

Sig Manufacturing's

4 STAR 64



A flying felid staple since 1989 gets a 21st century update!

By Larry Kruse

PHOTOGRAPHY: LARRY KRUSE

Classic model designs gain that status partially through their popularity and longevity. Not many existing designs can match Sig Manufacturing's *4-Star* series, still in production and available to the modeling public after nearly 25 years. Originally conceived in 1989 by preeminent designer, Bruce Tharpe, the design has gone through several iterations, but remained essentially unchanged.

Initially offered as a kit in the .40 to .60, and 120 engine sizes, a series of same-sized almost-ready-to-fly (ARFs) was offered simultaneously several years ago. When overseas production problems brought the ARF series to a halt, Sig continued to offer the kits, and the popularity of the plane as a "second" airplane (or first low-winger) has remained unabated. Even now you'll find one or two *4-Stars* being flown by members of practically every local club in the country.

Now with some refinements, the *4-Star* is back as a high-quality ARF in two sizes with two options for power—the *4-Star 54 EG* and the *4-Star 64 EG*. The numbers in the new nomenclature indicate the wingspan of

each kit, and the "EG" indicates either electric or glow power.

After I received my *4-Star 64 EG* for review, I thought it might be fun and perhaps even enlightening to talk to Bruce Tharpe, now the head of Bruce Tharpe Engineering, for some of the actual history of the design and his take on its longevity. Bruce was more than accommodating and shared with me the beginnings of the design, which he as a young designer at Sig had been entrusted to create.

The plane was initially conceived to compete with Doc Mathews' *4-40*, a .40 sized plane with generous surfaces, and a kit that was being sold by Ace R/C in fairly large numbers. In fact, at that time Sig was vacuum-forming some of the plastic moldings for Ace, so Bruce had a very good look at the Ace kit.

Bruce said that other than the obvious goal of selling kits, the aim was to expand the company's R/C kit offerings beyond the scale models for which Sig was then known, and to produce a plane with generous flying surface areas that "flew on the wing" for the sport modeler.

When I asked him how many prototypes were designed and built before production

began, he said,

"Just one!" It seems that after he had done the initial drafting, built the plane, and was flight testing it, the legendary Maxey Hester, another of Sig's outstanding designers, had come by the test field. When he asked Bruce how it flew, Bruce handed him the transmitter, and as he relayed it, Maxey just literally "stirred the sticks" for a few minutes and said, "This is great!" The .40 size kit went into production with no changes—and that was the start of nearly a quarter of a century legacy for the design.

Bruce went on to design the much larger *4-Star 120* and the *Spacewalker*, among other outstanding models for Sig before leaving the company. His start-up of Bruce Tharpe Engineering has been notable for its own classic designs like the *Venture 60*, the *Flying King*, and the *Delta Vortex*, all still in production and accessible through the firm's web site at <http://www.btemodels.com>. The latest run of the *Venture 60* kit is still available, I'm told. [See Larry's review the *BTE Models Venture 60* in the January, 2013 issue of *FLYING MODELS—Ed*]

AT A GLANCE

Type:	R/C sport
Construction:	balsa and ply
Wing span:	64 inches
Wing area:	847 sq. in.
Airfoil:	symmetrical
Length:	575 inches
Weight:	7-8.25 pounds
Wing loading:	19-22 oz./sq.ft.
Engine:	O.S. .61 FX two-stroke
Prop:	E-flite 60-amp
Radio:	Futaba 6EXA 2.4 Ghz 4-channel
Servos:	Futaba S3004 (4)
Manufacturer:	Sig Mfg. Co., Inc. 401-7 South Front Street, Montezuma, IA 50171-0520 641-623-5154 www.sigmfg.com



The components of the 4-Star 64 include options (above) for either electric or glow power. Note the electric motor mount and cowl in the lower right corner. The paint on the fiberglass parts exactly matches the "Ferrari Red" Oracover. The model comes with all decals in place and quality hardware throughout. In one of the very few small glitches in the kit, the aileron servo holes in the wing (below left) had to be enlarged slightly to accommodate the Futaba standard servos the author chose to use. The fuselage servo holes for the rudder, elevator, and throttle fit perfectly. The use of pins (below right) to help center the hinges before applying thin CA worked very well. Once the hinges are centered, the pins are removed and the parts slid together to eliminate any excessive gaps.



Even as the original 4-Star kits continue to be manufactured, Sig has refined the original 4-Star 40 and 4-Star 60 models into the 4-Star 54 EG ARF and 4-Star 64 EG ARF to reflect the actual wingspan and power choices, as noted previously. The reasons for these modifications originate with current 4-Star owners who commonly clip the wings tips of the respective planes by a rib bay on each side to improve roll rate and maneuverability. Likewise, the control surfaces have been enlarged: (rudder, elevator and ailerons) for better control at lower speeds. Aesthetically, the rather bulbous canopy has been replaced with a sleeker version, and the turtle deck is now sheeted for greater strength and a smoother appearance.

Additional improvements and modifications include a large magnetic hatch in front of the canopy for easy access to either a set of Li-Po flight batteries or a fuel tank, the use of the Oracover covering material (Hangar 9 "Ultracote" in the U.S.) in either Cub Yellow or Ferrari Red, and a fiberglass cowl to slick up the front end for electric flyers. I will be mentioning other positive changes as we move through the assembly phase of the model.

Assembling the 4-Star 64 EG

The doubled box arrived from Sig with no damage whatsoever and all components present. All parts were nicely bagged and protected from the jostling of shipping with either cardboard partitions or by being taped to each other or the sides of the colorful interior box. As I unwrapped each part, I was struck with the attention to detail and the quality of each component, whether it be the very light wing structure, the beautifully finished fiberglass parts, or even the landing gear which had been painted a metallic silver. The completely painted pilot and painted and trimmed canopy earned "plus" points, even though the pilot looked like he would have been more comfortable in a *Cor-sair* or *Hellcat* as the photos will show.

As is the case with all Sig kits, the plane had a complete and fully detailed photo-illustrated step-by-step assembly manual. The assembly steps were sequential and started with assisting the modeler in making a choice of either electric or glow power (the "EG" of the name), including specific recommendation for the electric flyer of motors, ESCs, batteries, chargers, and propellers. Since electric flying is new to many

modelers, I thought this was a most useful part of the manual.

More general recommendations were made for the glow flyer, and since that was the choice I had made, I did scan them to make sure I didn't miss anything as I prepared to assemble the plane. As a minor quirk on my part, I am really opposed to the pejoration of language on the part of most on-line blogs and reviews that refer to "building" an ARF, so you will find variants of the word "assemble" as you read on.

After going over the covering to remove what few minor wrinkles were there, actual assembly begins with installing the aileron servos in each wing panel. The modeler is left with the choice of either epoxying the wing halves together with a stout aluminum joiner tube in the middle or leaving them separate for easier transport. I opted for the latter, and could install the aileron servos in each wing panel without having to wrestle the entire length of the wing.

I chose my trusty Futaba T6EX FASST radio system with its R617FS receiver and standard Futaba 3004 servos. I was surprised when the servos did not fit the pre-cut aileron servo openings in the wings. I found

4-Star 64 EG



The landing gear components received high marks from Larry for their sturdiness and fit. The wheels (above left) are a dense foam that seem to wear well and at the same time provide some landing cushion. Paired magnets



(above right) fasten the rear of the top tank/battery hatch. Pins secure it from the front. Larry found it very handy, even with a glow-powered plane, to be able to instantly check the remaining fuel level.

that I had to dress down the openings nearly $\frac{1}{16}$ -inch in length and width to accommodate the servos. That may not be the case for other brands of servos, and those two openings were the only ones that were sized too small. The servo openings in the fuselage tray for the rudder, elevator, and throttle servos fit perfectly, so that may have been an anomaly with my particular wing panels.

Before leaving the aileron servos, I should mention that the manual advises you to connect an aileron extension wire to each servo lead and simply drop it down through the aileron mounting hole to the wing root. By "turning or gently shaking the wing panel you can get it to fall through the openings in the ribs." After doing the "turny-shakey" thing for a while with one wing panel, I reverted to the time-honored "nut- attached-to-a-string-attached-to-the-servo-lead" technique and threaded both leads right through.

Also, the manual instructs you to bend the aileron servo push rod wire at a 90 degree angle, inserting the bent end downward through the servo arm. Be very careful to clip the 90 degree bend short enough that it doesn't hang up on the servo case when it operates. It looks neater with its nylon snap keeper turned that way, but it can run into the side of the servo case and impact aileron movement if it is left too long.

I liked the sturdy triangular based control

horns that fit accurately into pre-drilled mounting holes in all the flying surfaces, beginning with the ailerons. That was a nice touch that saved quite a bit of time and assured accuracy in the control horn mounting process. The instructions call for clipping off the excess length of the screws that extend past the top retaining plates using a pair of side cutters or a rotary tool. I find the latter to be too dangerous to the covering and the former to create shrapnel that flies all over the shop. The technique I have developed is to position the side cutters on the screw shank to be cut, and then place a piece of blue masking tape over the top of the side cutters. When the excess piece snaps off it sticks to the masking tape and doesn't ricochet around the shop in a dangerous manner.

All control surfaces use Sig CA hinges. The slots for the hinges have been cut very accurately allowing the ailerons and the main wing panels to mate up nicely. As the photos show, using two pins to center each hinge works very well before removing them and applying thin CA as per instructions. Once the ailerons are hinged, allowed to dry, and flexed to make sure the hinges are firmly in place, the two wing panels can be slid together using the aluminum joiner tube. I should mention that the butt joint between the two wing panels at the root was perfect and left no gap as I slid the two panels together.

The fuselage assembly begins with the landing gear--and a sturdy unit it is, too! As the photo shows, the axle, main gear, and all hardware are heavy-duty products, including the 20mm socket head bolts that attach the landing gear to the fuselage. The wheels seem to be made of an unusually dense foam rubber that so far has handled take-off and landings with no evidence of wear at all. Likewise, the nicely finished wheel pants really dress up the overall appearance of the plane--and they fit to perfection over the axles and attach to the main gear using small socket head bolts.

Little needs to be done to the main fuselage other than mount the tail surfaces and tail wheel, making sure the stabilizer and fin are square with the wing in all respects. Two nice touches were to have the covering already stripped away from the stabilizer and the fin joints, and to have the fuselage/fin fairing already covered as an integral part of the unit. Everything fit squarely and perfectly. Screwing the tail wheel in place was assisted by the pre-drilled holes, although you will need a small-shank Phillips screw driver to get to the rear screw tightened down in the tail wheel bracket.

A couple of minor problems occurred as I began the process of attaching the elevator to the stabilizer and the rudder to the fin.



The tank is held in place with hook-and-loop straps. The fuel lines run through a pre-cut hole in the firewall (above left) for the tank stopper. When fully mounted, a small supplied balsa block will be glued at the back of the tank to keep it from sliding backward, and a specially cut tank bracket will be glued in place mid-way between the straps to keep it centered in the compartment. The



roomy fuselage interior (above right) provides lots of room for installing all components as well as having handy cut-outs for whichever type of power selected. Note the standard receiver switch cut-out on the far fuselage wall. The near wall contains a larger cut out for switches with integral charging jacks. The circles at the right are mounting supports for the hatch magnets.

First I found that the joiner wire in the right side of the elevator seemed loose, so it was re-epoxied and allowed to cure. Then as I was putting the fin and rudder hinges in their respective slots prior to applying CA to them, I discovered that the slot had not been cut in the rear of the fuselage to accept the bottom hinge. That was quickly corrected with a modeling knife, and the task of assembling the tail was completed.

Installing the Engine and Radio

My intention was to use a four-stroke Saito .72 as the power plant for the plane, since I had used an identical engine in the first *4-Star 60* ARF I had several years ago. I was surprised to find that the pre-drilled motor mount holes in the firewall put the two-piece motor mounts too far apart to accommodate the Saito's mounting lugs. Rather than modify the motor mounts or make a custom plate to mount the Saito, I went to my engine cabinet and selected a new O.S. .61 FX I had purchased some time ago and had never used. After breaking the engine in on my test stand, I mounted it with no difficulty and have since found that it is very close to the perfect engine for the new *4-Star 64* and my flying style.

Placing the tank in its cavernous bay in back of the firewall and securing it with the hook and loop straps provided, I was able to run the throttle pushrod to the outside of the motor mounts and the tank and curve it gently to meet the throttle servo amidships in the plane. The tank is pre-plumbed with three lines, but since I ended up using the O.S. .62 FX and all filling fittings are within reach, I simply plugged the third line and now fill the tank through the carburetor line. The large magnetic hatch cover is another nice fuel filling feature of the plane. It is easy to determine whether it's time to refuel or not by simply popping the top.

I wanted to use the sleek fiberglass cowl on the front end, but after determining that I'd have to cut away entirely too much of it to fit over the engine cylinder and muffler, I

set it aside and opted for the original fuselage shape. I did, however, cast several mournful looks at it after I made that decision. Electric flyers will really be pleased with the way it dresses up the front end.

Radio installation was a breeze with plenty of room to install the required servos and receiver and tuck the battery neatly under (the fuselage is upside down during this operation) the servo tray. The elevator and rudder push rods slid into place effortlessly and required no bending or tweaking. The metal clevises, held in place with a locknut and kept closed with short lengths of fuel tubing, provide "belt and suspenders" security against any mechanical control failure.

With the radio installed, all that remained was to epoxy the pilot figure in place in the cockpit, and to attach the canopy using Pacer Formula 560 Canopy Glue. I did drill a small "breather" hole in the cockpit floor in back of the pilot to keep the cockpit area from fogging up when exposed to heat and sun. I'm not sure why a military pilot figure was selected rather than one in civilian dress, but I comfort myself that when the plane is 100 feet in the air you can't tell what he is wearing.

Flying the 4-Star 64 EG

This plane is the fourth model of the *4-Star* series I have had over the years, counting both kit-built and ARF versions, so I knew I was in for a treat. The model balanced on the main spar with no additional weight required, which is the recommended mid-point in the allowable CG range. Control throws were set up according to the manual and they were checked to see that they were operating in the correct direction. That sounds rather elementary, but you would be surprised at the number of reversed ailerons that show up on the flight line, even in the hands of experienced pilots. Don't ask me how I know this.

With a radio range check performed, the bright red plane was ready for its maiden flight. Once again, in order to get flight photos for this article, I employed the good serv-

ices and steady hands of Paul Phillips, one of our club's best flyers, to do the honors while I manned the camera. The take-off was down the runway with just a bit of right rudder to keep it straight. In the air, a few clicks of "up" and a couple of clicks of aileron trim had it flying hands-off straight and level.

Brought to the point of a stall, the plane mushes before finally dropping a wing tip slightly, and it doesn't seem to have a preference as to which wing tip ultimately drops. With the throws on low rates, all maneuvers are slow and predictable. Loops are round and large with no need for rudder correction; rolls aren't exactly axial, but are comfortable; and inverted flight requires only a bit of forward pressure on the elevator to keep the plane level. Stall turns require quite a bit of rudder to kick the plane over.

Most pilots will want to use high rates for flying aerobatic maneuvers. While the plane is not a pattern or 3D aircraft, it will perform the usual inside and outside loops, rolls, knife edge flight, Immelmans, Cuban eights, and spins—in short, enough to satisfy the sport pilot's needs and abilities. The flying capabilities of the *4-Star* line remain intact in this latest version.

Landing the plane is just fun. Although it still has the *4-Star* tendency to float a bit, the clipped wing tips reduce that characteristic considerably. The best landings are three-point with just a little power on and the nose brought up slightly just before touch down. My first landing was on the main gear, and as I applied up elevator to keep the tail down, I got to land the plane again a couple more times as it gradually bled off speed!

In all, the new *4-Star 64 EG* ARF is a delightful plane and worthy of being added to any flight stable—whether by a veteran pilot or one just been weaned away from a high-wing trainer. Every flyer deserves to have the *4-Star* experience, and Sig has extended that opportunity with this high quality version of one of its most enduring and popular designs—now once again in an ARF version to appeal to today's flyers. 



Three-quarter front view of the plane (at left) show the cleaned-up and sleek canopy area, the sheeted turtledeck and the finished look provided by the wheel pants. All of the decals are already in place on all surfaces and remain true to the color scheme that has marked the design series since its inception nearly 25 years ago. The pilot figure (above, at left) is a nice physical fit under the slimmed-down canopy, but his military garb suggests he may have flown other airplanes. The cockpit dashboard decal was factory installed. The molded canopy fits nicely and is anchored in place with Pacer Canopy Glue. Those who prefer the original more bulbous canopy will be pleased to learn that it is available for this plane as an option from Sig. The new model (above) completes its maiden flight with a smooth three point touch down at the end of the runway. This new version maintains the easy flying capabilities that have marked the design since its inception. The improvements, including the slightly larger control surfaces, make it an even better flyer and even more attractive in the air..