

# Here Comes the Sun

TECH AND PICS: BRAD OCOCK



WHAAA EEEEEEE-OWWWWWW!

Remember that one sound sure to stop conversation in even the busiest speed shop, that shrieking by a big, blue-and-red machine spinning OEM distributor shafts to ungawdly rpm? Decades later, if there's one piece of really cool shop equipment that everyone seems to want in his garage (or living room), it's a Sun distributor machine. Alas, few of us own one, fewer know how to use one, and nearly nobody knows how to fix one. While you might find a machine with some digging, buy an operator's manual, maybe even talk an old-timer into teaching you how to make that old-time music, any ancient combination of mechanical and electrical components will need some work before going back into service. Until your Sun machine can actually do its job, it's just shop art.

Sun machines used to be a staple in service garages and speed shops everywhere. Like tuning a carb, tuning a distributor is a lost art in modern auto repair shops. If one still has such a relic, it's way back there in the corner,

covered in dust, serving out its once-proud life as a shelf. Engine builders who have been around for enough decades still have them, maybe even blow off the cobwebs to dial in a distributor for that vintage-engine guy who just won't go away.

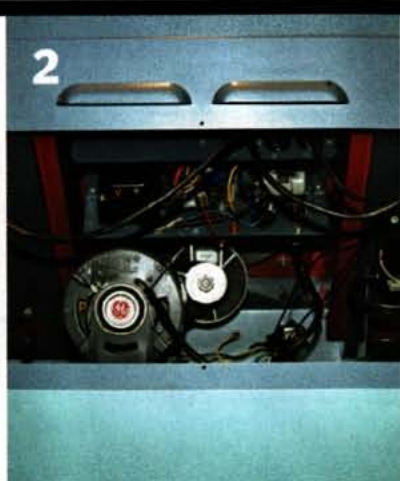
We won't tell your significant other that this is one of 'dem deals whose cost and footprint are hard to justify, unless she's hooked to a guy who frequently builds or tunes motors electrified by breaker points. You may already have some rarely used shop equipment that patiently waits its turn to shine. When that time comes, nothing else will do—and you're the envy of every needy friend. Helping this writer make the case to Mrs. Ocock for acquiring a Sun machine are her daily driver ('61 Corvair wagon), her loving husband's everyday wheels ('61 Suburban), a longtime-project car ('54 Buick), and that gasser nearing completion ('57 Chevy wagon). ("Sure, Sweetie Pie, we might find a shop, somewhere, with the capability to service all those distributors, but at what cost?")

Spousal permission secured, a Sun 404 was found for the bargain price of \$250, but several states away. The stars first aligned when a brother nearby was talked into storing it until we came up to visit, and again when the grateful husband was assigned to cover an event at US 131 Motorsports Park—within a Chi-Town Hustler burnout of Mark Saunders and Paramount Distributor Co. in Byron Center, Michigan. Saunders runs a small garage, and like us, needed to tune the occasional distributor. One thing led to another, and now he restores Sun distributor machines and even manufactures replacement parts and electronic-conversion pieces for anyone wanting to bring one back. Knowing absolutely nothing about the inner workings of Sun machines, we dropped in for a crash course on their anatomy and weaknesses, how to diagnose component failure and symptoms, and the fixes for same. We'll also admit to feeling like kids on Christmas morn when Saunders gave our grimy old machine the once-over, pronounced it to be in "pretty-good" working order, and





> Sun's Model 404 features a tach, a dwell meter, and a vacuum meter and is used for testing mechanical and vacuum advance, dwell, worn shaft bushings, breaker-point specs and, of course, ignition curve. The 500-series also features a condenser-tester gauge and a coil tester. Just going by these descriptions, we're guessing that the 500 would've been used in general-service shops, while speed merchants mostly spun 400s. (How about it, older readers?)



> The machines from the '50s on up used a 120-volt electric motor and a step-down transformer to run 12-volt distributors. Earlier machines used a motor and 6-volt car batteries in the cabinet to power 6-volt distributors.



> Lifting the "bell" reveals the light chamber and the chuck. The parts in here are expensive, so proceed with care.



> Our refurb began by removing the clamp and gauge panel. The panel comes out as a unit.

said he'd be happy to pay what we did for it. ("What'd I tell ya, Baby Cakes?") Back at the track, both that expert opinion and our suspicion that every car guy wants one were reaffirmed, repeatedly. We turned down dozens of offers. ("You've got a great retirement investment here, Honey Bunch!")

The performance-enhancing potential of a distributor machine is obvious: Every serious speed shop once offered a performance-recurve service for customers. What's not so obvious, but even more important to those of us with vintage engines, is old age. Springs have lost their tension. Breaker-plate bushings have gone away. The curve and total advance in a modified, 50-year-old distributor are anybody's guesses. Just rebuilding a stock unit back to factory specs—a bread-'n'-butter job for service stations, back in the day—will improve both performance and fuel economy. As for high-performance distributors, whether factory or aftermarket, chances are very good that someone



> Surface rust on our clamp's rods was preventing the clamp from moving without excessive force. Paramount sells new rods, but ours weren't too terrible, so we just hit them with the fine wire wheel on the bench grinder. They cleaned up nicely.

has been under that breaker plate before. Exactly what they did, and for what combination, are unsolvable mysteries.

We bought a few critical parts from Saunders just to get our machine back up to Sun specs, along with a reproduction instruction manual and a quick-reference guide for learning how to use the thing. We then spent two nights completely disassembling our 404, removing 40 to 50 years' worth of shop grime, and installing Paramount's replacement parts. As you can see, it cleaned up nice, and we'd be lying if we said the look of the machine isn't a source of pride: that '50s styling, the bright-red-and-hammer-tone-blue paintjob, the nameplate across the top of the box. ("Wouldn't it be just perfect for the living room, Dear?") What's most exciting is the newfound ability to dial in distributors in our fleet and on the vehicles of envious buddies. After all, hot rodding is about improving performance, not just slapping on an old part and calling it good. To do hot rodding right, you gotta have the right tools.



> Saunders says the quickest way to ruin the looks of a machine is spraying it with fast-acting chemical cleaners, such as Simple Green or The Purple Stuff. You'll end up permanently streaking the paint, if not washing it off. He recommends applying the chemicals to a rag, then wiping away dust and grime. We used half a bucket of GoJo hand-wipe towels, whose combination of citrus chemical and mildly abrasive texture did the job. For stubborn spots, a little shot of Brake-Kleen on a towel did the trick.



> The black disc is the window through which the strobe light flashes, illuminating the arrow on the ring outside the bell (just like a timing light illuminates the mark on a harmonic balancer). However, instead of picking up the firing signal from one spark plug wire, the tester picks up the firing signal from the points opening for every cam lobe/cylinder, illuminating the arrow either four, six, or eight times on the 360-degree ring, dependent upon the number of cylinders to be fired. The dark tube wrapped in silver wire is actually the dirty strobe tube.





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> This window is supposed to be clear. The accumulation of dirt on the glass and the strobe light itself will make the machine hard to use. Gently clean the dirt from both. Saunders suggests removing the strobe's circuit board and using hot, soapy water and a toothbrush.



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> This is the light housing on one of Saunders' restored machines. Paramount Distributor Co. disassembles everything and strips each component. We didn't go that far—for now.



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> The purple, high-voltage wire to the strobe sometimes gets broken if the chuck is loose on its shaft. There's a specific slot on the shaft that the wire runs through, below the hole; if the bolt holding the chuck in place loosens up, the shaft twists and cuts the wire. Saunders says 1 out of 10 machines that don't flash is due to a cut wire. Not wanting to hurt that wire, we didn't completely disassemble and clean.



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> These secure the degree ring to the machine. They capture the edge of the ring while allowing the ring to rotate around the housing. Paramount offers new rubber tires, and we wish we'd spent the 10 bucks. As it is now, our ring moves, but it binds on the worn and missing tires.



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> The aluminum cone is attached to the motor with a fan belt. The rubber tire drives the distributor chuck. As the wheel runs down the cone, the speed (rpm) of the distributor increases. When you don't back the wheel down to zero rpm before shutting off the machine and then start it back up with the wheel engaged on the cone, you flat-spot the tire causing the machine to vibrate hard during use. According to Saunders, this tire isn't too bad compared with most, which suffer from flat spots and/or dry rot. Replacing wheels and smoothing out cones are Paramount's most common repairs.



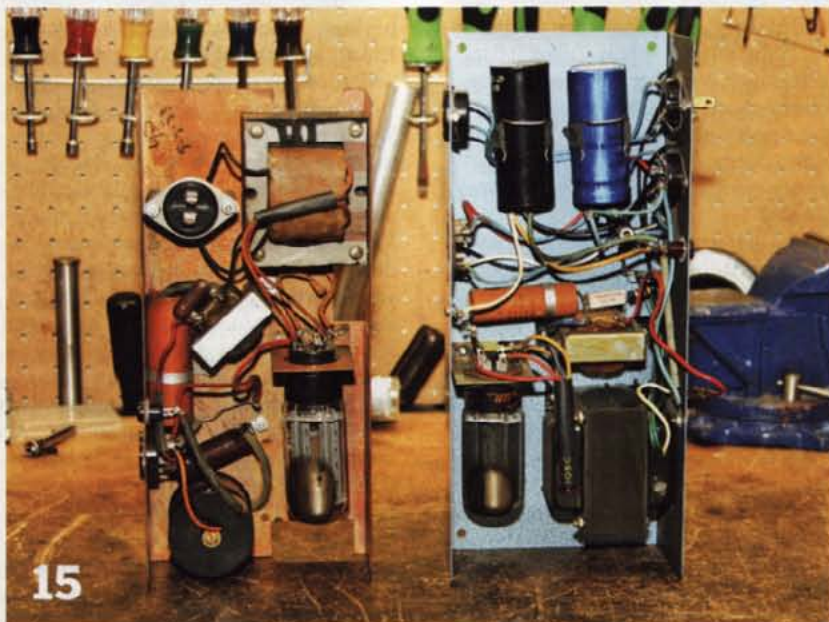
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> Paramount sells a new tire and bearing kit, which we installed. When pounding the old bearings out of the arm, you need to be aware that there's a shoulder inside that holds the bearings in place. Thus, they have to come out back to front using a small punch inserted from behind through the axle's hole.



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> We simply disassembled and cleaned all of our gauges. The vacuum gauge has a calibration screw with a hole through the glass, so that instrument's face is always gonna be filthy.



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> Here's the power supply for the strobe mechanism. The copper-colored frame on the left is from '40s and '50s machines; the blue unit is from '60s and '70s models.



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CAPACITOR FOR FLASH TUBE

CHOKE

TRANSFORMER

TRIGGER COIL

CAPACITOR FOR FLASH TUBE. ABOUT 1 IN 50 MACHINES HAS A MELTED TRIGGER COIL, ACCORDING TO PARAMOUNT. FAILURE RATES FOR OTHER COMPONENTS ARE LESS.

VACUUM TUBE



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> These three capacitors are in all but the 506 model. They frequently leak, explode, and so on. Saunders says these are responsible for 75 percent of nonworking flash. Paramount sells a retrofit replacement kit.



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> If the little white capacitor is burned through, you've got a sheared high-voltage wire or burned-out capacitors. If either is bad, expect to replace all.



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> The 400, 500, 600, and 680 models from the '50s and very early '60s used mercury batteries to power the tach and dwell meters. Sun eliminated batteries in the '60s and '70s from 404, 504, and 506 machines. That's the main difference between the -00 series and an -04 or -06 machine. Modern, alkaline batteries will work but must be removed between uses or they'll corrode the contacts. We lucked into a Model 404. When shopping for your Sun, try for either an -04 or an -06 model and avoid batteries altogether. These later machines also came with dual-range tachs (i.e., both hundreds and thousands rpm) and higher-reading meters (4,000 rpm versus 3,000).



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> The electric vacuum pumps came on with a switch only when the operator needed it. They rarely fail, but Paramount stocks replacements.



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> Early models used mechanical pumps driven off the distributor-drive cone. Although these pumps were on whenever the machine was running, failures are uncommon.





> The distributor leads plug into round-tube connector pins. To replace the leads, heat the pins from the outside and pull the wire out when the solder melts. Reverse the process to install the new leads. This sounds simple, but it took a long while to get the solder to melt enough for pushing the wires home.



> Knobs are often missing and/or wheels broken. After transporting our unit home, we know why: Anything that comes into contact with the machine is going to hit a knob first—and break it. Ours were intact, but new knobs and wheels are available.



> To test electronic ignitions, a pulse amplifier must be inserted between the machine's leads and the distributor leads. This is required for HEI, Autolite, Mopar, and some aftermarket electronic ignitions, but not for spinning vintage Unilite distributors or Per-Tronix conversions. This is an original that Paramount had. The company manufactures replacements that work the same but look different.



> Flathead fans, here's the adapter for you.



> The distributor chuck uses a square-shanked key, usually missing. Paramount makes a replacement with a teardrop-shaped, pine handle. Preferring an original-looking, black-handled, wooden key, we sacrificed a vintage screwdriver with a 3/16-inch-square shaft. It works like a charm and is almost a dead ringer for the real deal.



> Paramount sells a repro instruction manual and a double-sided quick-reference guide. We found each essential while learning to use the machine. Vintage Motors manuals will provide both mechanical- and vacuum-advance specs for all cars, including the amount of vacuum required to start moving the vacuum pot, as will a factory manual. We noticed that the Motors manual only had two rpm settings for advance, a low and a high, whereas the factory manual had a midrange-rpm setting to test.



> When the distributor is spun, the strobe lights the arrow for each cylinder at evenly spaced degrees around the ring. Low rpm is your initial setting, then as mid and upper ranges are hit, the arrows will move several degrees. Applying the vacuum moves the arrow farther. Bouncing arrows are an indication of worn shaft bushings.





> These are the weights and springs you'd change to bring the advance in either slower or faster. Our six-cylinder Chevy distributor was taken out of a running car that's rolled almost 10,000 miles in the last year—all with a mysterious ignition problem. What we discovered here is that the weights weren't moving at all. We had no mechanical advance whatsoever, only vacuum advance. Previously, we'd wrongly diagnosed point float. The Sun machine just earned its keep.



> The crusty distributor is a spare from a 140hp Corvair. Sun showed us that the new-looking vacuum pot was actually seized, while the mechanical advance was spec'd for a 110hp engine. Now we know our starting point, and that's the whole point of having the machine in-house.



> This Mallory distributor gave us a problem: The arrows walked around the ring while the machine was running, indicating that the chuck jaws are slipping on the distributor gear's tail. A little more English on the chuck, or better yet, a piece of heater hose on the bottom of the gear will solve this one. We put this distributor in the machine before any others and thought there was a problem with the machine. Then, when the six-cylinder distributors worked well, we figured the Mallory was scrap. Fortunately, neither was the case.



> Behold our tester, ready for action. We're going to have a breathable cloth cover made to keep it clean while letting it breathe, so moisture doesn't get trapped and cause rust.



> Paramount sells several restored and refurbished distributor machines a month, as well as cabinets. We found a cabinet for an early machine, and it's not nearly this pretty, though with new casters and a distinctive door logo, it will be.



> When was your machine made? The main case, gauge panels, and drive-housing panel will tell you. Each has its own serial number tag. The model number corresponds to the particular component to which it's attached: housing, gauge panel, and so on. The serial number is a quarterly code; here, the 4 indicates fourth quarter of the year (October through December) and the 3 indicates the last digit of the year manufactured. Since they didn't make 404 machines in the '50s or early '60s, this one is 1973 vintage. The letter (A) indicates running production changes: Version A, B, and so on. The last digits indicate the machine's production number. ★

## SOURCE:

Paramount Distributor Co.; Byron Center, Michigan; 616/878-9734; ParamountD.com