is utterly new, and a dramatic departure from the already wonderful engine of its predecessor.

Even after the resounding success of that special, simpler, less costly engine, BMW M decided to endow all new M3s with the same engine: a “world engine,” and one that does indeed embody the more exotic, costlier, even higher-performance concept formerly reserved for other markets.

Why? Because the world has moved on; expectations are higher. The previous engine had dual overhead camshafts, 4 valves per cylinder, single throttle and a then-impressive 6800-rpm redline; such features and characteristics have become normal for high-performing regular-production automobiles. To further the M3’s leading-edge position, it was time to move on to an even higher-caliber machine.

Under the new M3’s domed hood, then, is an engine like none other – even more spectacular than the one in 2nd-generation European M3s.

AN ALL-NEW BMW M ENGINE: THE S54, WITH NEARLY 100 HP MORE THAN ITS PREDECESSOR

In its broad concept, the new M3 engine, designated the S54 [1], shares its format with other BMW inline 6-cylinder engines. Virtually all of its engineering details, however, are unique and oriented to the very highest level of performance.

Given that other current BMW "sixes" have an aluminum block with cast-iron cylinder liners, it may be surprising that the new M3 engine (like its predecessor) has a cast-iron block. Why?

Compactness is the primary reason. An inline six is longer than a V-6, and BMW nurtures the inline layout because of its superior smoothness and sound. An aluminum block's cylinder liners take up space; with liners it would not have been possible to achieve the engine's 3.2-liter displacement without lengthening the block.

The second reason is **strength**. Given that this engine develops fully 333 hp from 3.2 liters – significantly over 100 hp per liter – its internal stresses are immense. According to M3 Project Director Siegfried Friedmann, BMW engineers researched a silicon-impregnated aluminum block (as used in BMW V-8 and V-12 engines), which would not require liners. They concluded that a cast-iron block could best sustain the engine's high cylinder pressures and very high piston speed at maximum rpm. (Current Formula 1 engines attain piston speeds around 25 meters per second; with 24 m/sec. at its rpm limit of 8000 rpm, the S54 is quite close.)

The block accommodates the engine's new bore and stroke of 87 x 91 mm, up from the previous U.S. engine's 86.4 x 89.6 mm to give a displacement of 3246 cc vs. 3152. However, playing much larger roles than increased displacement in the nearly 100-hp increase are the new engine's induction, combustion and exhaust engineering, together with its execution as a **high-rpm engine**. The starring role here is played by a brand-new cylinder head that could be termed "exotic."

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[1] – All BMW M engines are designated "S" for Sport. Current regular-production BMW 6-cylinders are of the M54 family; the previous M3 engine was designated S52 US.

TOUR DE FORCE:
THE CYLINDER HEAD

Feature-by-feature, the new head (of aluminum as before) differs sweepingly from the previous U.S. head, becoming more like other BMW M cylinder heads. Features shared with the BMW M5's nearly 400-hp V-8 engine, for example, are noted with an asterisk (*):

Double VANOS steplessly variable valve timing*. The previous U.S. engine had VANOS [2] variable valve timing on its intake valves only: a 2-stage system, with one timing setting for low, one for high engine speeds. The new engine has stepless Double VANOS, which varies valve timing on the intake and exhaust camshafts without the "step" of the 2-stage system. Though this VANOS is employed in current 3 and 5 Series 6-cylinder engines, as used in the M3 engine it varies timing over a wider range and contributes in a major way to the engine's stratospheric power output. Intake timing is varied by 60°, exhaust by 46°, vs. 40°/25° [3]. As in all BMW engines where it is employed, VANOS is hydraulically actuated in response to electronic controls.

VANOS pressure pump*. The M3 VANOS system has its own radial-piston hydraulic pump; in regular-production BMW engines the main oil pump supplies the pressure to operate VANOS. Integral to the exhaust camshaft's VANOS mechanism, the pump produces up to 120 bar (1740 lb./sq in.) of pressure. Herbert Vögele, who directs engine development at BMW M, explains that this high oil pressure enables the M3's VANOS to vary valve timing more quickly at very high rpm than would the regular-production hydraulic system. Thus BMW M refers to the M3's VANOS system as **High-Pressure Double VANOS.**

Unique valve mechanism. Regular-production BMW 6-cylinder engines employ bucket-type hydraulic lifters, actuating the valves directly with minimum noise and no periodic adjustment. For an engine with the S54's rpm potential, BMW M engineers needed less reciprocating mass.

To achieve this, they created a different actuating mechanism, using finger-type rocker arms. Pivoting on their own shafts (one on the intake side, one on the exhaust), these small – one could almost say dainty – arms reach

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[2] – **VA**riable **NO**ckenwellen **S**teuerung = variable camshaft control, or variable valve timing.

[3] – In terms of crankshaft rotation.

out to provide the actuating surface between camshaft and valve. As the entire arm does not move the distance of valve lift, its effective reciprocating mass is less than its actual mass – and it weighs less than the “bucket tappets” in the first place. When all is said and done, the effective mass is 30% less; in turn, this allows lighter valve springs, which further reduce inertia. The rocker-arm arrangement also results in less friction.

As the system involves no hydraulic maintenance of valve clearance, it does have to be inspected periodically. Lead engine engineer Helmut Himmel asserts that it is unlikely that clearance will actually require adjustment, but if so it is done with shims (tiny metal discs of various thickness) without removal of the camshafts.

Whereas the “regular” 6-cylinder engines have a simplex (single) primary chain driving the exhaust camshaft and a smaller secondary chain driving the intake camshaft from there, the S54 has a full duplex (double) chain driving both camshafts directly. As usual with BMW engines, the chain is hydraulically tensioned and needs no periodic adjustment or replacement.

Extra-high compression ratio. At 11.5:1, the M3 engine has the highest ratio in current BMW production. (M5: 11.0:1, also quite high.)

Machined surfaces*. “Engineering finery”: The combustion chambers and intake ports are completely machined, for smoothness that facilitates airflow. The exhaust ports are partially machined. For durability, the valve seats are of especially hard steel. A 3-layer stainless-steel head gasket ensures effective sealing of the head to the block.

Head casting and sealing. Extreme strength in the cylinder head has been achieved by making it a single aluminum casting. This construction, though more difficult to realize than the previous European engine’s 2-piece head casting, also saves weight – a very significant 29 lb. As this weight savings is at the top of the engine, it helps lower the car’s center of gravity.

INDUCTION SYSTEM:
BMW M TRADITION, STATE-OF-THE-ART TECHNOLOGY

The new M3 returns to a BMW M tradition: **an individual throttle for each cylinder**. Positioned much nearer to the cylinders than a single throttle can be, these bring atmospheric pressure practically right to the cylinder. The “lag time” inherent in airflow into the cylinders is thus greatly reduced and the engine can react more quickly to throttle movements.

In principle, the M3 system – electronically controlled individual throttles – is like that of the M5 even though no actual components are shared. All six throttles operate from a single shaft, each in its own throttle body right at the intake ports. Via the accelerator pedal and its two potentiometers, the driver gives the commands, which in turn are processed by the engine control module and received by a DC servo motor. The motor drives the throttle shaft through a tiny gearbox.

Upstream of (and acoustically decoupled from) the throttle bodies are the six intake trumpets, made of weight-efficient fiberglass-reinforced PA6 thermoplastic; their diameter-to-length ratio was calibrated with a computer program of BMW's Formula 1 racing department. In turn, the trumpets are laser-welded into the induction plenum of the same composite material to form a single assembly.

As on the M5, **M Driving Dynamics Control** provides Normal and Sport settings for throttle response. In Sport, selected via a console switch, the ratio of throttle opening to pedal movement is increased so that apparent engine response is even quicker. Even the transitional response of the electronic engine controls is altered to suit. Drivers will find one or the other setting more to their liking, or choose them according to driving conditions; the system always reverts to Normal when the engine is started.

Together with the stepless VANOS, this elaborate induction system adds to the engine's immense breathing and fuel/air processing capabilities.

EXHAUST SYSTEM: ENGINEERED FOR FREE FLOW

The M engine team led by Messrs. Vögele and Himmel developed one of the freest-flowing exhaust systems ever installed in a production vehicle. After the partially machined exhaust ports, it begins with two elaborately snaking stainless-steel headers serving three cylinders each.

These headers are formed under high pressure **with water inside them**, which ensures even distribution of the forming pressure and thus consistent wall thickness. In turn, this process allows stainless-steel walls only 1 mm thick (about 1/25th of an inch), not only helping save weight but also hastening engine warmup as there is less metal to heat up after a cold start.

Each header is a single piece, thus not welded-up as are most headers.

In one of the few differences between the U.S. and European versions of this engine, whereas the Euro model's converters are under the floorpan, in the U.S. version engine each header also includes the catalytic converter. This puts the catalysts closer to the engine, improving emission control when the engine is started from cold and meeting more stringent U.S. regulations in this regard. Four Lambda (oxygen) sensors are employed; the engine complies with U.S. LEV (Low Emissions Vehicle) limits.

From the catalytic converters rearward, the exhaust system continues as a true dual system through a large, L-shaped muffler/resonator and four polished outlets that speak the authoritative tones of M Power. This elaborate and efficient exhaust system imposes fully 40% less back pressure on the engine than that of its European-version predecessor, and of course this too contributes to the engine's power output.

HIGH-PERFORMANCE LUBRICATION AND COOLING

Though their lubrication systems are not identical, there is similarity to the M5 engine in that a "semi-dry-sump" system helps ensure adequate lubrication under the high cornering, acceleration and braking loads the M3 attains. Particularly in hard cornering to the left, it is critical to ensure return of oil to the pan; therefore, integrated into the gear-type pressure pump is a **scavenging pump** that collects oil from the right side of the small forward oil sump and pumps it back into the main, larger rear sump. This rear sump is almost completely closed off from the rest of the system, and thus able to hold the oil necessary for lubrication throughout the engine. Specific return passages are also incorporated into the intake (left) side of the engine to help ensure ideal oil flow under all operating conditions.

The graphite-coated aluminum pistons are cooled by oil spray, and each valve rocker arm is sprayed with oil just as it is about to be loaded by its camshaft lobe.

As on the M5 engine, a thermal sender monitors both oil level and temperature. If the level drops low, a warning appears in the instrument cluster; the tachometer face includes the oil-temperature gauge.

As on the M5 engine, the M3 cylinder head incorporates crossflow cooling; this promotes consistent temperatures from the front to the rear of

the head, helping minimize distortion and wear under the extreme heat such a high-performance engine develops when its full power is being exploited.

THE HIGH-RPM CONCEPT

A high-rpm concept is essential to achieving such high power from moderate displacement. High engine speeds pose challenges; engineers must ensure that durability standards are met and that the engine performs properly at the high rpm levels. Maximum power occurs just below the engine's 8000-rpm limit at 7900 rpm; drivers who mean to enjoy this engine "to the limit" may operate it frequently in these upper rpm reaches.

To achieve the revving capability, the engineers employed a number of detail measures. A forged, nitro-carbonized steel crankshaft provides great strength in this critical component. Forged-steel "crack" connecting rods eliminate the need for bolt sleeves and thus reduce reciprocating weight.

Demonstrating just how many details can go into realizing the high-rpm concept, a unique new water pump plays a role too. The crossflow cooling, essential to the high-speed operation, requires high coolant flow. To achieve this, the engineers developed a pump with 3-dimensionally contoured vanes. Such contours would have been inordinately costly to produce in metal, so BMW M developed a brand-new, novel pump design. Each vane is a small plastic casting, pressed into an also-plastic rotor and then welded into place. Also adding cooling efficiency is a ring-type thermostat, which imposes less resistance to coolant flow than conventional plate thermostats.

Electronics play their role too. BMW fully developed the S54's control module: Manufactured by Siemens and called MS S54, this unit can do everything, "and do it fast," as Helmut Himmel says. Every 6 degrees of crankshaft rotation, it calculates and adjusts the ignition and fuel injection at each cylinder individually. Ignition takes place through a very small-diameter pencil coil at each cylinder, adopted from BMW's V-12 racing engine and making its first appearance in a production car.

SPECTACULAR RESULTS: POWER, TORQUE, REVS, PERFORMANCE, SOUND

All this major and detail engineering work results in a remarkable, high-performing, great-sounding sports engine. Powered by its 333 hp through the standard 6-speed manual transmission, the new M3 sprints from rest to 60 mph in a thrilling 4.8 seconds, same as the M5, and continues on to an electronically limited maximum of 155 mph.

Yet for all this through-the-gears showmanship and the theatrics of upshifting at top revs, the M3 engine is by no means short on everyday driveability, willingness and auditory pleasure. “The engine is very strong and pulls eagerly to its 8000-rpm redline”, noted *Automobile Magazine* in August 2001, “but it is, at the same time, extremely flexible and will pull smoothly away from a slow corner in any gear.”

GREAT LOOKS TOO: THE VIEW UNDER THE HOOD

Following a long tradition of visually attractive machinery, the S54 engine’s appearance is as beautiful as its engineering. Tubing for the idle air supply, fuel to the injectors, fuel from the fuel pump is stainless steel. Housed in cast aluminum, the VANOS mechanism projects prominently forward of the cylinder head. Stainless-steel screws secure the camshaft cover. Chrome rings hold the induction trumpets to the ports. The “M” logo and a special M oil filler cap adorn the front of the camshaft cover.

M3 DRIVETRAIN: GETTING S54 POWER TO THE ROAD

Like every M Car to date, the M3 transmits its power to the road via classic rear-wheel drive [4]; BMW M is not inclined to accept the extra weight and friction of all-wheel drive in an ultimate performance vehicle.

That said, the M3 packs some premium and fascinating engineering into its drivetrain.

6-speed manual transmission. In another departure from the previous M3, the new one comes standard with the familiar, robust and precise Getrag Type D 6-speed manual transmission. As in the M5, it is crisply controlled by a shift knob with illuminated shift pattern and M logo.

[4] – The original M Car, the M1, had a midship engine and rear-wheel drive.

A dual-mass, hydraulically damped flywheel between the engine and clutch is specially tuned to the S54 engine's power pulses and drivetrain configuration. Its primary plate is made of forged steel for high strength. For the first time in a 6-cylinder M Car, the clutch is self-adjusting; this maintains consistent clutch-pedal forces over the life of the clutch, which helped the engineers achieve high torque capacity with moderate pedal effort. The hydraulic actuation circuit includes a limiter orifice that smoothes momentary loading peaks (shocks) without in any way cutting into the clutch's performance; this helped avoid excess weight in the drivetrain.

The transmission housing incorporates NACA air intakes which, together with careful aerodynamic design of the underbody, help keep internal transmission temperatures down; the engineers speak of 30°C (about 55°F) cooler oil than if these measures had not been taken.

M5-sized differential unit. Significant modification in the rear-suspension area, including an all-new subframe, has allowed equipping the M3 with the same heavy-duty differential dimensions as the 394-hp M5. For the first time in a BMW, a new high-strength steel alloy, called 18CrNiMo7, is used for the differential gears to achieve superior quietness and durability. A relatively "short" final drive ratio, 3.62:1, fully utilizes the engine's generous torque and rpm range; the 6th gear keeps it humming moderately at cruising speeds. Here too, targeted airflow under the vehicle helps keep the oil cool, along with a ribbed differential case.

M Variable Differential Lock. Together with the German division of GKN Viscodrive, BMW M engineers developed a new mechanical limited-slip differential for the new M3.

The principal (and principle) difference between a traditional limited-slip "diff" and the new M Variable Differential Lock is that where the former senses torque, the new senses wheel speed (rpm). Under dry to not-quite-dry road conditions, the traditional limited-slip has always enhanced the handling of sporty rear-wheel-drive BMWs; however, under slippery conditions, this differential type has limited ability to improve traction. On all current BMW models, electronic traction control addresses this issue.

The M Variable Differential Lock specifically addresses low- and split-traction situations in a way that reinforces sporty handling, imparting to the M3 a slippery-road ability no high-performance, rear-wheel-drive sports car has ever had.

Any time a speed difference develops between the two rear (driven) wheels, a **shear pump**, driven solely by this difference, develops pressure in the silicon viscous fluid in which the lock operates. In turn, this pressure is directed to a multi-disc clutch that transfers driving torque to the wheel with the better road grip ("select high"). The greater the speed difference between the two wheels, the more aggressively the clutch engages. As soon as the difference between the two wheels' speeds begins to diminish, the clutch begins to ease off.

This mechanism is "elegant," in that it achieves sophisticated action by entirely natural means. There is no external pump, no external source of lubrication or operating fluid. The very motion to be controlled – differences in speed between left and right wheels – generates its locking action. Viscous fluid is so-called because it develops internal force (via an increase in viscosity) whenever it is sheared; this is why the relatively small difference between one wheel speed and the other can generate the necessary action.

Dynamic Stability Control. This electronic traction and stability system, now standard on all BMW models, complements the M Variable Differential Lock.

DSC optimizes traction by electronic means, sensing wheel-speed differences and reducing engine torque and/or applying individual rear-wheel brakes. The crucial difference to the M3 driver between the M Variable Differential Lock and the DSC traction function is that the former in no way impedes power delivery, and is hence suitable for performance driving.

Yet in fact, even DSC's traction function in the M3 is calibrated to M-specific parameters. In cooperation with Continental Teves, BMW M engineers developed specific logic that, in combination with the fast-reacting engine, performance-oriented gearing and M Variable Differential Lock, achieves the desired traction optimization in a more M-compatible way...in other words, without undue interference with M3 performance and the differential lock's ability to get power to the road.

The DSC stability-enhancing function is essentially unrelated to traction. Sensing differences in wheel speed in a critical cornering or avoidance maneuver, DSC detects any deviation from the normal cornering path (abnormal understeer or oversteer) and gently applies individual wheel brakes to help the driver keep the vehicle on the intended path.

As usual with DSC, it can be de-activated via a console button.

NEW FOR 2002:
THE SEQUENTIAL MANUAL GEARBOX (SMG)
REVOLUTIONIZES SPORT DRIVING

Given the M3's performance nature, it does not seem logical to offer an automatic transmission as such; no matter how good – and BMW's 5- and 6-speed automatics are among the best – an automatic transmission incurs some performance loss relative to a well handled manual gearbox. On the other hand, given today's capabilities in electronics and hydraulics, it does make great sense to improve on the M3's 6-speed manual transmission.

For some years now, racing drivers, in particular in the world's premier class, Formula 1, have availed themselves of "power shifting" of manual transmissions via an electrohydraulic system. BMW M pioneered in applying this concept to road cars, introducing its first Sequential Manual Gearbox in M3s for the European market in 1996. The SMG concept, now in its 2nd generation, is available in the U.S. A team of some 15 people, which has been working on SMG about nine years, includes engineers and technical specialists from BMW M, transmission manufacturer Getrag, clutch maker Sachs and the electrical/electronics firm Siemens.

Thus the SMG now offered in M3s is in reality SMG II, evolved to a significantly higher state of perfection than the original system; in the U.S. it will be referred to simply as SMG. In conceptual terms, the system consists of • The same 6-speed manual transmission as is standard in M3 models.

- An electrohydraulic mechanism that does the actual gearshifting and operates the clutch.
- Electronic controls that regulate the electrohydraulic mechanism.
- The driver interface, which includes a shift lever on the console and shift "paddles" on the steering wheel.

There is no clutch pedal. On the console is a short, sporty shift lever with R (Reverse), 0 (Neutral) and S/A (Sequential/Automated) positions, plus "–" and "+" directions. The shift pattern appears on the illuminated shift knob and in an instrument-panel display under the tachometer. Behind the shift lever is a program selector, with which the driver may select –

- In the Sequential mode, 6 programs ranging from "softest and slowest" shifts to "firmest and quickest" shifts; i.e. from most leisurely to sportiest.
- In the Automated mode, 5 programs of similar gradation.

In the dash display, the program selected is shown in a bar graph that repeats the graphic of the program selector switch. The gear currently engaged is shown as a numeral at the left of the indicator; in A, an “A” appears next to the gear indication. At the right side of the shift pattern, “S” is shown if the Automated mode is currently engaged, and vice versa; this indicates which mode will be obtained if the lever is moved in that direction.

The vehicle may be parked in R or S/A, not 0. To start the engine, the selector must be in 0 and the brake pedal applied. This accomplished, the driver then selects R or A (again with the brakes applied); A is the default mode when the engine is first started and the lever is moved to the S/A position. When moving off from rest in A, the system automatically selects 1st gear, and shifts up through the gears to 6th as road speed increases. In this sense, the A mode resembles the operation of an automatic transmission – but only resembles, not duplicates, it.

Sequential (S) mode. In this mode, the driver has full control over shifting. Pulling the shift lever rearward in the “+” direction, or actuating the right-hand “paddle” on the steering wheel, effects upshifts; pushing the lever forward (“–”) or actuating the left-hand paddle effects downshifts. It’s that simple:

- S1-5: Selected by the console switch and indicated in the instrument-cluster display, the programs range from “softest” to “firmest” – that is, in 1 the shifting is accomplished at a relatively leisurely pace, in 5 much more quickly. The driver’s criterion here is how sportily he or she wants to drive; in any of the programs, the higher the engine speed the quicker the shift.
- S6: To select this most aggressive program, the driver must switch off the Dynamic Stability Control system. Minimum shift time in S6 is 80 milliseconds; under equal conditions, the “slowest” shift program (1) takes 2-4 times as long to complete a shift.

The word “sequential” indicates the basic concept of “one gear at a time” – each tip of the shift lever or shift paddle moves the transmission up or down one gear. However, the driver can skip gears by simply hitting more than one shift in quick succession. Whenever and however the driver calls for a shift, the response of SMG is immediate and satisfying.

Automated (A) mode. The word “automated” is key, as this DRIVELOGIC mode is not meant to substitute for a conventional automatic transmission. Here there are 5 programs. As with S, the higher the program number the

faster the shift; in A, however, the speeds at which shifts occur (both up- and downshifts) also increases. For example, in A1 with 35% throttle opening, the upshift to 6th gear will occur about 40 mph; in A5, not until about 80 mph. Decelerating at 5 m/sec/sec, DRIVELOGIC would shift down two gears from 6th to 4th at around 30 mph in A1, or from 6th to 5th at about 106 mph in A5. A2 through A4 of course effect shifts at points in between.

Additional capabilities and safeguards. Careful development of DRIVELOGIC has resulted in many fine points of the system's operation:

- 1st-gear start in S: If the vehicle comes to a stop in the S mode, DRIVELOGIC automatically selects 1st gear for starting off again; the driver will then effect upshifts as desired.
- 2nd-gear start: A1 can be used as a winter-driving program; to this end, it starts the vehicle from rest in 2nd gear to move off gently. (Dynamic Stability Control's traction function also guards against wheelspin.)
- Overspeed protection: If the driver calls for a downshift (S mode) that would overspeed the engine, the command to downshift is ignored.
- In any A mode, a floored accelerator can get one or two downshifts depending on conditions, and pleasingly quickly.
- Slip detection: In both S and A models, this safeguard helps keep the vehicle stable during downshifts, particularly when traction is low. Every 10 milliseconds, the rear wheels are checked by the DSC for slippage. If there is too much decelerative torque on the wheels, clutch engagement and engine speed are automatically adjusted to prevent too abrupt a downshift.
- Double-clutching. Also in both modes, DRIVELOGIC coordinates clutch disengagement, shifting, engine speed and clutch engagement to accomplish smooth downshifts – just as a skilled driver would.
- Hill detection: Depending on gradient, down- or uphill, the A shift programs are modified to ensure optimum gear selection. In S mode, shift times are shortened so that the engine is always "on point" for best acceleration uphill, or engine braking downhill.
- Intuitive shifts: In the A mode under certain circumstances, DRIVELOGIC modifies downshifts. In cornering, uphill driving or braking, for instance, a downshift will occur sooner than if the car were simply being driven steadily on level ground. This feature can seem almost supernatural in vigorous driving on a winding, hilly road: SMG seems to read the driver's

mind, magically getting into the right gear before accelerating out of a corner.

- Hill Start Assist: A “hillholder” function, active in both S and A modes. When stopped facing uphill, the driver actuates the left shift paddle. DRIVELOGIC “revs” the engine to about 1500 rpm and slips the clutch so that the vehicle does not roll back. This is available for brief periods only.
- Illuminated upshift indicator: The orange LEDs that, in a standard 6-speed M3, adjust the indicated maximum engine speed according to engine temperature, help indicate to the driver when to upshift. Illuminating in 500-rpm segments, they light progressively as the engine approaches its redline (8000 rpm); given the M3’s catapult-like acceleration, this can be an appreciated assistance.

At the moment, only one other make is offering a similar transmission concept in the U.S. Several features distinguish BMW’s SMG system:

- BMW’s 11 shift programs, vs. four.
- Shift paddles on the steering wheel, vs. the steering column.
- All shift programs available without affecting suspension settings.
- A5 is a truly sporty yet automated mode, suitable even for the race track; it is unique to BMW’s system.

Chronicle of an SMG shift. To those versed in driving with a manual transmission, shifting comes naturally – one is hardly aware of the fact that one is letting up on the accelerator, depressing the clutch pedal, moving the shift lever, giving gas again and letting up on the clutch – all in coordinated sequence. SMG’s electronically controlled, electrohydraulically actuated system does all of this for the driver – and under hard-and-fast driving conditions does it more quickly than even the most skillful driver is likely to do. Here’s the operating sequence:

1. Via a position sensor, the control system always “knows” which gear is currently engaged.
2. When the driver signals a shift, the system selects the appropriate valves.
3. Hydraulic fluid at high pressure (1200 psi or more) disengages the clutch.
4. The M3’s six individual, electronically controlled throttles are closed.
5. Hydraulic cylinders move the transmission’s gearsets into the next gear.
6. If it’s a downshift, the engine is “revved” to the speed it will reach when the selected lower gear is engaged (the “double-clutch” function).

6. The clutch is re-engaged.
7. The throttles are opened again.

All this occurs – perfectly coordinated and calibrated to the vehicle speed, what the driver is doing with the accelerator pedal, the shift program selected and other factors mentioned earlier – in an interval that may be leisurely or a mere blink of the eye. The driver keeps a firm foot on the accelerator; SMG and DRIVELOGIC do all the work. Keen drivers will find it fascinating, satisfying, amazing.

"As the tachometer's 'upshift lights' illuminate," wrote Switzerland's *Automobil Revue* in May 2001, "a quick pull on the lever, 2nd gear engages with a vengeance, the car keeps storming with virtually no power interruption, reaches 100 km/h [62 mph] in 5.2 sec, and now it's time for 3rd gear.

"The same shift system," continues this respected publication, "is also perfectly capable of taking the M3 smoothly through the city and overland without the driver's having to worry about shifting." *AR* summed up SMG:

"The additional advantage, in both cases: No power losses from torque-converter slip, and that treasured direct connection between engine and road speed of a conventional gearbox is completely preserved."

M3 CHASSIS: THE BEST OF 3 SERIES AND BMW M ENGINEERING

Conceptually, two elements characterize the direction BMW M engineers took with the new M3:

M3 – The previous M3 was known for its fantastic handling. In September 1997, it was acclaimed by *Car and Driver* as the "Best-Handling Car Over $30,000" – against models, some of them out-and-out exotics, costing up to twice its price. A key target was that the new M3 had to be even better.

E46 3 Series – Compared to the E36 3 Series on which the previous M3 was based, the E46 generation had made significant strides in refinement. The new M3 benefits from these advantages.

As we shall see, the new M3 benefits from this two-faceted heritage.

Front suspension. While retaining the basic concept of both E36 and current E46 3 Series, BMW M stayed close to the E36 M3 in terms of the system's kinematics (its arrangement and movements of components as the

suspension works over bumps and in curves). At the same time, the new M3 system takes advantage of E46 developments, including the wider front track and aluminum lower arms. Specifically:

- At 59.4 in., the new M3's front track is a hefty **3.4 in. greater** than that of its forebear.
- As on the E46 3 Series, weight-saving, strong forged-aluminum lower arms are employed. But their design is unique to the M3.

A major thrust in development of the M3 front suspension was the rigidity of its connections to the chassis/body structure. To form an ultra-rigid basis for the suspension system, the BMW M engineers created a new **thrust plate**, a reinforcement that handles the immense lateral thrust generated by the M3's tires in cornering. It is made of aluminum 3 mm thick, and attaches in the area between the left and right lower suspension arms. The thrust plate even incorporates a NACA air intake that takes in air to cool the transmission. The bearings, bushings and cushions on which these arms pivot are also all-new.

In contrast to the arc-shaped lower arms of current 3 Series models, the M3's **new lower arms** have a "bat wing" shape that achieves even greater strength. As on the regular models, they are made of forged aluminum for lightness; the M3 arms add three open sections for further weight savings. Other new/improved front-suspension components include:

- New steering knuckles
- Modified wheel bearings
- Subframe – from 3 Series convertible, even for the M3 coupe.

An additional distinction is that the M3 struts separate the top mountings of spring and shock absorber. The strut's top anchor point moves rearward, increasing caster, while the coil spring's mounting stays where it was; the separate mounting improves isolation from road harshness, compensating to some degree for the firmer bushing arrangement.

Steering. The M3 employs essentially the same steering mechanism as the E46 3 Series: rack-and-pinion, with engine-speed-sensitive variable power assist. Its power assist is calibrated for extra-firm road feel, and steering return action is enhanced by the increased caster.

Rear suspension. The advanced 3 Series multi-link system is also employed in the M3, with upper lateral links of cast aluminum. Here the track is also increased relative to the previous M3 (up 1.8 in. to 60.0 in.), and

both pairs of lateral links (lower and upper) have steel balljoints instead of rubber bushings at their outer ends. There are many other points of distinction from the standard rear suspension as well.

For the larger, stronger M3 differential, M engineers developed an entirely new mounting system that uses one bushing at the front and two at the rear, just the opposite of the standard 3 Series setup. In BMW's usual "acoustically decoupled" mounting, the differential mounts through these bushings to a subframe, which then attaches to the main structure through four rubber mounts. This subframe is specific to the M3, having been developed to accommodate the larger differential assembly.

BMW M has added a V-brace to stiffen the subframe's attachment to the main structure. This is analogous to the thrust plate at the front, adding rigidity where the suspension joins the vehicle structure.

As the most prominent element of the multi-link rear suspension system, the massive Central Link is retained. The link pivots on a large rubber bushing at its forward end; this element is firmer in the M3 than in any other current 3 Series model. The axle halfshafts are upsized for extra strength, and the wheel carriers are special to the M3: adopted from the 7 Series, and therefore endowed with strength intended for 4500-lb. vehicles.

Springs and shock absorbers: "black magic." When we arrive at this topic, we enter an area where BMW's – very especially BMW M's – capabilities are legend. "Black magic and witchcraft. Those must be BMW's secrets," raved *Car and Driver* in a recent road test. "How else does one explain the way it manages to bring inanimate metal, rubber, and plastic to life?"

After the basic design and geometry are set, M's chassis engineers hit the road and race track in prototypes, testing, changing, fine-tuning for absolutely optimum performance. The M3's coil springs have been carefully calibrated for the ideal blend of firmness and compliance. Its twin-tube gas-pressure shock absorbers – with hollow piston rods to minimize inertia and mass – are likewise perfectly calibrated for sports-car response. Anti-roll (stabilizer) bars – 26 mm front, 21.5 mm rear [5] – have been carefully sized front-to-rear for ideally responsive, yet not nervous, handling. All this has

[5] –330Ci with Sport Package: 24 mm front / 19 mm rear

been confirmed and re-confirmed on the BMW Proving Ground's handling course and at the famous Nürburgring racing circuit in Germany.

Brakes: even more powerful. Powerful brakes are always a BMW strength, and current 330 models have already upgraded 3 Series braking ability with front discs of 325-mm / 12.8-in. diameter and rear discs of 320-mm / 12.6-in. diameter. The M3 goes a step further with 328-mm / 12.9-in. rear discs, and the rotors are thicker all around: 28 mm at the front, vs. 22; and 20 mm at the rear, vs. 19. A tandem booster, sized 10 in. / 9 in., provides extra vacuum assist over the 330s' single 10-in. booster. As always on M Cars, all four discs are ventilated for high fade resistance; electronically proportioned for optimum distribution of braking power; and backed up by Dynamic Brake Control, which reinforces the driver's pedal effort in emergency braking. *Car and Driver's* June '01 test of the M3 measured an impressively short stopping distance of 155 ft. from 70 mph.

Wheels and tires: ultimate grip and style. M3 wheel and tire equipment comes tantalizingly close to that of the top-of-line M5. In a new version of the M Double Spoke design concept, the wheels are sized 18 x 8.0 front and 18 x 9.0 rear and have the same Satin Chrome finish as the M5's wheels.

Connecting these massive, deep-dish alloy wheels to the road are suitably wide, low-profile, high-speed-rated tires, developed specifically for the M3. They are sized 225/45ZR-18 front / 255/40ZR-18 rear.

As in all other current M models, the M3's exhaust system precludes space for a spare tire. If a tire is punctured – a rare event these days in any case – the **M Mobility System** provides a way to get home.

M Mobility consists of a container of rapid sealant, an integrated microprocessor, and a hose to connect the compressor to the damaged tire. All this is carried in a container in a recess under the trunk floor. (The compressor, plugged into the console power socket, can also be used for leisure purposes, such as pumping up an inflatable boat or tent.) The system can seal punctures up to approximately 1/4 inch across.

Omitting the spare tire saves fully 15 kg, or about 33 lb.

BMW M Tire Pressure Monitor. Like the M5, the new M3 is equipped with this system to warn the driver of loss of tire pressure. Using the DSC wheel-speed sensors, TPM detects abnormal variations in the tires' rotational speed, which indicate a falloff in tire pressure at one wheel or

another. This is signaled to the driver by a warning in the Check Control display.

Optimum weight distribution: 50.3% front / 49.7% rear for the coupe, 49.9/50.1 for the convertible, a traditional BMW strength that contributes significantly to formidable handling.

EXTERIOR DESIGN: CLEAR DISTINCTION FROM 3 SERIES AND A TASTEFUL PERFORMANCE STATEMENT

The M3's exterior design continues the established theme of BMW M:

- Distinguish the M Car from its regular-production counterpart
- Visually emphasize its performance and road capabilities
- Maintain the good taste and timeless esthetics that characterize all BMWs.

The differences between the M3 and the regular-production 330Ci coupe are extensive and purposeful.

Front view. The distinctive bumper/spoiler ensemble features three openings: center, with screen, for the engine oil cooler; sides, for the foglights.

The M3 hood, of aluminum to reduce weight, differs sharply from the 3 Series' steel hood. It features a "power dome" and contours that sweep up from the grilles' flanks to the A-pillars. As on the regular models, Bi-xenon headlights, now low and high beams, are optional. Clear turn-signal lenses are used here and at the rear.

Sides. The wheel openings are flared out fully 20 mm (0.8 in.) more on each side, accenting the 18-in. wheels and tires and keeping them inboard of the sheet metal. Overall body width is 70.1 in., 0.9 in. wider than the 330Ci.

Other specific side elements include "gills." The left one ventilates the underhood "electrobox" where electronic components live; the right one, though open, provides no necessary ventilation. Typical M aerodynamic outside mirrors add to the distinctive look. By pointing toward the rear wheels, unique side sills visually emphasize BMW's rear-wheel drive.

At the rear. The rear bumper/apron is all-new. Rear reflectors have migrated from there to the taillight clusters, a lateral ridge stretches all the way across, and openings for the four exhaust outlets line up with the trunklid sides. A discreet spoiler tops the coupe trunklid's top edge; this can

be deleted at no extra cost if customers desire. Also available, at extra cost, is the rear Park Distance Control option.

Colors. There is a choice of eight exterior colors, six of them metallic. A particularly eye-catching and contemporary choice is Phoenix Yellow Metallic.

INTERIOR DESIGN AND EQUIPMENT: THE IDEAL DRIVING ENVIRONMENT

With the exemplary 3 Series driving environment as its starting point, the M3 cabin – whether coupe or convertible – adds features and design details that reinforce and enhance the sporting character of these cars.

The driver's view. In a high-performance sports car, instruments are of paramount importance; the M3's do not disappoint. Its instrument cluster resembles that of the M5 closely, with bright rings around each of the four dials, M logo in the speedometer, and red pointers throughout.

Appropriately, the tachometer is of great interest. Its scale reaches to 9000 rpm. From 4000 to 8000 rpm, the **variable warning segment** first seen in the M5 also appears here. When the engine is cold, illuminated orange LEDs begin at 4000 rpm, reminding the driver not to use anything approaching maximum performance. As the engine warms up – operation is based on oil temperature – these LEDs phase out in increments of 500 rpm until the segment reaches its normal 7500-8000 rpm range, which always remains illuminated. The tachometer's advanced servo-motor operation is revised to keep pace with the M3 engine's rapid climb up the rpm curve. In M3s equipped with the Sequential Manual Gearbox, these LEDs illuminate progressively as engine revs climb, helping the driver shift right at the redline.

Also in the tachometer face is an analog oil-temperature gauge: Oil temperature is the most important indicator of a high-performance engine's readiness to perform at its peak.

Another prominent facet of the driver's command center is the special M sport steering wheel. Incorporating BMW's handy multi-function controls, the wheel has a wide bottom spoke with the M logo, and its leather-covered rim with M-color stitching has thumb contours at 10 and 2 o'clock.

An oval rearview mirror is yet another distinctive M element in the driver's view; electrochromic auto-dimming is standard.

Seats: three choices, all designed for support and comfort. Standard in the M3 coupe are 10-way manual sport seats, with adjustments for –

- Fore-aft
- Cushion height
- Front-of-cushion height (cushion angle)
- Backrest angle
- Thigh support.

These seats include BMW's "differentiated contours": the backrests have prominent side bolsters toward the bottom, then a delineated upper backrest section without side bolsters. The idea is to provide the desired lateral support, but without possible constriction around the shoulders. The cushions are also prominently bolstered at the sides for lateral support – something the M3, with its high cornering capability, puts to good use.

The next step up for the coupe is **power sport seats**, with 8-way power adjustment and manual thigh support. These are included in the coupe's optional Premium Package, and include a memory system for the driver's seat and outside mirrors. Standard in the convertible are 10-way power sports seats, the added adjustment being a combined one for the head restraint and belt height; the convertible's front safety belts are fully integrated into the seats, optimizing belt fit on the occupants and easing entry into the rear seats.

Top-of-line M3 seating is provided by the **power-adjustable backrest width**, optional in the coupe only. Here BMW M has added another dimension to "lateral support without constriction" by equipping the backrest bolsters with inflatable air chambers. An additional power control allows the occupant to "pump up" the bolsters for increased lateral support, or deflate them to reduce it; this effectively adjusts the backrest width to various statures. Included in this option is **4-way power lumbar support**, familiar from other BMW models; thus these ultimate sport seats offer a total of 14-way power adjustment. The manual thigh-support adjustment is included in all M3 front seats.

Upholstery and trim. Standard upholstery in the coupe is an attractive ribbed fabric called M Cloth, combined with Nappa leather trim and available in Anthracite (dark gray) only.

More appealing to most U.S. M3 buyers is the full Nappa leather interior, available in a choice of four colors. This premium leather grade, optional in the coupe and standard in the convertible, is applied in an Extended Leather treatment with unique stitching to –

- Seats
- Door panels (complete except upper ledges and outer surfaces of storage pockets at bottom; leather does extend down into the pockets)
- Rear-compartment side panels.

With all upholstery combinations, the coupe's headliner is in Anthracite color. The convertible's fully automatic, fully lined softtop is available in black or dark blue. New for 2002, Titan Shadow interior trim, with a graphite-like look that complements M3 technology – appears across the instrument panel and on the door and rear side armrests.

Split folding rear seats standard. As in 3 Series coupes, the M3 coupe's split folding rear seats add a measure of versatility that might be surprising, given the M3's performance and sportiness. They include a fold-up center armrest, and for security can be released only from the trunk. Rear-seat entry and exit are aided by BMW's easy-entry feature, which allows the front seats to be moved forward when their backrests are folded over. In the convertible this feature is powered, a dedicated button on the backrest's outer edge activating a motor that moves the seat at twice the normal adjustment speed.

Appealing features even in the trunk. In the coupe trunk, a reversible mat has BMW's usual flock on one side and a non-slip rubber finish on the other. One can set a briefcase there, even a metal one, and know that it will not slide around, even when the M3 is driven the expected way: vigorously.

In the convertible trunk, a variable compartment holds the folded softtop but allows increased cargo space when it is raised. Conveniently positioned for raised or folded top via a lever in the trunk, this compartment enlarges the trunk approximately 15% over its capacity with the top lowered.

SAFETY AND SECURITY FEATURES: 3 SERIES STANDARDS, PLUS

Every M3 comes with an exemplary range of safety and security equipment:

- 2-stage front-impact Smart Airbags
- Height-adjustable front safety belts with automatic tensioners and force limiters (coupe)

- Seat-integrated front safety belts with power height adjustment, automatic tensioners and force limiters (convertible)
- Interlocking door anchoring system for side impacts
- Front-seat Head Protection System (coupe)
- Rollover Protection System (convertible)
- Front-seat side-impact airbags, door-mounted
- Battery Safety Terminal
- Central locking system with double-lock anti-theft feature, selective unlocking
- Coded Driveaway Protection.

The convertible's Rollover Protection System automatically deploys structural bars behind the rear seats in case of an impending rollover accident.

As an additional safety feature, rear-seat side-impact airbags are optional for both models, so that customers may choose to have them or not. Vehicles with this option are delivered from the factory with the rear airbags de-activated; customers may have them activated or de-activated at any time, free of charge and regardless of the vehicle's age or mileage.

Thus both M3s address not only the emotional desire of customers to possess a machine of great performance and beauty, but also the very rational demand for safety and security. The coupe is of the same basic construction as the 3 Series sedan that, along with four other midsize luxury sedans, was tested and ranked by the Insurance Institute for Highway Safety.

In actual 40-mph offset tests of these five models, the 3 Series sedan earned the Institute's Best Pick rating. BMW's occupant compartment held its shape, with a low likelihood of injury. As described above, the 3 Series and M3 convertibles add their own, convertible-specific safety features.

OPTIONS AND ACCESSORIES: APPEALING CHOICES FOR BOTH MODELS

BMW M offers an appealing range of Packages and stand-alone options to outfit both M3s to individual customers' tastes and priorities.

Sequential Manual Gearbox (SMG). Described in detail earlier; an exciting new way to drive a high-performance sports car.

Premium Package for the coupe. Includes rain-sensing windshield wipers, the new automatic headlight control, Nappa leather upholstery, power sport seats with memory, and a tilt-and-slide power moonroof.

Cold Weather Package. High-intensity headlight cleaning system, 3-stage heated front seats and a ski bag. The heated seats are also available as a stand-alone option.

Power Seat Package. Power sport seats with power-adjustable backrest width and 4-way power lumbar support for coupes not equipped with the Premium Package. For coupes with the Premium Package (which includes power seats), the adjustable backrest width and power lumbar are available as a separate option. For the convertible, power lumbar is available as a stand-alone option.

Bi-Xenon headlights. For even brighter, more daylight-like illumination; now include low and high beams. Automatic leveling of the lamps is provided to ensure correct aiming whether the vehicle is lightly or heavily loaded.

Rain-sensing windshield wipers and automatic headlight control, available as a stand-alone option for the convertible.

Park Distance Control. Four ultrasonic sensors in the rear bumper help the driver avoid backing into unseen obstacles.

Spoiler delete. The coupe's rear spoiler can be deleted at no extra cost.

Nappa leather upholstery, available as a stand-alone option for the coupe.

Removable hardtop, Made of aluminum and weighing only 65 lb., the hardtop can be attached or removed by two persons. It includes separately switched left/right reading lights front and rear, retractable coat hooks, and (like the convertible's softtop) an electrically heated rear windows.

Power moonroof. As in the coupe's Package, but as a stand-alone option.

Harman Kardon premium audio system. Increased audio power, more speakers and upgraded componentry. Speaker configuration differs between coupe and convertible.

Cassette player. Replaces the standard in-dash CD player; no extra cost.

BMW Onboard Navigation System. Versatile system including GPS Navigation, 8-function Onboard Computer, and controls for the audio system

and (if the vehicle is so equipped) BMW Cellular Phone System. Newly updated with larger, easier-to-read color monitor and optimized controls.
Rear-seat side-impact airbags, optional to give customers the choice.
BMW Cellular Phone System – a full-featured, fully integrated in-car/portable system installed by the BMW Center.
Alarm system. Keyless entry and a multi-function, keyhead-integrated remote control are standard; the alarm system is Center-installed.
6-disc CD changer. Choice of trunk or glove-compartment versions; Center-installed.

AN M3 LIKE NEVER BEFORE

As a logical, yet highly emotional evolution of the previous, beloved M3, the new M3s not only represent a significant step forward in the art of high-performance automobiles, but maintain and advance BMW M's reputation as a creator of unique sports machinery. After the exotic M1, two generations of M3, the current 3rd-generation M5, and the spirited M roadster and coupe, the new M3s are yet another BMW M milestone – and addition of the Sequential Manual Gearbox makes that milestone all the more significant.

FULL MAINTENANCE PROGRAM INCLUDED WITH EVERY M3

Like all other 2002 BMW models, the new M3s come standard with BMW's 4-year/50,000-mile Limited Warranty, Roadside Assistance for the same period, and BMW's Full Maintenance Program for 3 years or 36,000 miles. This reassuring package of product backing and customer service makes every BMW model even more appealing from a cost standpoint than its base price would indicate.

PERFORMANCE WITH A CONSCIENCE

BMW strives to produce its motor vehicles and other products with the utmost attention to environmental compatibility and protection. Integrated into the design and development of BMW automobiles are such criteria as resource efficiency and emission control in production; environmentally responsible selection of materials; recyclability during

production and within the vehicle; elimination of CFCs and hazardous materials in production; and continuing research into environmentally friendly automotive power sources. Tangible results of these efforts include the recycling of bumper cladding into other vehicle components; water-based paint color coats and powder clear coats; future availability of hydrogen-powered models; and various design and engineering elements that help make BMWs easier to dismantle at the end of their service life.

BMW GROUP IN AMERICA

BMW of North America has been present in the United States since 1975. Since then, the BMW Group in the United States has grown to include marketing, sales and financial service organizations for the BMW, BMW Motorcycles and MINI brands; a South Carolina manufacturing operation; DESIGNWORKS/USA, an industrial design firm in California; a technology office in Silicon Valley and various other operations throughout the country. The BMW Group is represented in the U.S. through a network of 341 car, 321 Sports Activity Vehicle and 153 motorcycle retailers. BMW US Holding Corp., the Group's headquarters for North, Central and South America, is located in Woodcliff Lake, New Jersey.

Information about BMW Group products is available to consumers via the World Wide Web on the BMW homepage at http://www.bmwusa.com, http://www.bmwmotorcycles.com and http://www.miniusa.com.

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Journalist note: Information about the BMW Group and its products is available to journalists on-line at the BMW Group PressClub at the following address - www.press.bmwgroup.com.

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