49115 JANUARY 1978 $1.50

RCM radio control MODELER

THE WORLDS LEADING PUBLICATION FOR THE RADIO CONTROL ENTHUSIAST

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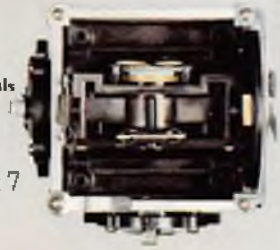
Dual conversion receiver

We built the Contest 7 to prove a couple of important points. First, we packed more unique features into the entire system than any previous Futaba radio. Features to assure you of competition-caliber performance coupled with our famed reliability. And we held the price to just $579.95, just to make sure that our reputation for quality and value continues to be unequaled.

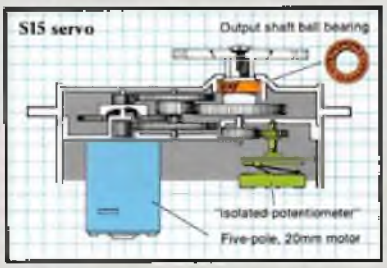
We began with the receiver, which boasts a dual conversion IF stage in addition to our standard double-tuned, RF amplified front end. And we've also used our exclusive, extra strength 3-pin connectors for the ultimate in positive contact.

Then we built the FP-T7G-72 transmitter complete with 7 channels, dust-free, ball-bearing open gimbals, dual-rate elevator and aileron controls, slide auxilliary pots, and a beautiful aluminum case.


Dust-free open gimbals

Even the servos for the Contest 7 are special.

The system includes four S15's (3-S15's/1-S15L), our ball-bearing equipped, miniature marvels.



Within each sturdy nylon case lurks a custom monolithic, single-inline IC and a separate output Stage 9 pin IC for the optimum in selectivity and accuracy.

The Contest 7. It all adds up to the most Futaba money can buy.

Futaba

The Futaba Contest 7.

Futaba Industries, U.S.A./630 W. Carob Street/Compton, CA/90220

VOLUME 15 1978 NUMBER 1

RCM MODELER

FEATURES

This Month's Cover: Joyce Wilson of Chino, California, posing with a Royal Super Cessna Skymaster. Model weighs 10¾ lbs. and is powered by two H.P. 40's and Kraft radio. Model took 1st Place (Stand-Off Scale) at the '77 "MACS" show in Anaheim. Ektachrome transparency by Randy Kidd.

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From The SHOP

DON DEWEY

This month's From The Shop will feature some reprints from various publications which we felt would be of interest to you. Our thanks to The Hobby Market (via Chuck Cunningham) for sharing the following "poetry" with us and also for exhibiting their "sense of humor".

The Hobby Market
P.O. Box 2172
Ft. Worth, Texas 76101

July 26, 1977

Dear Dave:

My plane's all ready to go in the air
The skies are blue, the winds are fair
The servos are set to do their thing
The engine is mounted upon the ring
The batteries charged, the radio tuned
May is gone and so is June
What's keeping all of this on the ground
Just sitting there or standing around?
The muffler's not here for the K & B
Oh Please, Oh Please won't you mail it to me?

Anxiously Waiting,
Charles A. Foy, Sr.
Honolulu, Hawaii

* *

July 29, 1977

Dear Dave:

My plane's still not flying, it's just sitting there
Not out in the sky, not up in the air
It rests on a bench in a still dark room
And it's all because of the engine's BOOM
We've missed you, said Sam, at the club last night
When will your plane make its very first flight
I answered him then, I said with a sigh
It's really enough to make a man cry
My engine's too loud, it really does roar
My engine's enough to make your ear sore
I'll just have to wait and postpone my first flight
Till my muffler gets here, tomorrow it might
The plane looks so pretty all blue and yellow
It makes my heart sick, I said to this fellow
To leave it at home alone in the dark
While your planes are out sailing around at the park
But maybe tomorrow I'll be lucky too
and my plane will be out there up in the blue
Maybe the mailman will stop at the door
and say to me, Charles, don't worry no more
There's a package for you from down Texas way
My eyes will light up, Oh I'll be so gay
Then I can go flying with Al, Sam & Frank
My engine all muffled and fuel in the tank
But that's only if the postman comes here
and leaves in my hand the rest of my gear

I'm still very anxiously waiting
Charles A. Foy, Sr.

* *

July 30, 1977

Dear Dave:

I checked again the mail in vain
The muffler must still be on a train
Or on a boat coming round the horn
Or maybe it hasn't yet been born
Maybe the factories have all closed their doors
The workers out soaking the sun in their pores
Maybe the mines have all been shut down
Leaving the metal down in the ground
Maybe the trucks don't run anymore
To deliver the goods to the Texas store
Perhaps its a plot by those communist folk
Whatever it is I don't think its a joke
Maybe a whatsit or even a krasner
is stuck in the machine, is that the answer
A lot of things could have happened I know
A rain storm, a flood, perhaps even a snow
Perhaps an invasion from some foreign people
And no one hung lights in the old church steeple
Maybe the mainland's not there anymore
Maybe Texas is gone and so is your store
Whatever the cause whatever the reason
We'll soon be through with the flying season
For the weather turns bad at the end of the year
And it won't matter then if the muffler's not here

Not quite truly yours,
Charles A. Foy, Sr.

* *

August 1, 1977

Dear Dave:

I've written you letter, I've raised my voice
But gentlemen now you leave me no choice
My patience was wasted, all used up in vain
the lack of my muffler has caused me great pain
The boys are all laughing, They're laughing at me
Cause I don't have a muffler for my K & B
They're all busy flying and getting all set
But I haven't flown, I haven't flown yet
So if you don't mind and would be so kind
I really don't want to put you in a bind
But I MUST have my muffler, send it today
or else send my money, Please Right Away

Sincerely,
Charles A. Foy, Sr.

* *

August 2, 1977

Dear Dave:

The mail came today with a little note
From the Texas Store to me they wrote
We sent you muffler, they didn't say how
Maybe tied to the back of a Texas cow
Maybe its coming over the overland trail
or shipped by barge without a sail
Is it coming by mule train tied in a pack
or one of those wagons with hoops on their back
Is it stuck in the desert without any shade
Was it captured perhaps in an Indian raid
I know you fellows were very sincere
When you sent the muffler from there to here
Your letter arrived but the muffler's late
It hasn't come here as of this date

Expectingly yours,
Charles A. Foy, Sr.

* *

August 8, 1977

DEAR DAVE:

ITS HERE ITS HERE
THAT MUFFLER GEAR
ITS MOUNTED AND READY
TO FLY STRAIGHT AND STEADY
OR LOOP OR ROLL
OH MY HOW DROLL
WE'RE OUT IN THE AIR
WITH NARRY A CARE
WITHOUT ALL THAT NOISE
THAT ANNOYS THE BOYS
ITS SO QUIET YOU SEE
WHEN MY K & B
TURNS UP THIRTEEN FIFTY
O BOY IS IT NIFTY
NOW I DON'T STAND AROUND
WITH MY PLANE ON THE GROUND
I'M DOING MY THING
I'M HAVING MY FLING
THE FLEDGLING IS FLYING
I'M REALLY NOT LYING
I KNEW YOU'D COME THRU
YOU WOULD BE TRUE BLUE
AND SEND OUT MY ORDER
OUT OVER THE WATER
FROM YOUR DISTANT STORE
RIGHT HERE TO THIS DOOR
I'LL THANK YOU NOW BOYS
FOR STOPPING THE NOISE
AND IF I FIND A RHYME
TO END UP ON THIS THIS LINE
I WILL
I'M STILL

VERY TRULY YOURS,
CHARLES A. FOY, SR.

•

This next humerous event is reprinted from the "Rockland County Radic Control Club Newsletter."

PERSISTENCE IS A VIRTUE

We RC fliers are a hardy bunch, and we're hard to keep down. The challenge of a model aircraft lost in the woods has been faced many times. Some people have resorted to flying full size airplanes over the woods in an attempt to try to spot the lost model. We know of one individual who keeps a compass in his flight box so that he can plot a more direct course to the lost model should the occasion arise. Perhaps the most difficult situation to face, however, is not a lost aircraft, but one that is visible at the very top of a one

to page 184

Buy a Hobby Lobby Radio now and save yourself up to $24!

Save 2 ways - beat the price increase and get a FREE spare Servo with our 6 channel !

You never had more reasons to buy a Hobby Lobby radio NOW:

1. **Prices of our 6 channel and our 3 channel radio systems will soon increase by 5 to 9%. You can save $10 by ordering either radio NOW.**
2. **If you'll order our 6 channel radio now, we will give you FREE an additional Flight Control Servo worth $14.**

and

You still have a dozen other good reasons to buy a Hobby Lobby radio:

1. Hobby Lobby radios are reliable. Reliability is partly achieved by locating the servo amplifiers inside the shock-protected receiver case.
2. Extra servos for the four main functions of our 6 channel, or for all of the functions of our 3 channel radio, only cost you $14 each.
3. Servos are tiny and weigh only 1 ounce.
4. Servo travel can be reversed by the modeler in less than a minute.
5. Servos have such accurate response that they center within 1° arc of center every time.
6. Hobby Lobby radios use reliable and maintainable Deans Gold-plated connectors for all airborne connections.
7. Range is so extreme that many of our radios can be flown safely with partially retracted transmitter antennas.
8. Hobby Lobby radios are American designed and engineered.
9. Control sticks have adjustable centering tension.
10. All our transmitters have meters that show battery condition.
11. There is a 6 month warranty on our 6 channel system and 3 months on our 3 channel, and all service is performed right here at Hobby Lobby.
12. There are thousands of Hobby Lobby radio systems in daily use giving dependable service.

☐ **HOBBY LOBBY 6 DIGITAL PROPORTIONAL $209.00**
(Includes Transmitter, Receiver, 5 servos, rechargeable nicads for transmitter and airborne, charger, 6 month warranty, 27 or 72 mhz.)

HOBBY LOBBY 3 CHANNEL SYSTEMS (27 or 72 mhz. frequencies)
☐ **with 2 servos $109.00**
☐ **with 3 servos $119.00**
☐ **with 3 servos and airborne nicads, charger $139.00**

SEND ME THESE ITEMS

_____
_____
_____
_____

☐ I ENCLOSE CHECK FOR $_____
ADD $1.40 HANDLING
☐ CHARGE TO MY **BankAmericard**
☐ CHARGE TO MY **Master Charge**
CARD NO _____
EXPIRES _____
($2.75 HANDLING)
☐ SHIP C.O.D.
($2.75 HANDLING)

NAME _____
ADDRESS _____
CITY – STATE – ZIP _____ rcm 11

Hobby Lobby INTERNATIONAL

Rt. 3, Franklin Pike Circle, Brentwood, TN. 37027 • 615/373-1444

☐ Would you like a copy of Hobby Lobby 6 Illustrated Owner's Manual? Send $1.00 and we'll send you one by First Class return mail.

KIT SALE!

(Prices in effect until January 31, 1978)

We have complete accessory packs available for all these kits. Call us!

(Accessory packs contain everything you need to complete each kit except for radio and engine!)

Ace Kits

Whizard $12.77
Ace High Glider $12.77
GLH II ½A $10.77

Airtronics

D-Tee $15.77
Square Soar.....$16.77
Aquila $49.77

Bridi

RCM Basic Trnr.$27.77
Trainer 60 .....$42.77
Trainer 40 .....$35.77
Super Kaos 40...$37.77
Sun Fli 4-20.....$17.77

Lanier ARF Kits

Comet II $38.77
Cessna $29.77
Comet 35 .....$33.77

Marks Models

Wanderer $12.77
Bushwacker $28.77

M.E.N.

M.E.N. Trainer ..$20.77

Michigan Hobby Hanger

Miss Vintage $37.77

Midwest Kits

Cardinal ARF....$19.77
Sweet Stick.....$26.77
Chipmunk ARF $19.77
Attacker ARF....$26.77

Bud Nosen Kits

(Until Jan. 31, '78, you can buy a DuBro Prop Drive Reduction Unit for only $59 with the purchase of a Bud Nosen kit!)

Gere Sport $99.00
Aeronca Champ $78.00
Citabria $78.00
J-3 Cub $93.00
Jenny $99.00
Trainer $63.97
Mulligan $109.97

Peerless-Kyosho

Capri Cruiser $49.97
Dash 7 Buggy.....$89.97

Sig Kits

Buy a Fox Engine at HALF PRICE with the purchase of any of these Sig kits:

Sig Kadet $33.95
Fox 25 RC.....$15.97
Sig Piper Cub.....$37.95
Fox 25 RC.....$15.97
Sig Kommander $39.95
Fox 45 RC.....$25.97
Sig Kougar $42.95
Fox 45 RC..... $25.97
Sig Klipper.....$19.95
Fox 15 RC.....$17.47

Top Flite

Headmaster.....$16.77
Contender $32.77

★ HOBBY LOBBY ★ RADIO WINTER TUNE-UP SPECIAL

It's winter. A good time to have your Hobby Lobby Radio completely checked over. Our unbusy technician, Ed Brannon will go over the entire rig. Re-tune it, range and vibration check it, cycle the nicads and completely check it out. All this for $19.97 plus parts. Allow $1.40 for shipping and handling on prepaid orders, $2.75 on C.O.D. and bank cards. Do us a favor, make Ed's winter a busy one.

NEW! HOBBY LOBBY BOAT KITS and RUNNING HARDWARE

These beautifully crafted wood kits are made in Japan. The interlocking machine cut plywood parts fit together so well the entire framework can be assembled without gluing, like a jig-saw puzzle.

Hobby Lobby Susanoh 20 Outrigger . $44.77
list price $57.95

Hobby Lobby Susanoh 40 Outrigger . $69.66
list price $94.50

Susanoh 20 is 27¼" long with 16" beam for .19 to .21 engines and uses Hydro 20 Running Hardware. 40 is 33½" long with 19 5/8" beam for .29 to .45 engines and uses Hydro 40 hardware. The prototypes of these boats swept all class championships in the 1976 and 1977 JMPBA Heat Races.

Hobby Lobby Transonic 200 . . . . . $38.55
list price $46.95

Hobby Lobby Transonic 400 . . . . . $61.94
list price $74.95

There is no need to overpower these hulls—they run extremely fast with the recommended engine sizes. Transonic 200 is 26¾" long with 12½" beam for .15 to .20 engines and uses our Hydro 20 Running Hardware. 400 is 33½" long with 15 3/8" beam for .30 to .40 engines and uses our Hydro 40 hardware. 200 with a K&B 3.5cc engine won both B&D classes, and 400 with a K&B 6.5cc engine won C class at the 1977 Kyosho RC Boat Contest.

Hobby Lobby Speedmaster X200 . $32.77
list price $39.95

Hobby Lobby Speedmaster X400 . $56.55
list price $68.95

X200 is 23½" long with 8 5/8" beam for .15 to .20 engines and uses our Mono 20 Running Hardware. X400 is 31½" long with 11¼" beam for .35 to .45 engines and uses our Mono 40 Running Hardware. X200 placed 2nd in the All-Japan 400 meter B class Contest using a K&B 3.5cc engine. X400 placed first in Class C with a K&B 6.5cc engine.

Mono 20 Running Hardware $17.97
list price $21.95

Mono 40 Running Hardware $21.33
list price $25.95

Bronze & stainless steel construction. The rudder doubles as the water pickup. Prop is handmade of bronze and stainless. Included is a bushing that serves as a lubrication fitting for the shaft.

Hydro 20 Running Hardware $32.77
list price $39.95

Hydro 40 Running Hardware $47.55
list price $57.95

Bronze, stainless, cast aluminum construction. These are among the most perfectly crafted RC boat items we've seen. Two universals permit infinite prop thrust angle adjustments and parallel running prop. Adjustable shaft hanger, offset rudder post, machined bronze grease fitting, handmade bronze-stainless prop all contribute to the deluxe appearance of these hardware sets.

SUPERKOTE

A BETTER COVERING MATERIAL!

only **$3.99** /roll 27" X 6' List price $6.95

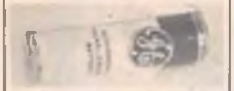
- Cessna White
- Beechcraft Red
- Piper Yellow
- Waco (dark) Blue
- Ryan Orange
- Aero (light) Blue
- Midnight Black
- Campaign Brown
- Terra Green
- Taylorcraft Cream
- Metallic Gold
- Aluminum

Sooner or later you'll build this plane which has been described as both: "the best kit . . . ever produced", and as: " . . . the greatest flying RC airplane in history". Why not build one now? 95" wing span, 14" wing chord, 1,330 sq. in. wing area, 1653 sq. in. total lifting area, total weight only 8 pounds. Senior Telemaster flies as slow as 10 mph and as fast as 75 mph with no elevator trim change. It will not only perform some fantastic maneuvers, but can also take off in only 3 feet, and be side-slipped into landings. Most RCers put .60's on this plane, but it flies most realistically with a .40 (and one hardy soul actually used a .19!) So incredibly easy to fly that it qualifies as the world's best trainer.

HOBBY LOBBY INTERNATIONAL

Rt. 3, Franklin Pike Circle, Brentwood, TN. 37027 • 615/373-1444

SPECIAL!
G.E. Nickel-Cadmium Batteries
1.2 volt 500 mah. Pencell size
4 for $8.99
Regular $3.20 each



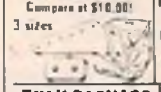
This is the high quality G.E. cell that's original equipment in the best radio outfits. Cells have solder tabs.

SPECIAL!
KRAFT KP-5C DIGITAL PROPORTIONAL
$269.00

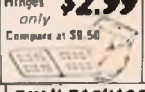
Price in effect only through Dec. 31, 1977. Quantity may be limited. list price $375.43

SAVE UP TO 68% ON HARDWARE!

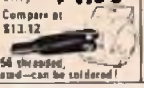
BULK PACKAGE Control Horns
75 Control Horns only **$3.35**
Compare at $10.00!
3 sizes



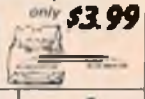
BULK PACKAGE Polypropylene Hinges
200 Hinges only **$2.99**
Compare at $9.50



BULK PACKAGE RC Metal Clevises
35 Clevises only **$4.99**
Compare at $13.12
2-56 threaded, plated—can be soldered!



BULK PACKAGE Nylon Tube Pushrod
25 feet Nylon Outer Tube
25 feet Nylon Inner Tube
only **$3.99**



BULK PACKAGE Brass Threaded Couplers
35 Couplers only **$3.99**

BULK PACKAGE 8 Wheels
4 Pairs: 2" thru 2¾" only **$5.99**
Compare at $19.76

These are lightweight, high quality air-inflated wheels on strong molded nylon hubs. We think these are comparable to, or better than wheels that sell for twice the price. We absolutely guarantee that you'll like them. If you don't think they're comparable to wheels that sell for twice the price, return them and we'll give you your $5.99 back.

BULK PACKAGE RC Steel Links with 10" Rods
25 Links only **$4.99**
Compare at $12.25

BULK PACKAGE Flex Cable Pushrod
20 feet nylon tubing
20 feet 1/16" bronze cable
only **$3.99**

BULK PACKAGE Wing Fasteners
20 threaded wood blocks
20 ¼-20 nylon bolts
Compare at $8.50
only **$3.99**

5 Fuel Filters
only **$3.99**

BULK PACKAGE 10 FEET Surgical Fuel Line Tubing
only **$1.99**

Hobby Lobby PAPILLON 1/2A R/C Motor Glider
only **$14.83**
List price $21.95

45½" wing span, 278 sq. in. wing area.

•Precisely cut, easy-to-build, all balsa kit from Japan.

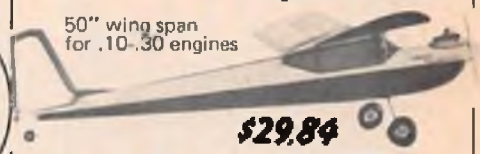
•2-channel powered glider—great trainer slope soarer and sport plane!

This beautiful little plane can be flown in confined areas or in the wide open spaces. Its slow, gentle flight is perfect for a beginner. For 2 channels (rudder and elevator). Papillon will perform aerobatics or just hang itself on a thermal or slope updraft. Heat shrink plastic "sock" wing covering is included.

FREE! $34.85 MILLING ATTACHMENT
Included with Lathe until December 31, 1977

Hobby Lobby's 4 Channel Beginner's Plane

50" wing span for .10-.30 engines



$29.84

Hobby Lobby JUNIOR TELEMASTER
list price $37.95

No need to work your way up from a 3 channel trainer to 4 channels—you can start flying with 4 channels right off the bat with Junior Telemaster—full span ailerons are included. It's a gentle flyer that's perfect for beginners. Machine cut balsa and plywood with ultra-clear full size plans and hardware.

BALSA SALE!

20—3/32x3x36 **$9.99**
15—3/32x4x36 **$11.11**
10—1/8x4x36 **$8.88**
20—1/16x3x36 **$7.77**
10—3/16x4x36 **$9.99**
20—1/16x4x36 **$11.11**
10—1/4x3x36 **$7.77**

Hobby Lobby/Taig MICRO LATHE $189.00

About half the price of competitive precision metal-working lathes! The Taig lathe is a heavily overbuilt machine that was originally designed for light industrial use. Capacities: 4½" turning diameter; 7¾" length; Cross slide travel 1¾". Tailstock adjustable. Working accuracy: 5/10,000".

Included are: Taig 15" bed lathe, 1/10 hp motor, mounting board, 3 jaw chuck, ¼" Jacobs drill chuck, 7 pc. tool set, new lever-operated tailstock, stepped pulley & belt set, self-adjusting motor bracket.

We have a complete stock of accessories available for advanced operators.

When you've got it — FLAUNT IT! **$3.99**

HOBBY LOBBY T-SHIRT
☐Small 34-36 ☐Large 42-44
☐Med. 38-40 ☐X-L 46-48
Price includes postage in U.S. and APO's

Comes with OBECHI-SHEETED foam wing!

OBECHI-SHEETED FOAM WINGS

Hobby Lobby/Trueline TIGER $49.97
list price $66.00

Tiger's sleek line are reminiscent of the NATO fighter. The 52" span foam wing comes ready-sheeted with obechi veneer, and the rest of the plane is very simple balsa construction. For .35 to .40 engine, 4 channels. Flying characteristics: fast, unusually aerobatic, holds knife edge attitude, lands at very slow airspeeds.

All you can handle with a .40 . . . even Granny can fly it with a .25!

Hobby Lobby/Kamco KAVALIER $54.00

list price $70.95 for .25-.40 engines

54" wing span Imported from England

4 channel RC

You only need Engine, Covering Material and RC gear.

ALL THIS INCLUDED:

CALL US! (615) 373-1444
for FAST SERVICE, C.O.D. or CREDIT CARD ORDERS—ADVICE

JIM DICK FRANK GREG

We've got over 100 years of RC experience among us (we are older than we look). Call us with your RC problems.

BRAND NEW! ~VOLUME 7 CATALOG
Hobby Lobby's best catalog yet!
*More LOW PRICES! *More RC AIRPLANE KITS!
*More BOATS and BOAT HARDWARE items!

SEND VOLUME 7 CATALOG TO:
Name
Address
City State Zip
☐$3.00 – send it FIRST class. ☐$2.00 – send it THIRD class.
(Deduct $1.00 from above prices if you enclose the words "VOLUME 5" or "VOLUME 6" from old Catalog cover).

Except as noted, prices in effect until Jan. 31, '78

☐ I ENCLOSE CHECK FOR $ _____
ADD $1.40 HANDLING
☐CHARGE TO MY BankAmericard
☐CHARGE TO MY Master Charge
CARD NO. _____
EXPIRES _____
($2.75 HANDLING)
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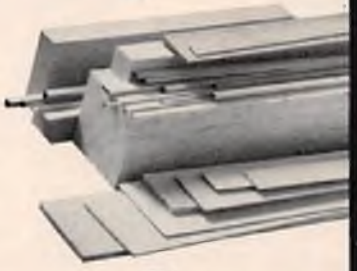

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AMA-SP

Cunningham On RC

CHUCK CUNNINGHAM

Last month, we talked about experiments with lifting airfoiled tail sections, and this month I want to report upon the flying characteristics of the new Miss Texas design with a lifting tail section. As you can tell from the picture, Miss Texas is a large aircraft. It isn't BIG in the sense of big models these days, but it is a heck of a lot larger than the average aircraft, since it has an 84" wing span, and a fuselage length of over 60". It came out weighing a bit over nine pounds, which is a pound more than I hoped it would weigh, but with 1100 square inches of wing area, it still has a wing loading of only 19 ounces per square foot. Most of the extra weight is in the wing center section since the entire center section supports the two landing gear trunions. These are tied to two 3/16" ply dihedral braces that are about 24" long. The landing gear is of two pieces of 3/16" wire and this, along with large wheels, adds a lot of weight, but also has a lot of strength to take the landing loads of a large aircraft. But, back to last month's discussion on lifting tail sections. If you will recall, I was wondering if the lifting horizontal stab section coupled with a semi-symmetrical wing airfoil would respond in the same way on take-off and landing as did the lifting tail section and flat bottom wing coupling on the Lazy Ace bipe. It does.

First test flights (though slightly marred by a problem that I will tell you about later) were a dream. The take-off run is beautiful and very realistic. When you taxi out for a take-off and turn into the wind and crack the throttle open, the tail end comes right off the ground and the MT tracks straight down the runway lifting off after about 100 feet of run. The lift-off is smooth and clean and looks, for all the world, like a full size aircraft. Landings are the same. When you get ready to set her down, it comes right in, nice and clean and easy with a wheel landing and smooth roll out. I haven't made enough flights with her yet to try both three point and two point landings, but the ten or so landings that I have made so far have all been nice and smooth and beautiful. I have only tried one set of rolls, which led to the problems that I mentioned earlier and, just now when I finish writing this, I have to get busy and repair the Miss Texas 'cause it bashed the ground. Not much damage, thankfully, but it did get a large hole in the leading edge of the wing, bent up one set of landing gear struts, and knocked the horizontal stab loose. This crash was caused by something that you should know about if you are interested in building larger models. It was caused by using an aileron hook-up method that is quite adequate for smaller aircraft, but not strong enough for an aircraft this size or larger. I used a plastic clevis to connect the aileron pushrods (full span ailerons, 2" wide and 36" long, hooked up via a standard right angle bellcrank setup) to the servo. While making my fourth test flight, the new HP .61 in the nose just beginning to sing, I decided to lay a horizontal roll across the sky. The roll was okay, and the roll rate seemed pretty good, but I came out of the string after only one roll with just a funny feeling that everything wasn't quite right. I leveled off and started to bank around and come back toward the field at about two hundred feet in the air. Suddenly I realized (with a very sinking feeling in my stomach) that I did not have and aileron control. I could get just a little bit, but not much. I chopped throttle and took the throttle trim to the lowest position, hoping that the new engine would die. Great idle, kept on ticking away (actually, one **super** engine!). I started trying the rudder to see just how much good it would be and, like almost all low wing designs, the rudder is pretty good on the ground but not much help in the air. I started losing altitude, but the aircraft was getting painfully near the shores of Benbrook Lake and, even though the day was 97°, I really didn't much feel like a swim out to salvage it. The engine finally quit, and Miss Texas kinda' spiraled in the last fifty feet even though I was trying to apply rudder and elevator to break the spiral. She bounced hard and, from where I was about five hundred yards away, looked like there would be no way that she could survive the contact with the ground without extensive damage. When I drove over to pick her up, I found that all parts were intact and that the damage was really rather slight. So the crash proved two things to me: one, that the structure of the aircraft, both wings and fuselage, is quite sturdy and able to take hard knocks; and, two, the cause of the crash was that the plastic clevis had sprung open when doing the roll and had slipped off of the aileron throttle. I reconnected the clevis and, upon examining the aircraft, found that when the ailerons were flexed by hand, the clevis tried to open. A bit more flexing and open it did. So, a word to those of you who are like me, interested in large aircraft, use a piece of 1/16" music wire bent to connect the servo arm to the pushrods. Use a wheel collar to keep the wire rod connected to the servo arm. I had used a wire hook-up on the Lazy Ace and used it only because, when hooking up the ailerons, I discovered that I hadn't thought ahead to purchase a nylon clevis attachment, and so went ahead and bent up a piece of wire. Now, along with making the crash repairs, I am also going to remove the nylon clevis and save it for a smaller aircraft, where it will be just perfect because I have used them many times before.

Yours truly, showing off Miss Texas.

Full test flights and subsequent adjustments will have to wait a bit until I get Miss Texas repaired and into the air again, and then I'll be torturing poor old Dick Kidd again with having to draw a beautiful set of plans from my less-than-thrilling drawings. But, I think that you will like it. Now, I am working on the design of a 10' span low wing that will also fly on a .60 engine, but will have enough room to take a larger engine such as the Speed Webra .90, or a Du-Bro Power Drive. The lessons that I have learned from both Miss Texas, and the Lazy Ace will be used in the new bird. Anyone have a spare balsa tree?

To sum all of this up, though, if you are designing a large aircraft, then by all means, use a lifting horizontal stab section and, if you are one of the many who are interested in building aircraft that will carry a pay load for experimental work or

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Engine Clinic

CLARENCE LEE

The mail the past few months has had more and more letters asking questions related to "tuned pipes". Although tuned pipes have been around for many years, it is only recently that they are becoming accepted for R/C use; prior to this, their main use being in U-control speed events. To my knowledge, Bill Wisniewski, K & B's engine designer, was the first modeler to successfully adapt a tuned pipe to model use. Following Bill's success in U-control speed, the "pipe" has pretty well become standard equipment for U-control speed fliers.

We first gave a tuned pipe a try on an R/C model during the summer of 1969 while testing the first commercially available pipe — the E.D. "Power Pipe" made by Kevin Lindsey in England. Although we did not achieve any spectacular power gain — a 300-400 rpm gain realized, Kevin was the first to offer a broad range combination pipe/muffler that would increase the power of the engine, while at the same time lowering the noise level equal to or better than most mufflers available at the time. However, it was a little early for R/C modelers, in general, to accept the pipe as the coming thing. The December 1969 issue of RCM carries our review.

At the first Tournament of Champions held in Las Vegas, several of the foreign modelers showed up using tuned pipes on their pattern aircraft and this has lead the way for most all serious competition pattern fliers to use the "pipe". With pattern aircraft becoming heavier and heavier due to additional servos for extra control functions, retractable landing gears, etc., the need for more power resulted. With many engine designs having just about reached their power potential, the pipe was a solution to getting some more power out of the engine.

The use of a pipe, however, is not quite as simple as just bolting it on as in the case of a muffler. From the letters received, many fellows do not understand the principle of the pipe, how it works, and why it cannot just be "bolted on". So, this month I'll try to clear up some of the things that are a puzzle to many of you.

Although I have explained the principle of a pipe's operation several times in past columns, I realize not everyone has been following "Engine Clinic" since its inception, also many have only become interested in using a pipe recently, etc. So, first off, we will run through how a pipe increases the power of your engine.

A tuned pipe works on the principle of pressure waves. When the exhaust port in your engine opens after the combustion process, the hot, high pressure gases rushing out, set up a low pressure wave as they travel down the expanding cone portion of the pipe, sucking the spent exhaust gases from the engine and some fresh fuel/air mixture into the manifold section of the pipe. When the exhaust wave reaches the converging cone section of the pipe, a high pressure reflected wave is formed that pushes the fresh fuel/air mixture, that is in the manifold, back towards the exhaust port. If this high pressure wave reaches the exhaust port while it is still open, but before the bypass port has opened, a "supercharging" effect takes place. This is where the "tuned" part comes in. If the pressure wave reaches the exhaust port too soon or too late, no supercharging effect takes place and no power gain will be realized. Many variables effect the "tuning" of a tuned pipe: rpm at which you run the engine, amount of nitro in your fuel, temperature and humidity, and the length of the pipe itself; the length of the pipe being the means you use to "tune" the system. By lengthening or shortening the pipe, you bring it into "tune" or resonation.

Many fellows have installed pipes on their engines and noted an immediate power gain, while others have experienced none. Any properly designed pipe will give a power gain, but it does have to be "tuned" to the particular engine, fuel, prop combination. If you use an 11/7 prop and 25% nitro, the length of your pipe is going to be different than if using an 11/8 and 15%. Generally, the higher the rpm at which you run the engine, the shorter the pipe will be. Some engines will show more of a gain with a pipe than others — this is due to the exhaust and bypass timing, compression ratio, etc. It is preferable to have more of a delay between the opening of the exhaust port and bypass port with a engine intended to be used with a pipe than with an engine used without a pipe. Engines designed expressly for pipe use have the exhaust port considerably higher than those used without pipes. Any non-pipe engine can be converted to pipe use by raising the exhaust port .025"-.040", depending on the size of the engine; even higher if all-out speed is intended. Taking a typical .60 displacement engine as an example, if a pipe were installed and properly cut to length with no other modification made to the engine, you might expect a 300-500 rpm gain — some engines as much as 700-800. By raising the exhaust, another 300-400 rpm gain would be realized for a maximum total of 1000-1200 rpm. However, not every engine will show this much gain even with the exhaust raised. Crankshaft timing, compression ratio, etc., all play a part. A "piped" engine will usually run better with the compression ratio lowered. This is due to the supercharging effect of the pipe forcing a denser mixture into the engine to begin with. If when using a pipe you can detect that "frying egg" sound, then you need to lower the compression ratio. Burning a glow plug a flight is also an indication of the compression ratio being too high. This is to be expected in racing engines burning 60% and higher nitro in the fuel. But, with pattern ships in the 15%-25% nitro range, you should get more than a flight per plug. Many fellows are dropping to 5% nitro because of fuel consumption. Power does not come without increased fuel consumption and a piped .60 is a real guzzler; almost two ounces per minute at full throttle not being uncommon. A 16 ounce tank is often marginal in getting through the pattern if more than 15% nitro is used.

Actual pipe tuning is pretty straightforward — you do need an accurate tach. Do not attempt to tune a pipe by ear or sound, as this can be deceiving. Start your engine and check the rpm. Then shorten the neck of the pipe or end of the manifold that connects the pipe to the engine by 1/4". This can be done simply by slipping the pipe in the silicone rubber connector that joins the pipe and manifold, however, when the ends butt in the connector, then you have to start cutting. If you cut 1/4" off and nothing happens, then cut another 1/4". Most pipes are supplied considerably longer than necessary to allow for

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Dave Brown

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Dave Brown

1st Place Winner Dave Brown with Phoenix 7. Won the '77 Nationals in R/C Pattern.

Dave used a World Engines retract servo and a 2" white Goldberg "Snap-on" spinner.

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Both Salkowski and Oddino used S & O retract servos with Goldberg mechanics.

3rd BILL SALKOWSKI with his Curare

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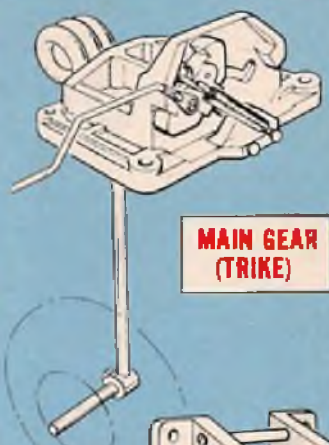

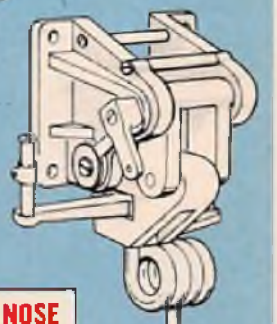

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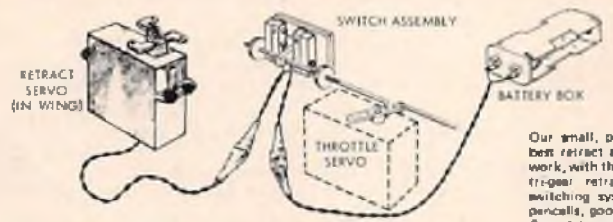

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ENGINE CLINIC

from page 10

tuning. If you cut 1/4" off and the engine loses rpm, then the pipe is already too short and needs to be lengthened by simply pulling it back out of the connector. It is doubtful that you will run into this situation with a new pipe and manifold, however. So keep cutting the pipe or manifold, whichever has the most material, 1/4" at a time until a gain is noted. Continue shortening the pipe until no further rpm gain is noted or even a slight rpm drop; this will be the correct length. Do not be concerned if you hit maximum rpm, make a 1/4" cut and lose 100-200 rpm — in the air, the engine unloads and picks up rpm. At higher rpm, the pipe needs to be shorter. With a U-control speed model, or R/C speed model for that matter, where all out speed is the ultimate goal, you would want to cut the pipe for in the air rpm. However, for a pattern engine, it is better to cut it for maximum ground rpm. A hair shorter would be okay, but it is better to have a pipe too long than too short. If it is too long, nothing is affected other than slightly less power; if too short, the engine will sag in climbing maneuvers, be harder to set the needle, etc.

One word of caution when tuning the pipe by sliding the pipe in and out of the silicone rubber connector: A Trombone effect can occur. By sliding the pipe until maximum rpm is achieved, upon stopping the engine and re-starting it, it will not reach the previous rpm unless the pipe is again lengthened and shortened by sliding until maximum rpm is reached. This will give an incorrect setting. Always shorten the pipe in 1/4" increments, stop the engine, re-start and check rpm. The Trombone effect will result in the pipe being somewhat shorter than desired if left at this length.

In the past, the double coned pipes have always been a bit "peaky" when it

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Sunday Flier

KEN WILLARD

Radio controlled aircraft — what a great activity for persons of all ages. I use the word "activity" rather than hobby, or sport, because it truly is much more.

The flying of R/C planes started out primarily as a part of the "hobby." Modelers would build a model then fly it. As time went on, this changed. Men - - - and a few women - - - with leisure time, but no inclination to build planes, would buy them and fly them for the sport. Some of those individuals would see other possibilities for these rather sophisticated vehicles, and began thinking up jobs for them to do — and the concept of the RPV (remote Piloted Vehicle) intrigued both military and civilian governmental agencies. It wasn't long before a good R/C pilot, if he were lucky enough to be in the right place at the right time, could actually be **paid** to fly R/C. Don Lowe, Jan Sakert, Maynard Hill, Gary Korpi — even your Old Chief Sunday Flier lucked out that way. So flying R/C went from a sport to a form of profession.

Building R/C planes is the hobby aspect, if you wish. Designing them is also part of the hobby, but a bit more demanding in the way of some general knowledge of both aderodynamics and structures. And, of course, I have always maintained that the ultimate fun in R/C airplanes is to do all three - - - first, design a plane; second, built it; and third, fly it. It's your baby, from concept to flight test.

But not everyone can do that for very good reasons. So, they do as much as they can. The one thing that almost everyone can do is learn to fly — unless some physical handicap prevents it - - - and it has to be pretty serious — like poor eyesight; there are a lot of fliers around who control their planes while sitting in a wheelchair.

The desire to fly is inherent in every human being. The achievement of that desire varies — but flying R/C is one way. The fantastic thing is how universal it is when you consider the age at which it can be started and how old you can be to continue to enjoy it.

In September of 1976, I went to Yuma, Arizona, to take part in tests of the Air Force Harassment Vehicle at the Yuma Proving Grounds. Occasionally we would have to work on weekends, and every Sunday some members of the Yuma R/C Club would show up down at the end of the runway to fly their R/C models. They had permission from the commanding officer, of course. During lulls in our RPV tests, I'd go over and talk with the fellows. It was at that time that I met Merle Hyde, a Chief Petty Officer in the Navy Supply Corps who worked at the Marine Corps Air Station at Yuma Airport. On weekends he spent his time polishing up his flying skills with his competition R/C design and, even more demanding, he was teaching his young son Gordon, better known as "Chip", how to fly R/C. Chip was five years old in October 1976. He had begun flying in July 1976, as a four year old, with Merle carefully bringing him along through the use of a buddy box. Late in September 1976, I watched Chip land his Slo Comet trainer. Merle was on the buddy box, just in case, but the landing was achieved successfully.

During the next few months, Chip's proficiency continued to improve — but it took an almost inexhaustible amount of patience on the part of Merle. Like all R/C flyers, Chip wanted to solo and, with the determination and impatience of youth, gave Merle a hard time occasionally. Tears, tantrums, some comforting words, and the training went on.

I left Yuma in April, and didn't get back there until late in September 1977 — this time on a combined business and pleasure trip. While there I called Merle and we arranged to meet at the Yuma R/C club's flying field at Adair Park, which they had developed in coordination with the Yuma Parks Department. It's a nice sport R/C field, but I'll be glad when they get the shade producing structure put up. It's **hot** in Yuma.

Merle has an Ugly Stik for sport flying with Chip. They started it up, and then Chip, sans buddy box, taxied it out, took it off, climbed out, did a Split "S" to come back, performed a slow roll, another Split "S" followed by three inside loops, came in, did a touch-and-go, then came around and landed. Totally solo! Five years old! And Merle informed me at the time that Chip is also now flying Merle's competition Dirty Birdy solo!

When I returned from Yuma, I found a copy of the South Bay Soaring Society's Newsletter in my mail. On the cover was a photo of Gayle Weaver, five years old, flying his Dad's competition sailplane. Again, the result of lots of determination by a youngster, and great patience by his father. So — how young can you be to fly R/C? Five? Yes. I've seen it done. Do you know anybody younger? Let me know.

Gayle Weaver, 6 years old, flying his father's Aquila. Fred Weaver, his dad, is one of the top glider pilots in the U.S.

The corollary to that is obvious. How old can you be to fly R/C? And don't point at me, fellas. Your Old Chief Sunday Flier may be a contender, but not really. I know a couple of guys in their seventies who do a good job of flying R/C. Do you know anybody in their eighties? Let me know. For the oldest R/C pilot, we'll give him a year's subscription to RCM. Just send me a certified statement, witnessed by two AMA members. We'll also do the same for the youngest — with the same certification. As of this writing, the ages are 71 for the oldest, and 5 for the

youngest. Can you top those?

★

On the weekend of Saturday and Sunday, September 24th and 25th, the Hill Country Flyers staged their annual World War I Western Front Jamboree. It was held at the Hill Country Air Museum, Morgan Hill, California, a truly fantastic development created by Irving Perch. It's a great place for family activities; there's a museum of early American wagon wheeled vehicles and farm machines, plus another building with classic airplanes, and a first class restaurant — The Flying Lady — with an aviation motif and models of many early aircraft hanging from the ceiling.

If you ever get out to California and particularly, the Bay Area, be sure to go down the peninsula from San Francisco to Morgan Hill — about eighty miles — and visit the Hill Country Air Museum — it's well worth your time.

There were some thirty-six entries entries in the Jamboree — not as big as Rheinbeck yet, but each year more modelers are showing up. The popularity of Sport - - - or Stand-Off Scale, depending on whom you're talking to, was evident in that there were almost ten times as many entries in Sport as in AMA Scale. It's understandable, when you take a look at AMA Scale models these days. The amount of detail and documentation is mind boggling - - - and then to put all that work up in the air with nothing between the modeler and the model than an invisible radio beam seems almost fool-hardy. But they do, and it's thrilling to watch.

The only thing that I find missing in Sport Scale is some form of scoring for realism. For example, I entered my 1/2A Jenny, built from a Sterling kit; got Fifth Place in Static Scale, too, which surprised me a bit. But for flight points, I got very low marks because I had to rush through the maneuvers before the Baby Bee, with a standard tank, ran out of gas. However, I did do a loop — and it was for all the world a real Scale Jenny loop - - - dive until the rigging was singing, pull up, struggle to the top, just barely make it over and then come down the back side winding up lower than the start. And don't tell me that isn't a Scale Jenny loop - - - I've done them in the full Scale version! But, since it wasn't round, and didn't recover at the same height as the loop began, I got low marks. 'Tain't right. There should be marks for realism.

Didn't get any score for the take-off, either. Well, maybe I did stretch a point. The grass was too high for the Jenny's small wheels so I went up to Monty Groves, the Director, and said, "Monty, in 1919, as an experiment, the U.S. Navy converted a Jenny to an experimental catapult launch from a battleship — so what you're going to see is, at first glance, a hand launch by Duke Crow, but you should realize that it really is a re-enactment of that experimental Jenny catapult launch, from the U.S.S. Duke Crow!" Somehow - - - even though Monty announced it, the judges just couldn't see it my way, so I got a zero for take-off. Oh, well.

I would like to show you a few shots of some of the more interesting things — and planes — that caught my eye at the Jamboree. Here they are:

Picture #1: A Stand-Off Scale model of the Albatross B-I. It was built by Rich Westlake and flown by Harry Apolan of the Orange Coast Club.

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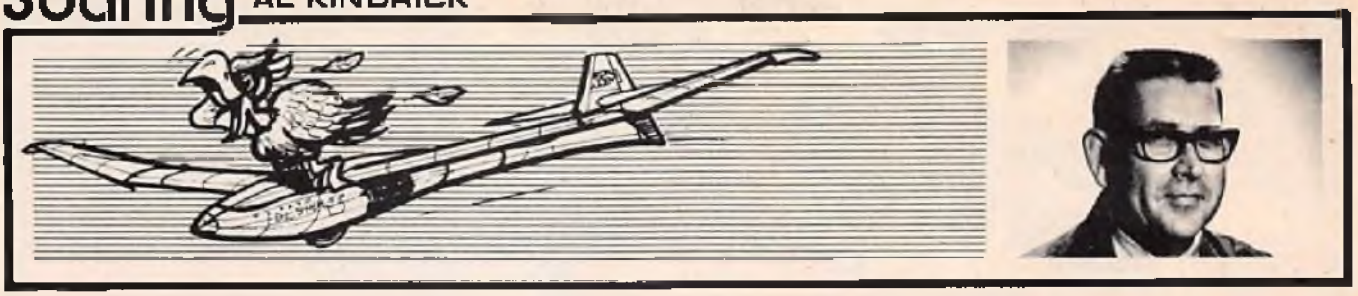
Soaring

AL KINDRICK



Dr. Stan Pfost, 1978 President elect NSS, and all around busy man.

This month, we salute Dr. Stanley Pfost, Secretary and President-elect of the National Soaring Society. Stan lives with his wife and two daughters in Winter Park, Florida. He is a full-time dentist, full-time modeler, full-time NSS member, full-time President of the Orlando Buzzards Radio Control Soaring Society, and will shortly fill the office of the President of the NSS. This guy is even too busy to get cavities. We wish him good luck in his ventures.

•

In June of 1977, I wrote a piece about flying instructors and the importance and the responsibility involved. A companion article to this appeared in the Tri State Soaring Society, edited by Mark Yothers and written by Dave Burt entitled, "Trimming Your Sailplane For Thermal Flight".

The first thing to get straight in your mind is that the flight trimming of any aircraft is an aerodynamic compromise. No two ships or kits from the same plans will fly exactly the same, due to irregularity in material and workmanship. Instructions by the designer or kit manufacturer for C.G. locating, tow hook location, and other things, are only a starting point and are usually conservatively stated. It is up to the pilot to trim his or her ship for the best performance, be it for contest work or just sport flying. The following ideas are suggested to help you get the most from the ship you have. Sailplane design is yet another subject.

C.G. location, wing and stab angles, final choice of C.G. location, and associated wing and stab angles, are not determined by minimum sink rate in gliding. Their location is, instead, determined on how the ship flies and handles in both light and strong thermal lift. When a properly trimmed ship enters thermal lift, it signals to the pilot by nosing up or raising wing tip briefly. The nosing up signal should be just noticeable in very light lift and quite pronounced in a strong lift. If your ship gives you no nosing up signal, the C.G. is too far forward or there is no lift. The forward C.G. condition may be bad enough so that the ship will barely climb in even strong lift. A rearward C.G. condition is present when the nosing up signal becomes so pronounced that the pilot cannot easily correct the nose up attitude. As C.G. locations are moved, it is, of course, necessary to adjust wing or stab angles for a good, no stall glide.

Control movement and response: Your thermal sailplane is a wide speed range aircraft. It must be easily controlled during stall speeds in very light lift conditions or during occasional high speed dives. Elevator response is usually no problem except during high speed when you need a very light finger on the stick. Lack of rudder response at low speed is almost always a problem. The rudder servo arm can be lengthened and a shorter rudder horn usually corrects the problem. It is essential to have good rudder response at stall speed so you can make the sailplane do what you want it to do and not what the thermal or turbulance dictates.

Tow hook location: Tow hook location determines the height you can reach on each winch or high start launch. The further back (within reason) you go, the higher the launch.

Start with a hook location 1/2" to 1" forward of C.G. and move it back 1/4" to 1/8" at a time until you do not get any climb increase or the ship becomes unstable and goes easily into a high speed stall right after release. Once the best hook position is found, no additional adjustment should be required. The pilot himself can compensate for high wind velocity by use of the elevator and winch speed.

Spoiler operation: The common type spoiler which pivots up from the thickest part of the airfoil is very effective because of the lift area of the wing which it spoils and the drag which it generates. If it is raised only 60°, it spoils a lot of lift but generates only a minimum of drag and the ship pitches down into a fast dive. When the spoiler is raised a full 90°, its full drag is generated, the pitching down is minimized, and the resultant high sink rate with minimum speed build up results. The final flare-out for landing is also much slower with little tendency to balloon as a result of overspeed.

Ballasting: Much has been written lately about ballasting. Is ballasting necessary for your sailplane? Previously, I've described a method of trimming a sailplane which is good for light to moderate winds. When it gets windy (+15 mph on ground) should you ballast? Possibly not. The preceding trimming method results in what we can call a small positive pitch stability. This means it will slowly return to its adjust glide path if turbulance and wind gust cause it to nose up or down. Thus, in windy weather, the normal glide path is upset, resulting in a lower average glide speed. Add a small amount of weight - - - one to three ounces depending on the size of the ship - - - to the nose of the ship and you increase the positive pitch stability. The net result is that your average ground speed increases. Ballasting, by itself, is probably most effective on ships which are underweight and fly at air speeds which are lower than their most efficient speed. These ships would be better built with more structual strength. Keep all this in mind when you build your new sailplane that is just like your buddies - - - every sailplane is different and requires different trimming. Don't blame the kit manufacturer if your new bird doesn't fly perfect on its first flight, work with it, adjust control surfaces, and work with the C.G.

•

The Southern California LSF Tournament, under the direction of Jim Tomblin, was a huge success. Seven rounds of competition flying, four rounds of scale, and four rounds of flying wing competition were all completed by 3:00 P.M. Sunday afternoon. Jim did a professional job and if all of the other nine regional tournaments went as smoothly as Southern California's, everybody will have had a good time.

Three interesting items were seen at the Southern California meet - - - a new sailplane designed by Robert Gerbin and to be kitted by House of Balsa, was flown by Neal Taub of Huntington

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ARMCHAIR ACE

BY HOBIE STEELE

IMPENDING DISASTER!

I've had some wild experiences in R/C since the early days of tuning for two hours or more to fly around the field one time and break a prop. Learned to fly at the parking lot for Duke University's baseball field which had little space, an impossible approach from one direction and only a terrible approach from the other. Flew at "Dook" field 'cause that's where Eddie May and the gang hung out - - - I was in school fifteen miles away in Chapel Hill ("If God isn't a Tar Heel, why is the sky Carolina Blue?").

We had a fellow flyer named Ed Hotelling who had a hell of a time hitting that postage stamp modelport, as most of us did. Ed left to fly jets off carriers and may still be in the Navy, but we all wondered if he could hit a carrier deck. Can you, Ed?

I shouldn't talk. I flew my Champ into Duke Chapel one windy Sunday.

Of course, flying jets is a whole other ball game. My personal opinion is that if God intended man to fly in jets, the Wright Brothers would have invented jets. But, it is easier to land on the spot when you're sitting in the airplane!

John Chapis told how he learned to hit the spot in the Marksmen newsletter - - which probably should be called Markspersons newsletter in this age of ERA. His story, "Flying by the Seat of Your Pants" appears below and, although amusing, could help a neophyte RC'er in his quest to land on the field.

" 'Flying' by the seat of your pants is often used by full-scale pilots who don't know what instruments are for. Not really a good practice for full-scale flyers and, as this true story shows, not so good for modelers either.

"It all started back about 1958 when I

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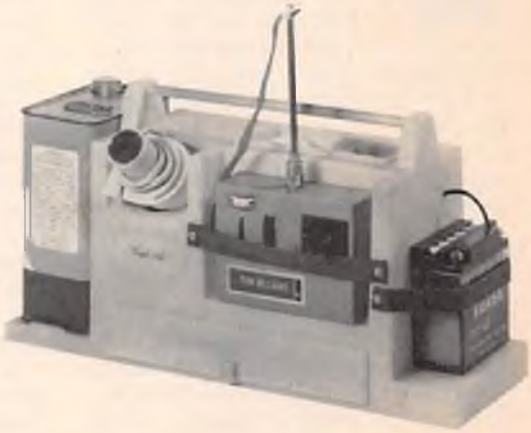

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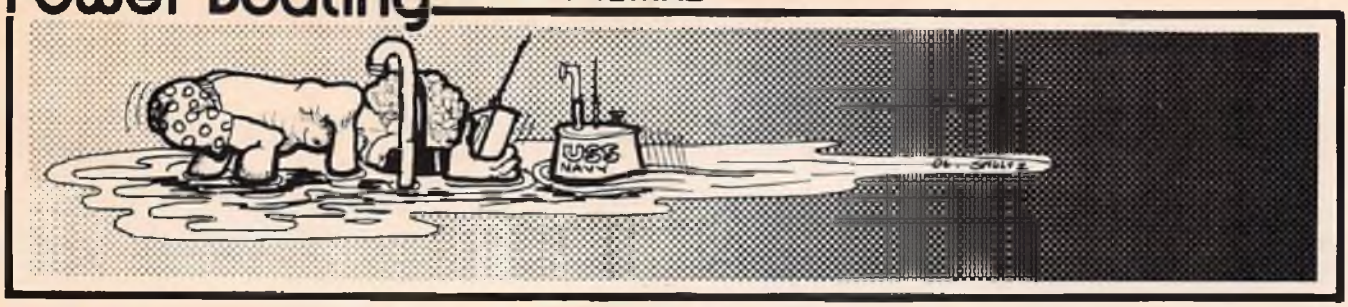

As usual, let's start this month with new products, or at least products that are relatively new. The first one is a forward/neutral gearbox with built-in water pump from M.A.C.K. Products. As you can see from the photo, this is a nicely engineered piece of work, at least as far as its appearance is concerned. I say that, because I can't get inside! I don't know how many of you are like me, but the very first thing I do with any new item that comes to hand, whether it is connected with modeling, the car or the house, is to take it to pieces, see what makes it tick. Well, I guess the guys at M.A.C.K. are wise to people like me, and to stop us doing this, and maybe upsetting something, they have fixed this unit so that you just can't get in there.

MACK Products forward/neutral gear-box with built-in water pump. A nicely-made item, but I haven't tried it out yet.

I haven't had time to try it out yet, but I did take the trouble to connect it up to a powerful electric motor, and run it. The gearbox turns freely, and the water pump turns well. The pressure needed to shift the gear arm will be well within the scope of any ordinary servo.

When I wrote to the manufacturer, I expressed my regret that this unit was only forward/neutral, and that there was no reverse facility. However, they wrote back and assured me that they are, in fact, developing a gearbox with reversing, and I imagine that this will prove to be a popular item — especially with scale modelers. One thing they do point out is that, presumably to keep prices as low as possible, they supply only direct from the factory; so, if anyone is interested, take a look at the ads for their address. I'll tell you more about this item when I have had chance to put it in a boat and try it out.

The second product is a speed controller from Astro Flight. It is rated at 20 volts, but I am not sure of the current handling capacity, and am waiting to hear from the manufacturer. However, I thought I would mention it since I have already used it and it works just fine. I had it on the equivalent of an Astro Flight 25, running at 18 volts and about 12 amps and, after ten minutes running time, it hardly got warm. One of the nice ideas is that there is a potentiometer incorporated that can be adjusted to suit the controller to different radio outfits. When I first connected the unit, the stick moved through half its travel before the controller gave any sign of life. A quick twist at the potentiometer with a small screwdriver, and I now have a very progressive travel — from one end of the stick movement to the other.

Astro Flight Speed Controller for electric motors up to 20 volts. This one works just fine, and is compact.

The controller is housed in a plastic box, one side of which is a thick piece of anodized alloy which serves as a heat sink for the power transistors. Flying leads go to the motor and a polarized two-pin plug is supplied for coupling to the power-pak. The case has a couple of mounting lugs, which make location anywhere in the model a very simple matter. My only regret, as in the case of the mechanical gearbox, is that this controller does not have a reversing facility, but I gather that Astro Flight does make reversing controllers. Again, I'll come back to this one when I have more information on it — and when I have had more chance to try it out.

While on the subject of commercial products, you may remember that on a couple of occasions I have mentioned the Rossi 65 Speed ABC engine. Well, I am still waiting to see one and I gather that they have production problems over there in Italy. However, from the same country comes news of another manufacturer, Kosmic, who have been producing small glow motors for some time now. It appears that they have come out with a new 15cc engine, so they join Webra and a couple of other manufacturers in producing this size of engine, which seems to be getting pretty popular with the boating fraternity. I can't tell you anything about the engine at this time, apart from the fact that it exists.

★

I had a very interesting letter from Greg Warner of Rochester M.B.C., New York, which I should like to quote:

"We have a standard hull, made out of vacuum-formed plastic or from plywood. This hull is about 2' long and with a 10" beam, and it is tough. On the front deck there is a block to support a pin 1" above the deck and 1" in front of it. The rear deck has a clothespin to hold a balloon. These boats are electric powered and have a maximum of 7.2 volts. The object is to pop your opponent's balloon before he gets yours. With as many boats as you can get on the water at one time, it can be a lot of fun, 'cause these boats can take the knocks of hitting each other. Many of the boats have dolls on them, so that the spectators can cheer the boats on. So get together and have some fun."

I must say that I was very interested in this letter — thanks, Greg. You will note that the boys in the Rochester club don't fix the balloon on a length of line, as we do, but directly to the boat. This means that there is going to be a lot of contact, so, as the man says, the boats are tough. I also like the idea of a standard hull — a one-design class if you like — and, presumably, a standard power plant. I don't know what electric motor they use, but I would guess a Mabuchi

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EK-Products

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POWER BOATING

from page 20

RS 54. Limiting the power to 7.2 volts, in a standard hull, means that everyone is in with the same chance, and it all depends on the pilot. We have never tried more than two boats at a time, but we shall!!! This one really sounds like fun. In fact, in a big club it would be quite possible to elaborate on the game and play teams of three or four.

The game could go something like this: two teams of four, each team having its boats marked in a distinctive manner — a small coloured flag on the ariel, or a colored mark on the super structure. Two boats to carry balloons, the other two to run defense. 60 yards apart, put two goals, made from buoys two yards apart. The idea would be for the boats with the balloons to go through their own goal to start, and then to try to get through their opponent's goal without getting their balloon burst. They would then have to go back and through their own goal before starting out to score again. As soon as a balloon is burst, the boat in question can then play attack on the opponents.

You can imagine the tactics that could be evolved in this sort of thing, especially if there were teams of six — two balloons, two defense and two attack! All you would need would be someone to keep the score — say the first to get to 10 goals, if anyone ever got that far. As a crowd puller, it should be a wow!

Going a stage further, it should be possible to organize inter-club, and even inter-state competitions of this sort. Can you imagine - - - the All-American National Balloon Game — and why not? After all, when you think about it logically, this is just the sort of thing to get average modelers, who are not usually interested in competitions, together.

In fact, I will propose a set of rules, and we will see what the response is.

(1) Hull: Only mono-hulls may be used (no catamarans, to keep it simple). Maximum length to be 20" and maximum beam 10". Any building material can be used (with the restricted amount of power available, the heavier the hull, the slower it will be, and the lighter it is, the more fragile. This would mean the development of a medium-weight model within the capabilities of all modelers). Super structure to resemble a full-size boat (this is always a tricky one, because it is very subjective, and should be interpreted reasonably. It is, however, obvious that the more like a full-size boat the model is, the more spectator appeal it will have).

(2) Motor: This should be limited to something cheap and readily available commercially. (The Mabuchi RS 54 is the most obvious choice.) The motor must be as sold; no re-working allowed.

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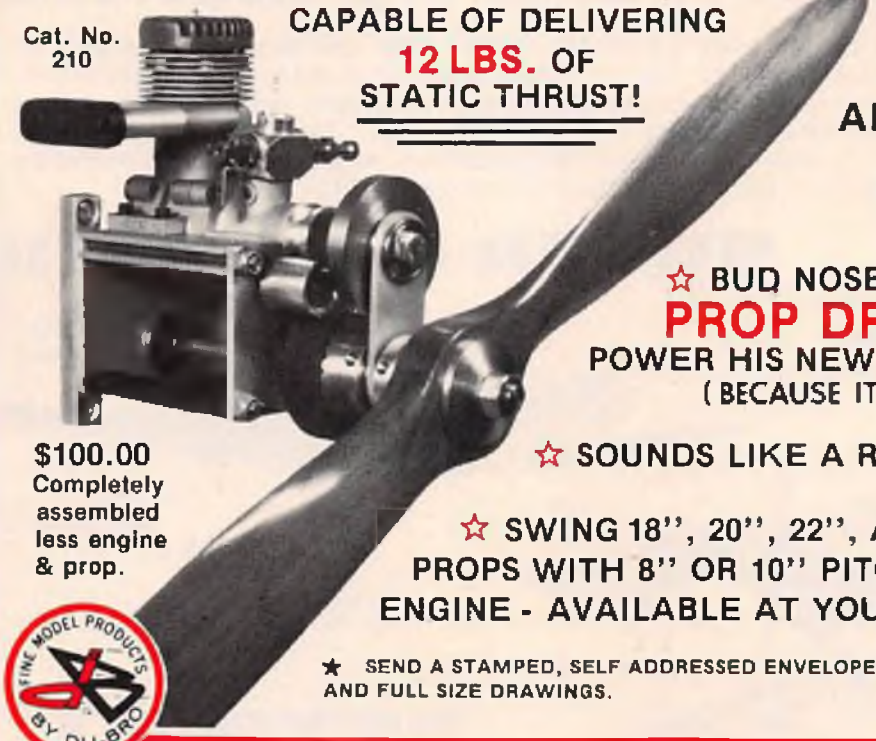
THE NAME OF THE GAME IS POWER!



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☆ SOUNDS LIKE A REAL AIRCRAFT ENGINE

$100.00 Completely assembled less engine & prop.

☆ SWING 18", 20", 22", AND 24" GRISH BROS. PROPS WITH 8" OR 10" PITCH WITH YOUR .60 ENGINE - AVAILABLE AT YOUR DEALER NOW

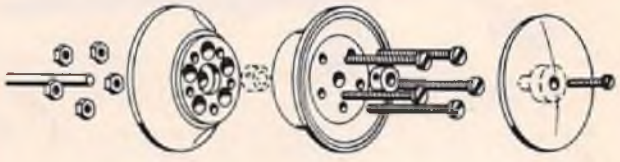
★ SEND A STAMPED, SELF ADDRESSED ENVELOPE FOR COMPLETE STATISTICS AND FULL SIZE DRAWINGS.

FINE MODEL PRODUCTS BY DU-BRO

BIG WHEELS

5 SIZES:

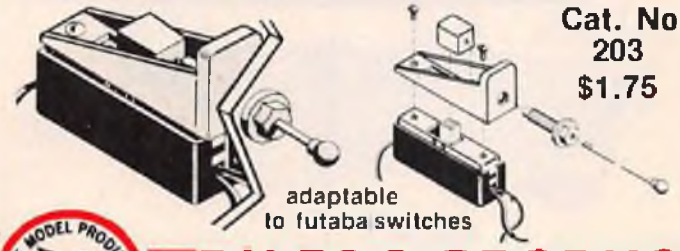
400R.	4" Dia.	$7.95 Pr.
450R.	4½" Dia.	$9.95 Pr.
500R.	5" Dia.	$11.95 Pr.
550R.	5½" Dia.	$13.95 Pr.
600R.	6" Dia.	$15.95 Pr.



Smooth, inflatable wheels for those big airplanes. Features two piece bolt together hubs and hub caps. Wheels can be inflated (or deflated) thru a tiny valve in the side of the tire. Truly a remarkable, realistic looking wheel.

KWIK-SWITCH MOUNT

Mounts your battery switch anywhere in the fuselage in minutes, by merely drilling one, 3/16" hole. This is the best one yet!



adaptable to futaba switches

Cat. No. 203
$1.75

"HAPPY HOLIDAYS and MANY HAPPY LANDINGS!"

FINE MODEL PRODUCTS BY DU-BRO

DU-BRO PRODUCTS INCORPORATED

480 Bonner Road Wauconda, Illinois 60084 U.S.A.

SIG LEADS THE FIELD IN THE CURRENT ENTHUSIASM FOR SCALE AEROBATIC BIPLANES AND MONOPLANES

More and more builders are getting into the swing to scale-like models. Sport and Sunday fliers prefer their realistic appearance and more contests are being held for entries copied after full-scale stunt prototypes. The International Model Aerobatic Club is actively promoting this style of competition and the 1978 Las Vegas Tournament of Champions will switch from RC pattern models to scale types. Sig scale models have been fine-tuned during their development so that they are top-notch competitors, as can be seen by some of the contest victories listed below. But they are still docile enough to be handled by the average RC flier.

SMITH MINIPLANE

Designed by MIKE GRETZ

OUR NEWEST SPORT-SCALE KIT

SIG
KIT RC-38

ENGINES: .40 - .45 Cu. In.
TOP WING SPAN: 44 In.
TOTAL WING AREA: 650 Sq. In.
LENGTH: 40-3/8 In.
TYPICAL WEIGHT: 5 to 5-1/4 Lbs.

$49.95

1ST SPORT SCALE 1976 NATIONAL MULTIWING CHAMPIONSHIPS by Maxey Hester
1ST SPORT SCALE 1976 CANADIAN NATIONAL CHAMPIONSHIPS by Maxey Hester

SUPER CHIPMUNK

Designed by MIKE STOTT

SIG
KIT KBRC-1

ENGINES: .61
WING SPAN: 64 In.
WING AREA: 690 Sq. In.
WEIGHT: 7 Lbs.

$59.95

2ND SPORTSMAN MONOPLANE at 1977 SIG IMAC
2ND ADVANCED MONOPLANE at 1977 SIG IMAC

SKYBOLT

Designed by CLAUDE McCULLOUGH

SIG
KIT RC-34

WING SPAN: 51 In.
LENGTH: 42-1/2 In.
WING AREA: 790 Sq. In.
ENGINES: .45 - .60

$62.50

1ST, 2ND & 4TH PLACES ADVANCED BIPLANE at 1976 MULTIWING CHAMPIONSHIPS
1ST PLACE SPORTSMAN BIPLANE at 1977 SIG IMAC CHAMPIONSHIPS

CESSNA 150

SIG
KIT KBRC-4

Designed by HANK POHLMANN

ENGINES: .45 - .61 Cu. In.
WING SPAN: 65 In.
WING AREA: 645 Sq. In.
WEIGHT: 7-1/2 Lbs.

$69.95

1ST PLACE - NON-MILITARY SPORT SCALE - ST. LOUIS
1976 LINDBERGH COMMEMORATIVE MEET

LIBERTY SPORT

SIG
KIT RC-33

Designed by DICK GRAHAM

SELECT A SIG STANDOFF OR SUPER SCALE MODEL

1st Place - 1973 National Multi-Wing - Dick Graham
1st Place - 1975 CL AMA Scale Sr. - Cathy Burnstine
2nd Place - 1975 FF Scale Gas JS - Scott Gesner

WING SPAN: 57"
LENGTH: 45"
ENGINE: .60

$64.95

SIG MANUFACTURING CO., INC.

THE WORD IS GETTING AROUND . . . . .
KADET - FIRST CHOICE FOR BEGINNERS

New! CHECK LIST

If your Kadet kit does not have this check list, send a self-addressed large size stamped envelope and we will send you a free copy.

During the past year, the Sig Factory Fliers have been teaching a group of modelers from the surrounding area how to fly RC with Kadets. We found many small things, often taken for granted in kit directions as being too elementary to mention, are really essential information to an absolute novice at the hobby. This turned out to be particularly true in preparing a model for the first flight. Notes were kept on things our students did wrong or didn't understand while building the model, installing the radio equipment and making their first flights.

From this practical experience, a comprehensive check list has been prepared. If the Kadet builder will go down the list and verify each item before flying - just like a careful pilot does a walk-around inspection and runs his check list in full size aviation - we feel the chances for successful flights are greatly improved. Additional building tips are also provided with this check list.

Another improvement in the kit is a completely new plastic wing tip. The old one was hard for an inexperienced builder to fit in place and was heavier than necessary. The new wing tip slips easily over the end of the wing for a neat, finished appearance.

WHY RUDDER CONTROL?

Some expert fliers think beginners should learn to fly by starting with an aileron-controlled model. Maybe this will work out if an instructor pilot is available to make the takeoffs and landings and stand by every minute of a flight, ready to take over if the student gets disoriented, until his pupil gets skilled enough to manage by himself. But this process takes a lot of flights. Most beginners do not have someone willing or able to spend so long a time with them.

We think a stable, rudder-controlled model is a lot less likely to get a novice into trouble from overcontrolling or not controlling. If the flier freezes up momentarily and can't decide what to do next, a flat bottom sectioned, high wing model --- like the Kadet --- will right itself, or partially do so, if the sticks are allowed to snap back to neutral, giving him time to think. Most aileron-controlled models need immediate and proper corrective control movement to make them recover, an automatic reaction that a beginner has not yet developed.

Many club instructors and hobby dealers have told us that two or three check-out flights on a Kadet are sufficient to allow a student to practice fly and learn without constant attention. And we know of modelers in isolated areas, with no one to help them, who have taught themselves to fly with the Kadet.

So remember---you may dream of darting around the sky with a sleek P-51, but first you must have some flying time with our boxy buddy, the dependable Kadet. It's the standard trainer-nationwide!

In club newsletters across the country, the Kadet continues to be the most recommended trainer for RC novices. But perhaps the biggest boost comes from the word-of-mouth advertising of those who have learned to fly on the Kadet. They tell their flying buddies to get the Kadet and the list of many thousands who have successfully soloed grows longer.

Designed Specially For Rudder Control---Not A Compromise.

From the number of Kadet-like trainers now appearing on the market it is obvious that other kit companies have gotten the word also! And some of our competitor friends are advertising their 4 channel aileron trainers as suitable for rudder control on three channels. An aileron trainer converted to rudder will never be as good a trainer for the beginner as the Kadet, which was designed---from the start ---for rudder control.

And, of course, every Kadet kit has a copy of this Building & Flying manual, fully illustrated with construction photos, detailed isometric drawings and step-by-step directions. Also included: Big full-size plan.

These junior age fliers were contestants in the 1977 All-Sig Kit Fun Fly held in Council Bluffs, Iowa on September 25th. From left to right: Rick Holmes, 14 years old, (Council Bluffs, Iowa), Jerry Cleaver, 14 years old (Omaha, Nebraska) and David Howlette, 15 years old (Red Oak, Iowa). The Kadets shown are their first RC models.

SEE YOUR DEALER FIRST! TO ORDER DIRECT, ADD $1 POSTAGE UNDER $10, POSTAGE FREE OVER $10. NO C.O.D.

401 S. Front St. . . Montezuma, Iowa 50171

PAPER GRAN PRIX

By Gus Morfis

Your recent R/C car article reminded me of something I had seen in Scientific American Magazine four or five years ago. It was a "paper" game, based on graph paper and a race track design, and can be played by as many "racers" as can be fit on the layout. The only tool needed is a pencil, and it's easier if each player has his own color, so he can keep his track separate from his opponents.

I have taken the standard track layout and layed a graph over it for your convenience, but in practice, any graph paper and any track layout will work, the more free-form, the better.

The game is really quite simple. Obviously, the object is to get around the track before your opponent. To start, each player makes his mark at the intersection of the graph lines at the starting line. Since no two players can occupy the same exact point at the same time (just like in a real race), they will have to decide who takes which point on the starting line. Each player moves in turn.

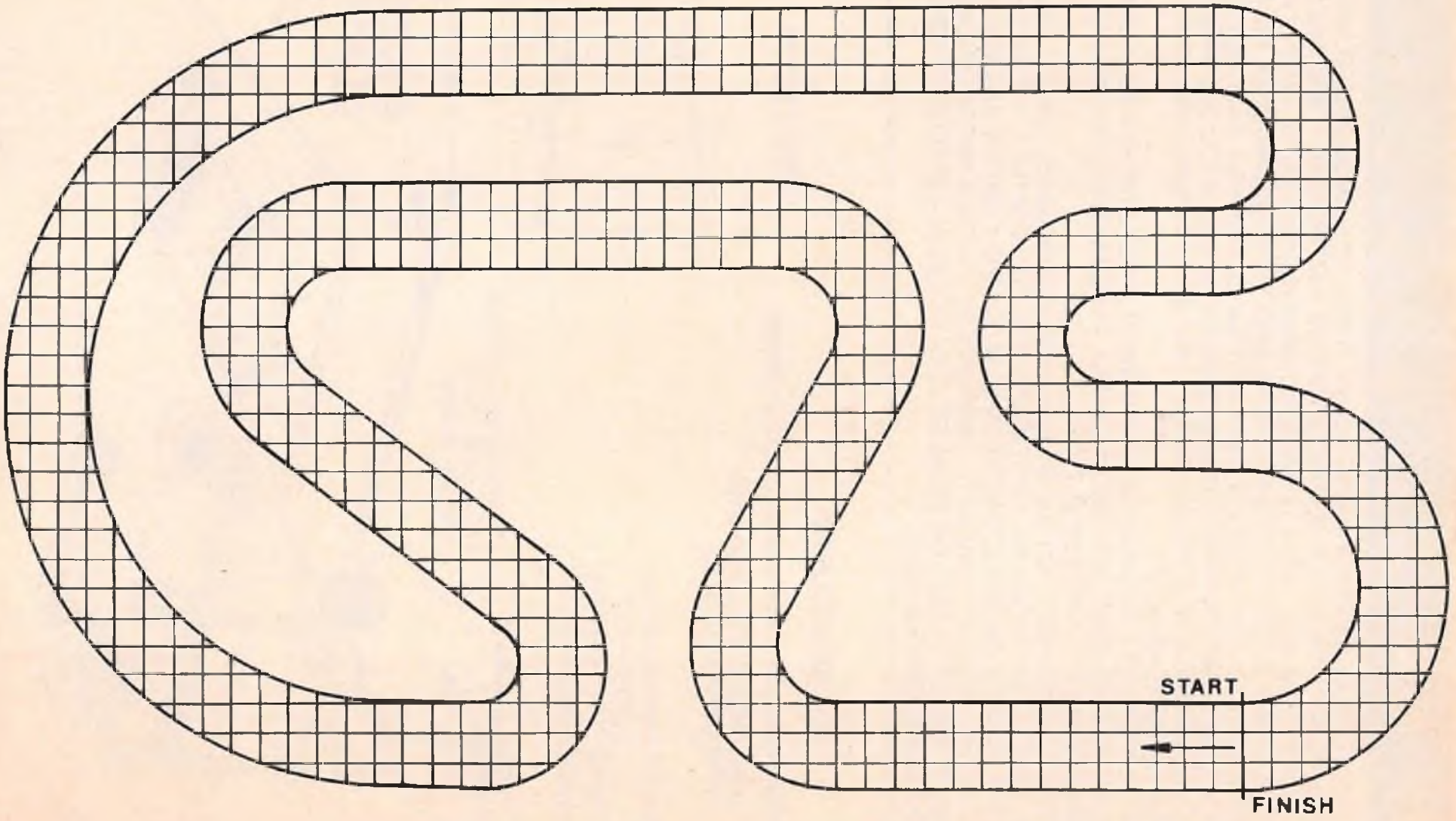
A player can accelerate or decelerate in an axial (around the curve) or lateral direction (side movement) by one square each move, so the first move possible is only one square. The next moves possible are two (one plus one), then three (two plus one), then four (three plus one), etc. It is permitted to keep a steady speed, if desired. Deceleration is permitted at the same rate as acceleration. As we said, if you are moving at the rate of six squares, your next move can be five (six minus one), then four (five minus one), etc.

To turn, you can deflect left or right by one square each move, in the same fashion as before. For example, if you are moving at a steady four, the next move is four forward and one across. Then four forward and two across, four forward and three across, etc. Of course, you can decelerate your forward move while you are turning, or increase your speed if you want. You will notice that somewhere in the turn your sideways motion (lateral) will become your new forward motion and vice-versa.

As in the real world, hitting the wall means that you are out of the race, so plan your decelerations well in advance. Remember, the slower driver who finishes will beat the faster driver who crashed, and burned on the last turn.

Some simple variations will change the character of the race course significantly. Just moving the traditional start/finish line a few squares one way or the other will give the track a different character. Other variations are to go the other way, or even make a two lap event out of it. Let me assure you that the second lap can be totally different than the first.

I don't know what the shortest course around this track is, but maybe Don will print some of the better solutions if the readers send them in. For sure, however, someone, somewhere, is going to write a computer program to optimize the race - - - damned professionals! □


START
FINISH

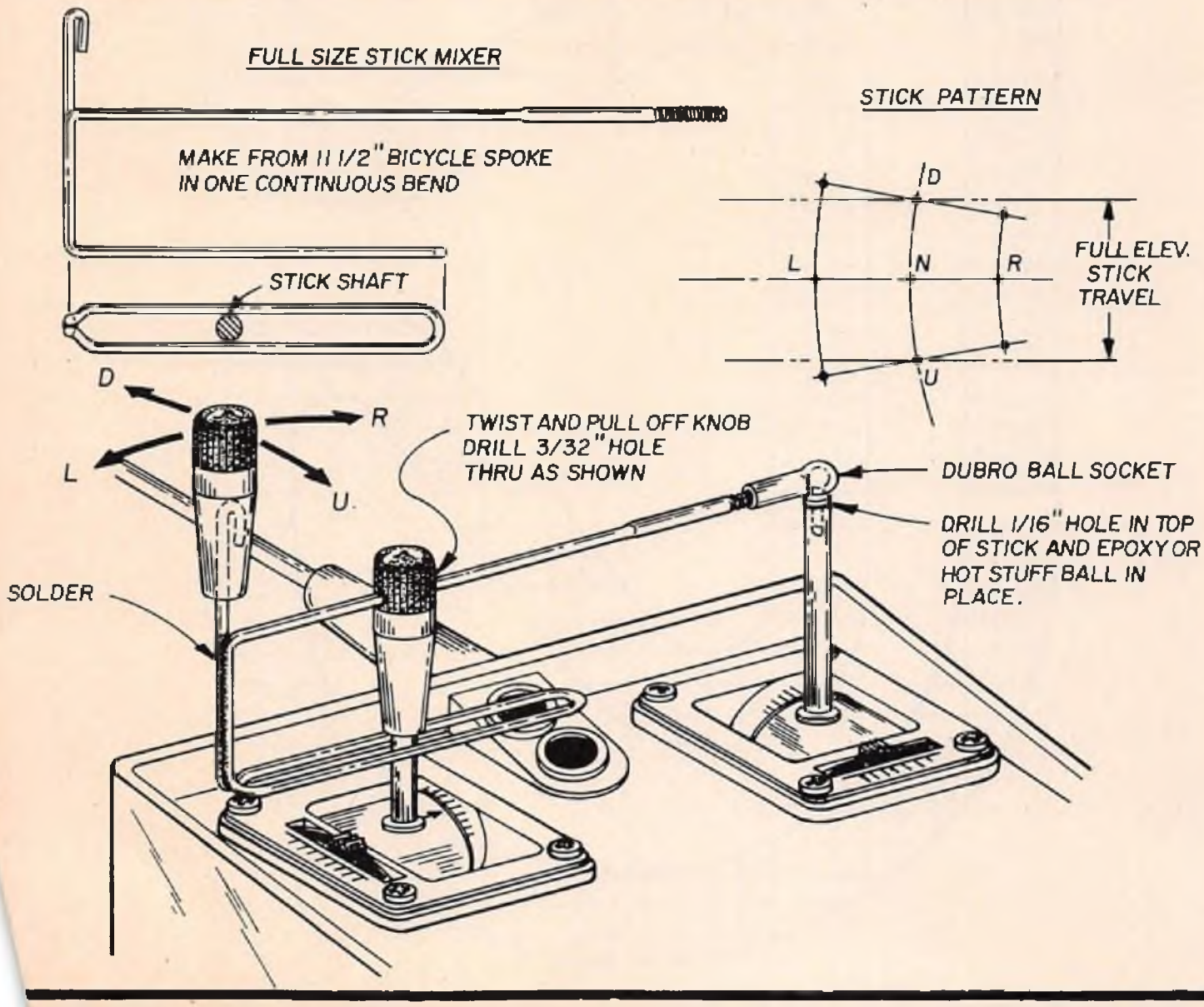
HERE'S HOW

BY JERRY SMITH

WHILE FLYING THE OTHER DAY, A YOUNG FELLOW ASKED ME IF I WOULD'NT HELP HIM FLY HIS AIRPLANE. I AGEED, REACHED DOWN AND PICKED UP HIS X-MITTER. LORD, IT WAS ONE OF THOSE 2 CHANNEL COX/SANWA RIGS. MODE I, TO BE SURE. HAVING FLOWN MODE II FOR 12 YRS OR SO, I EXPERIENCED A SUDDEN LOSS OF CONFIDENCE IN MY ABILITY TO REACT PROPERLY. BELIEVE ME, I HAD TO THINK CONTINUOUSLY! HOWEVER, THE FLIGHT WAS SUCCESSFUL AND THE YOUNG FELLOW WENT HOME HAPPY WITH HIS FIRST FLYING EXPERIENCE. MANY OF YOU OUT THERE MIGHT HAVE EXPERIENCED MY FEELING OF INCONFIDENCE. I AM SURE YOU HAVE. AND, THERE IS SOMETHING THAT CAN BE DONE ABOUT IT!

GEORGE M. MYERS (YES, THE SAME GEORGE M. MYERS WHO AUTHORS RADIO TECHNIQUE IN MODEL AVIATION MAGAZINE) SENT ME THIS SIMPLE AND CHEAP STICK MIXER IDEA FOR THE COX/SANWA 8002-16 (2 CHANNEL) X-MITTER.

IT IS INTERESTING TO NOTE THAT THE MIXER CAN BE INCORPORATED FOR LESS THAN A DOLLAR! A PRICE UNHEARD OF THESE DAYS. HUH GANG? IN ACTUAL USE THE X-MITTER IS HELD IN ONE HAND. THE CONTROL KNOB IS LOCATED TO THE LEFT OF THE X-MITTER ALLOWING YOU TO FLY THE LITTLE FELLA SINGLE STICK, MODE II. TAKE NOTE OF THE STICK PATTERN SHOWN BELOW. THERE IS SOME DISTORTION IN THAT THE ELEVATOR STICK MOVES AT A DIFFERENT RATE DEPENDING ON THE RUDDER STICK LOCATION.



K&B

The LEADER of ALL in our GREATEST YEAR of ALL . . .

1977

The LEADER in MODEL AIRPLANE ENGINES

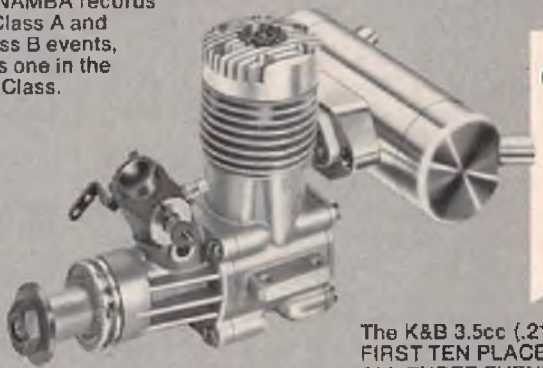
Leaders in the field for over 30 years, K&B Engines continue to dominate . . . 14 First Places out of 20 events in which they were entered in the 1977 AMA Nationals.

The LEADER in MODEL HELICOPTER ENGINES

The National AMA Helicopter champion, John Simone, Jr., Powered his Rev-Olution II with a K&B .61 R/C. It led the pack of 34 entries.

The LEADER in MODEL BOAT ENGINES

K&B Engines hold a total of 20 out of a possible 24 NAMBA records in Class A and Class B events, plus one in the XH Class.



The LEADER in MODEL CAR ENGINES

The K&B 3.5cc (.21) R/C took the FIRST TEN PLACES in ALL THREE EVENTS at the First World R/C Car Championship. 92 out of 108 entries were powered by a K&B 3.5cc R/C engine.

Impressive! We think it is, but we're still not satisfied. Though K&B Engines have proven themselves champions in each of these four above fields, we at K&B continue to strive to improve their quality and achieve greater performance. You can depend on it. K&B is your engine of today . . . and tomorrow!

K&B MANUFACTURING
DIVISION OF AURORA PRODUCTS CORP.
12152 WOODRUFF AVE., DOWNEY, CA. 90241

RCM PRODUCT TEST

Hobby Shack's 1/2A RICKEY RAT

IMPRESSIONS	E	G	A	F	P	IMPRESSIONS	E	G	A	F	P
Packaging	●					Pre-Shaped Parts	●				
Plans		●				Parts Match to Plans	●				
Written Instructions				●		Overall Parts Fit	●				
Quality of Hardwood			●			Ease of Assembly		●			
Quality of Fiberglass			NA			Fidelity to Scale		●			
Other Materials		●				Flight Performance	●				
Accessories		●				Overall Appeal	●				
Die-Cutting		●									

E=Excellent / G=Good / A=Average / F=Fair / P=Poor

The 1/2A Rickey Rat model is designed as a 1/2A pylon racer. The model is kitted by OK Model Co. Ltd. of Japan, and imported under the Pilot name by Hobby Shack. The Rickey Rat has a wing span of 34½" and an average cord of 6½" giving a wing area of 215 square inches. Keeping the weight down to 20 ounces gives a wing loading of 13.40 ounces per square foot. The Rickey Rat's fuselage and tail surfaces were covered with white Flight Kote and the wing with white Super MonoKote. The trim was done with Sig's blue Stripe-Rite striping tape. The canopy and cowl cheeks were painted with Aero-Gloss Curtiss Blue. A Cox .051, swinging a 5½/3 prop supplies the power while a 2 channel RS radio supplies the necessary guidance.

This is a beautiful kit with all the parts in plastic bags and separated into their respective groups. The canopy, cowl cheeks and wheel pants are ABS plastic which allows them to be glued and painted with common model products. The plans are primarily in Japanese, but a lot of detail and some construction steps have English translation. This is not a beginner's kit, but, with a little building experience, you will have no difficulty. The black landing gear wire and elevator joiner are very brittle and should be replaced with music wire. In the area of modifications, the prototype used a small Hall Co. landing gear and a Kraft-Hayes engine mount. A clear 9" Sig bubble canopy replaced the kit's yellow canopy to show off the ping-pong ball pilot.

Flight performance and overall appeal of the Rickey Rat is excellent. It flies as if it is on a rail and hand launching is no problem with its mid-wing. One thing to remember — the aileron response slows up as the speed drops off; elevator response is the same all the way.

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SPECIFICATIONS

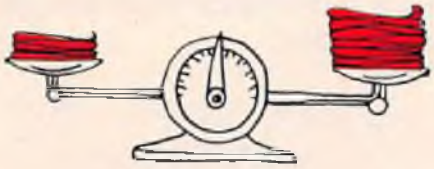
Name ..... Rickey Rat
Aircraft Type ..... 1/2A Pylon Racer
Manufactured By ..... Pilot
Distributed By ..... Hobby Shack
18480 Bandilier Circle
Fountain Valley, California 92708
Mfg. Suggested Retail Price $19.99
Available From ..... Hobby Shack only
Mfg. Recommended Usage ..... Competition
Wing Span ..... 34½ Inches
Wing Chord ..... 6¼ Inches
Total Wing Area ..... 215 Square Inches
Fuselage Length ..... 27 Inches
Radio Compartment Dimensions ..... (L) 8" x (W) 2" x (H) 1¾"
Wing Location ..... Mid-Wing
Airfoil ..... Semi-Symmetrical
Wing Planform ..... Double Taper
Dihedral ..... 2 Degrees
Stabilizer Span ..... 12 Inches
Stabilizer Chord (Incl. elev.) ..... 3⅜ Inches
Total Stab Area ..... 43 Sq. In.
Stab Airfoil Section ..... Flat
Stabilizer Location ..... Top Of Fuselage
Vertical Fin Height ..... 4½ Inches
Vertical Fin Width (Incl. rud.) ..... 3" (Avg.)
Mfg. Rec. Engine Range ..... .049-.06 cu. in.
Recommended Fuel Tank Size ..... 1-2 Ounce
Landing Gear ..... Conventional
Recommended No. Of Channels 2
Recommended Control Functions ..... Elevator & Ailerons
Basic Materials Used In Construction:
Fuselage ..... Balsa, Ply, ABS Plastic
Wing ..... Balsa
Tail Surfaces ..... Balsa
Hardware Included In Kit ..... Very complete
Plan Size ..... 25" x 37" (2 sheets)
Building Instructions on Plan Sheets ..... Yes
Instruction Manual ..... No
Construction Photos ..... No
Kit Includes ..... Shaped & Die-cut Parts
Mfg. Rec. Flying Weight ..... 16-23 ozs.
Wing loading based on rec. flying wt. ..... 10.72-15.41 oz./sq. ft.

RCM PROTOTYPE

Weight, Ready To Fly ..... 20 Ounces
Wing Loading ..... 13.40 oz./sq. ft.
Covering & finishing materials used ..... Flight-Kote, MonoKote, Sig's Stripe-Rite, Aero-Gloss
Engine Make & Disp. ..... Cox .051
Muffler Used ..... No
Radio Used ..... RS
Tank Size Used ..... 2 Ounce

Eight products that make covering fun!

1.Stronger than tissue. Silkspun Coverite looks like tissue, feels like tissue but it's 10x stronger. It's an iron-on that can be used as is (filler coat is built-in). Or it can be painted, requiring 1/3rd the paint & effort. It's the most economical covering there is.



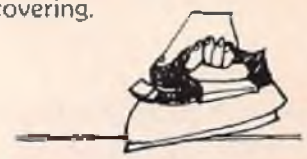
2. Same weight as silk. Super Coverite looks like silk, but it's 100x stronger. Since it requires 1/3rd the paint, it weighs the same or less than painted silk. Being a woven fabric, it's very authentic. Tough, too.

3. 4 coats of no-scuff. Permagloss Coverite looks like painted silk. It actually has 4 coats of special Permagloss paint on it, which is fuelproof, rotproof, fadeproof & definitely scuffproof. New for '77: aluminum and olive drab.

4. Black Baron's pet. Camouflage Coverite looks like WW I German lozenge pattern. Silkscreened in 4 authentic colors, just as it was done in the war. Comes in 1 1/2" or 2" scale.

5. Iron-on in a can. The Black Baron's secret iron-on adhesive now comes in a can. Brush or spray it on tissue, silk, nylon and presto! you have an inexpensive iron-on covering. Also works great as an all-purpose model adhesive.

6. Takes the sag out. Balsarite is a crystal clear liquid that makes balsa watertight. Plastic films sag & come unglued because the balsa is drying out. Balsarite's deep wood penetration takes the gamble out of covering.



7. New goofproof trim. Coverite trim is made out of Permagloss. It's an iron-on (not a stick-on), which means you can re-heat, lift, replace again and again and again. That's why it's goofproof. Also nice & thin, so it looks more like a painted trim.

8. Dayglow is snazzy. Now Permagloss comes in Dayglow colors: fiery orange and screaming yellow. You can see them clearly even against gray skies. And they look fantastic! Cover an entire plane or just trim.

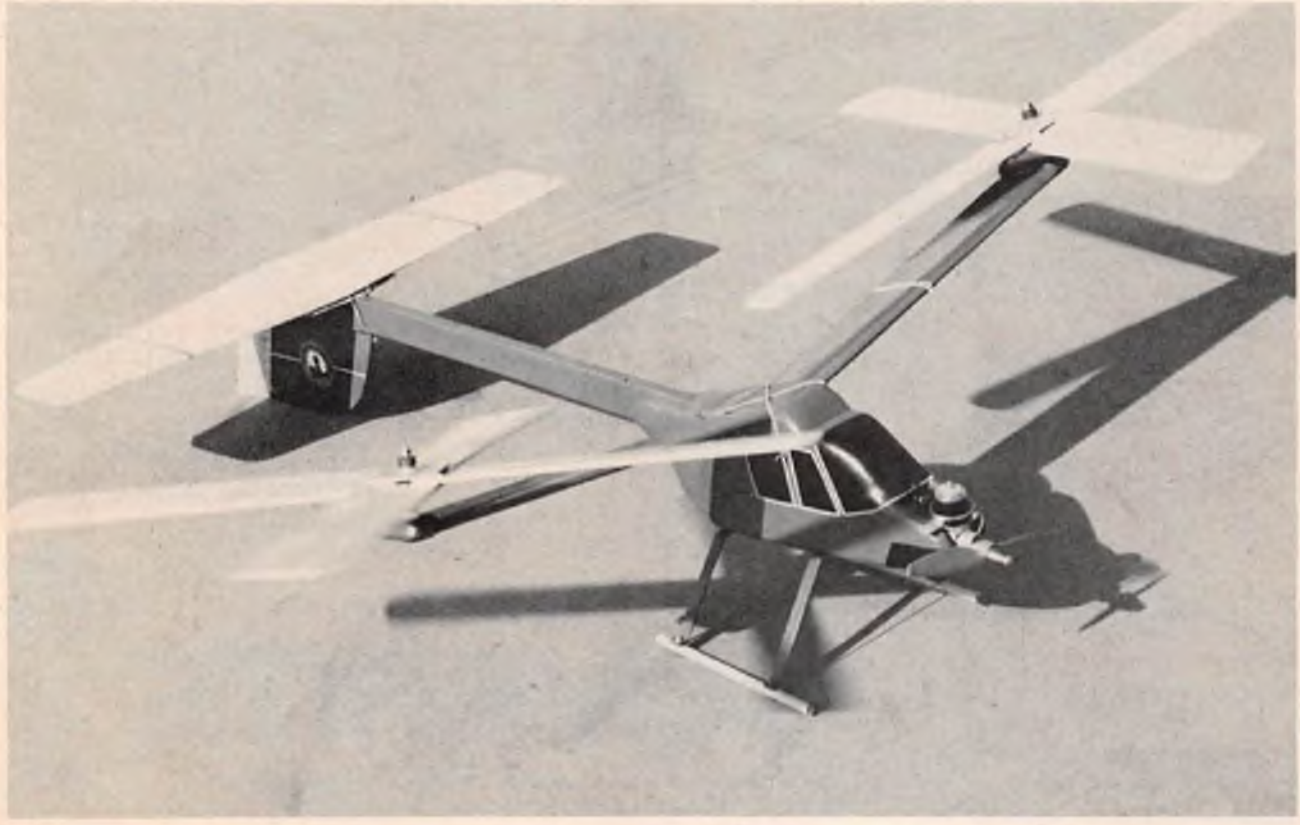
tough but lightweight

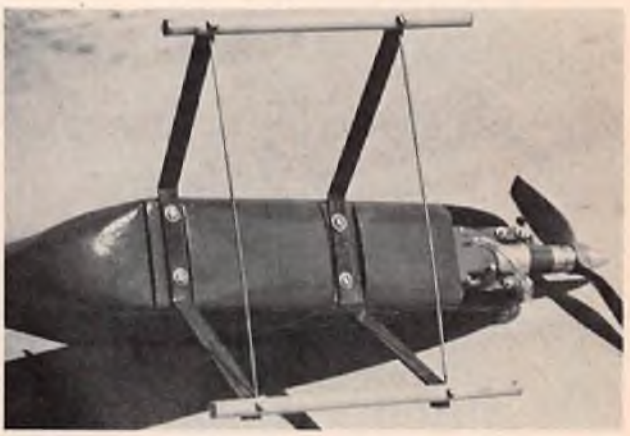
COVERITE

2779 Philmont Avenue, Huntingdon Valley, Pennsylvania 19006

Coverite products are distributed world-wide: Australia, Belgium, Canada, England, France, Germany, Holland, Italy, Japan, Malaysia, Philippines, South Africa, Sweden, Switzerland, United States.

For swinging singles, try this twenty-four inch span single channel autogyro. With a total rotor area of 552 square inches, this Half-A machine is definitely for the sport flyer looking for something easy-to-build and out of the ordinary.





TOP ROW, LEFT: Close-up of simple rotor blade installation. TOP ROW, RIGHT: Designer uses sewn hinge on rudder for the most flexible hinge possible. ABOVE, LEFT: View showing Ace R/C's standard actuator. Room for one of the small micro servos. ABOVE: Bottom view showing landing gear skids and spreader bars screwed in place. LEFT: Close-up of Cox's tank mount with .049 Medallion installed.

the rotors should spin quite briskly. If they don't, disassemble and reduce the friction until they do rotate freely.

Horizontal Stabilizer: The horizontal stabilizer is shown on the plans as a built-up structure, mainly 1/16" sheet and 1/8" strips, with soft 1/4" sheet added front and back, but, if you prefer and have enough 3/16" sheet available, a simpler solid sheet version can be substituted.

To build the stabilizer, begin by making the central box, which uses 3" wide skins top and bottom. When dry, sand the edges smooth and flat, then add the 1/4" sheet. A final sanding to the correct contours finishes off this item.

Fin and Rudder: These are cut from reasonable quality 1/8" sheet, the rudder being attached to the fin with carpet thread hinges. Be sure that this hinge is very free. Cement the fin underneath the boom, and reinforce this joint with a couple of 1/8" triangular strips.

The horizontal tail mount is now made from 3/32" sheet, then cemented to the top of the boom, together with its own 3/8" triangular reinforcing strips.

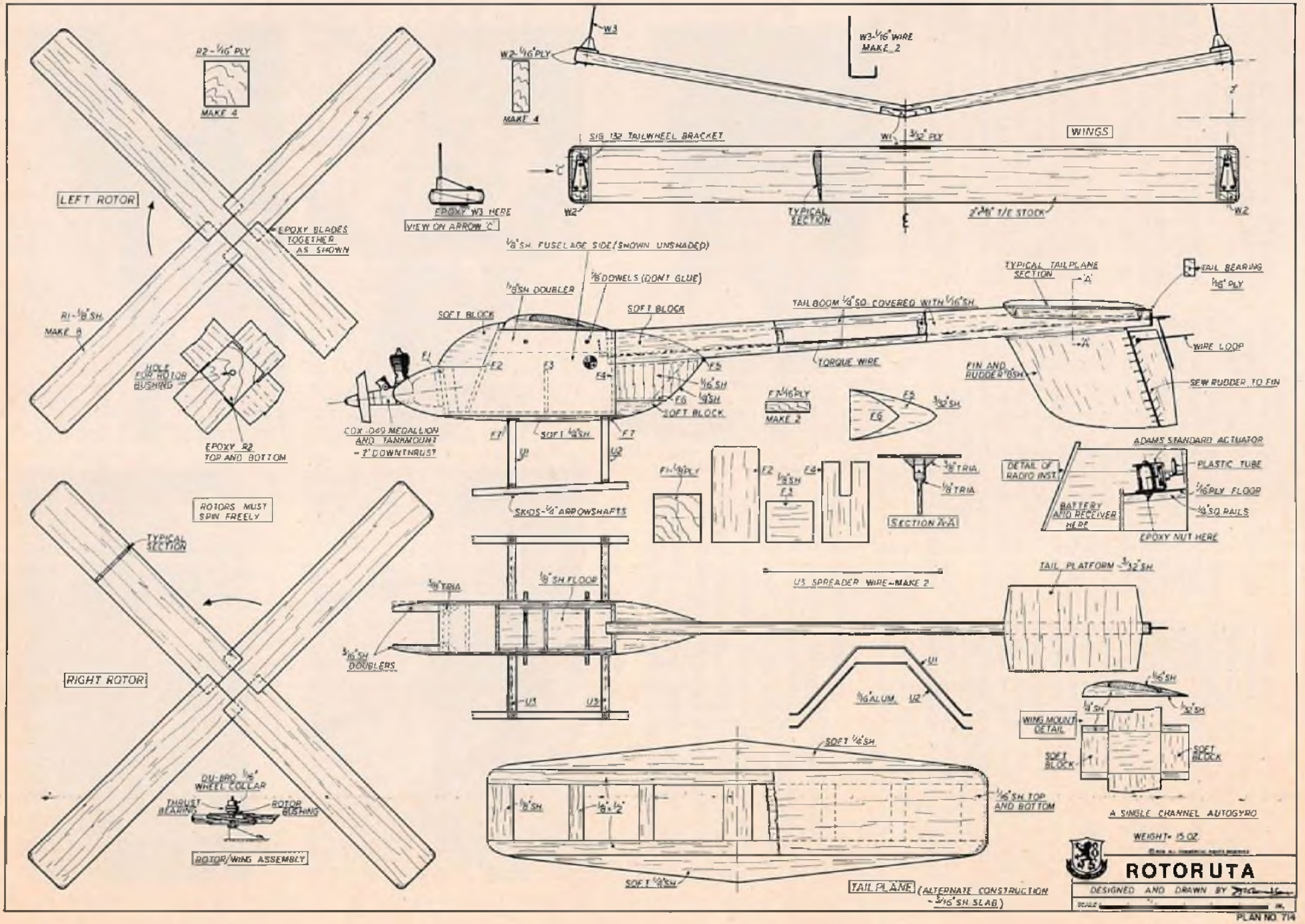
Undercarriage: The undercarriage is made up of 1/16" sheet aluminum legs onto which some short lengths of 1/4" diameter arrow shafts are bolted. To prevent the whole thing from collapsing after the first landing, the legs are cross braced with a couple of 1/16" wire spreaders. When the model is complete and painted, the unit is screwed onto the fuselage bottom, plywood plates being provided for this purpose.

Engine: The photos mainly show the model equipped with a Cox .049 QZ R/C engine, and this was the motor that I used for some of the early test flying. However, it soon became apparent that more urge was required, so the QZ was replaced by a Medallion with a Cox tank mount, and this cured all the flying problems. So, that's the engine you see drawn on the plans, plus the aforementioned tank mount. (I still wonder why Cox uses a different mounting hole pattern on this tank unit than the regular Bee engine hole array?)

If you prefer a separate tank, then move the firewall forward, use an Ace mount, and fit the tank behind the new firewall.

Radio: My old faithful Ace was used in the prototype, with a standard actuator. The fuselage has plenty of room for all the goodies, and these can be well wrapped with foam rubber before instal-

text to page 146


R2-1/16" PLY
MAKE 4
LEFT ROTOR
EPOXY BLADES TOGETHER AS SHOWN
R1-1/8" SH
MAKE 8
HOLE FOR ROTOR BUSHING
EPOXY R2 TOP AND BOTTOM
ROTORS MUST SPIN FREELY
TYPICAL SECTION
RIGHT ROTOR
DU-BRO 1/8" WHEEL COLLAR
THRUST BEARING
ROTOR BUSHING
ROTOR/WING ASSEMBLY
W2-1/16" PLY
MAKE 4
W3
W3-1/16" WIRE MAKE 2
2"
WINGS
SIG 132 TAILWHEEL BRACKET
W1-3/32" PLY
W2
TYPICAL SECTION
2"-3/16" T/E STOCK
EPOXY W3 HERE
VIEW ON ARROW 'C'
1/8" SH FUSELAGE SIDE (SHOWN UNSHADED)
1/8" SH DOUBLER
1/8" DOWELS (DON'T GLUE)
SOFT BLOCK
SOFT BLOCK
TAILBOOM 1/8" SQ COVERED WITH 1/16" SH
TYPICAL TAILPLANE SECTION
TAIL BEARING 1/16" PLY
WIRE LOOP
FIN AND RUDDER 1/16" SH
SEW RUDDER TO FIN
TORQUE WIRE
F1
F2
F3
F4
F5
F6
1/16" SH
1/8" SH
SOFT BLOCK
COX .049 MEDALLION AND TANMOUNT - 7° DOWNTHRUST
F7 1/16" PLY
MAKE 2
F5
F6
3/32" SH
SOFT 1/8" SH
F7
U1
U2
SKIDS-1/8" ARROWSHAFTS
F1-1/8" PLY
F2
1/8" SH
F4
F3
3/8" TRIA
1/8" TRIA
SECTION A-A
DETAIL OF RADIO INST.
ADAMS STANDARD ACTUATOR
PLASTIC TUBE
1/16" PLY FLOOR
1/8" SQ RAILS
BATTERY AND RECEIVER HERE
EPOXY NUT HERE
U3 SPREADER WIRE-MAKE 2
TAIL PLATFORM 3/32" SH
3/8" TRIA
1/8" SH FLOOR
3/16" SH DOUBLERS
U3
U3
U1
1/16" ALUM. U2
1/16" SH
1/8" SH
3/32" SH
WING MOUNT DETAIL
SOFT BLOCK
SOFT BLOCK
SOFT 1/4" SH
1/8" SH
1/16" SH TOP AND BOTTOM
SOFT 1/4" SH
TAIL PLANE (ALTERNATE CONSTRUCTION - 3/16" SH SLAB)
A SINGLE CHANNEL AUTOGYRO
WEIGHT- 15 OZ
ROTORUTA
DESIGNED AND DRAWN BY
PLAN NO. 714

LSF 8 HOUR SLOPE FLIGHT

BY DR. BARBARA HENON
PHOTOS BY CHRIS ADAMS

Eight hours of continuous flight with nothing but the wind to keep you up! Terry Koplan (President of the San Fernando Valley Silent Flyers), Mike Regan, Dick Shilling and I, all of the SFVSF, recently set out to complete this mind-numbing, kidney-crunching feat of endurance for the LSF soaring accomplishment program. The eight hour slope flight is only one of the requirements for the attainment of Level V in the LSF. The LSF is worldwide and has over 2400 members in 22 countries. Only three R/C soaring pilots have achieved the distinction of reaching Level V: John Baxter of the South Bay Soaring Society in Northern California, Steve Work of New Mexico, and Fred Weaver, also of the SBSS.

In addition to the eight hour slope flight, a two hour thermal flight is required as well as a goal and return flight in which the pilot flies a glider non-stop to a declared goal 6.2 miles away and back again to the starting point. As if this wasn't enough, in order to reach Level V, the candidate must win first place in three contests against twenty or more of his or her peers. All of these tasks may be performed only after reaching Level IV in the LSF program which, in itself, requires several years for an active R/C soaring pilot to complete. No wonder there are so few Level V's.

LSF'ers have varied opinions as to which of the Level V requirements is the most difficult. To some, winning contests comes relatively easy, but the 6.2 mile goal and return represents a formidable challenge. Two hour thermal flights are not uncommon in some parts of the world, but very rare indeed in other areas. For people living in the mid-West or similar regions where hills are scarce or non-existant, the eight hour slope flight may be the greatest single obstacle on the path to Level V. For those of us living in Southern California, it is probably the easiest of the requirements to meet.

The coastal regions of California are blessed with many fine slopes where the Pacific Ocean breeze provides good sustaining lift for eight or more hours a day for many days of the year. One of these slopes is the secret slope soaring site of the San Fernando Valley Silent Flyers. This slope is located in the Pacific Palisades and overlooks a long stretch of beach that borders the Santa Monica Bay. On a clear (translate smogless) day, you can see Catalina Island from the slope. Chris Adams, the only member of the SFVSF to have done the eight hour slope flight prior to our attempt did his flight two years ago on this same hill.

Several of the Level IV's in our Club had been talking for some time about getting together and doing the eight hours and we finally decided that the time was right. We set the date at a club meeting and firmed up our plans at an SC^2 contest the weekend before the flight. We prepared for the task by modifying the transmitter and receiver battery packs to last the eight hours. Four C cell "alkaline energizers" were wired to-

Terry Koplan, Barbara Henon and Dick Shilling – the three who made it!

"In this fog, it takes more than the usual endurance to hang in there for 8 hours!"

gether to serve as a receiver battery pack. This pack has a measured duration of 10½ hours. A nine volt transistor battery, of the type used in dry battery (non-nicad) transmitters, was wired to the switch of the transmitter. This gave us a capability of 10 hours plus four additional hours by using the nicads in the transmitter as a back-up. We all flew lightweight thermal type planes rather than slope ships as we felt that they could take the weight of the extra batteries without becoming too fast or difficult to handle during the long flight. Terry and I flew Windrifters; Dick, a Legionaire, and Mike, a Paragon.

The weather, of course, is the critical factor in determining the success of a flight attempt. On the morning of the proposed flight, Dick phoned the flight briefing service for the Santa Monica area Department of Transportation using his AMA number for identification. They informed him that there was no wind predicted that day for the Santa Monica area. It seemed we were between two high pressure areas and the prospects for enough wind for sustained slope lift didn't look good.

Dick called Terry to give him the sad news, but Terry had already left home. Terry and Mike were already at the slope when Dick and I arrived and Chris Adams, who was home on vacation from graduate school, was testing out the lift with his Cirrus. Chris, who relied on his own observations, was optomistic about the lift prospects.

We all launched into the fog and set up a traffic pattern. The lift was light and the visibility poor, but we had hopes. About 45 minutes into the flight, the lift weakened. After struggling to maintain altitude for about five minutes, my Windrifter came down close to the trailer park at the foot of the hill. Chris and I went down to get it only to find that a man had loaded it into the back of his car. When he handed it to us, I thought there was no hope, as the tail assembly was completely detached and the leading edge of the right wing was damaged on the outer panel. The Windrifter was already battered from the previous weekend's contest and was scheduled to be retired at the end of this flight after three years of faithful service. Chris said he could have it in the air in ten minutes. True to his word, I launched for the second time at 10:55 a.m. This meant that I would have to fly until nearly 7:00 p.m. and the lift was only "guaranteed" until about 6:00 or 6:30 p.m. I knew that others had suffered through many hours of slope flight only to have the lift die before the goal could be reached. Dave Thornberg, who served as runner-up on the U.S. Soaring Team at the World Championship in South Africa, is reported to have made two attempts of well over seven hours only to have the flights end when the wind died. He is rumored to have torn his level form to shreds while mumbling something about childish nonsense.

There was another incident which happened a few years ago. John Baxter, Gerry Wolfram and several others from the SBSS were forced to evacuate the hill after several hours of flight, not because the lift died, but because the hill caught fire due to the carelessness of a camper below them.

Eight hours is a long time and we did what we could to make ourselves comfortable. Terry brought a lawn chair to sit

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Barbara, cold and shivering behind her makeshift windbreak asking, "How much longer?"

Chris Adams, Barbara, Terry, Dick, and Arthur Rood propose a toast to their grueling accomplishment.

RCM PRODUCT TEST

Wing Mfg. LOVE MACHINE

IMPRESSIONS	E	G	A	F	P	IMPRESSIONS	E	G	A	F	P
Packaging		●				Pre-Shaped Parts	●				
Plans		●				Parts Match to Plans		●			
Written Instructions		●				Overall Parts Fit		●			
Quality of Hardwood	●					Ease of Assembly	●				
Quality of Fiberglass			NA			Fidelity to Scale			NA		
Other Materials	●					Flight Performance	●				
Accessories	●					Overall Appeal	●				
Die-Cutting			NA								

E=Excellent / G=Good / A=Average / F=Fair / P=Poor

The Love Machine is the latest kit offering from Wing Manufacturing. Designed by Ralph Andrae with the sport flyer in mind, the Love Machine can be powered by engines from .29 to .50 cu. in. in displacement.

The Love Machine features an accessory and hardware package that includes such items as landing gear straps and screws, formed landing gear (3 piece), spinner, control horns, clevises, aluminum pushrods with end fitting and threaded rods, aileron horns with nylon bearings and fittings, fiberglass cloth, hinges, aluminum engine mount, optional tail wheel bearing, canopy with cockpit interior, and pressure sensitive decal sheets. Construction is both easy and rapid. Our test aircraft was completely assembled with Carl Goldberg's new jet cyanoacrylate glue (with the exception of the wing and the firewall/fuel tank area reinforcing). This fine product enabled us to assemble the basic fuselage-tail assembly in less than half an hour. The wing, which features foam cores with card stock skins and balsa leading and trailing edges, goes together equally as fast. Contact cement was used to glue the card stock skins to the foam cores; with five minute epoxy being used to install the leading and trailing edges and wing tip blocks.

Being graduates of the balsa or plywood wing skin school, we were a little skeptical relative to using card stock for this purpose; however, after using it, we have altered our opinion. Card stock is just as easy to apply as balsa or plywood and, for a .29 cu. in. and up powered sport aircraft, we can offer no valid reason for not using it.

The fuselage is of the conventional box type construction.

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SPECIFICATIONS

Name ..... Love Machine
Aircraft Type ..... Sport
Manufactured By ..... Wing Manufacturing
P.O. Box 33
Crystal Lake, Illinois 60014
Mfg. Suggested Retail Price $46.95
Available From ..... Both Mfg. & Retail
Mfg. Recommended Usage ..... General Sport
Wing Span ..... 55 Inches
Wing Chord ..... 10" (Avg.)
Total Wing Area ..... 550 Square Inches
Fuselage Length ..... 41 Inches
Radio Compartment Dimensions ..... (L) 10" x (W) 2¾" x (H) 2¾"
Wing Location ..... Low Wing
Airfoil ..... Semi-Symmetrical
Wing Planform ..... Double Taper
Dihedral ..... 1½ Inches
Stabilizer Span ..... 18 Inches
Stabilizer Chord (incl. elev.) ..... 5½" (Avg.)
Total Stab Area ..... 99 Sq. In.
Stab Airfoil Section ..... Flat
Stabilizer Location ..... Top Of Fuselage
Vertical Fin Height ..... 6 Inches
Vertical Fin Width (incl. rud.) ..... 6½" (Avg.)
Mfg. Rec. Engine Range ..... .29-.50
Recommended Fuel Tank Size ..... 8 Ounce
Landing Gear ..... Tricycle, Conventional
Recommended No. Of Channels 4
Recommended Control Functions ..... Rud., Elev., Throt., Ail.
Basic Materials Used In Construction:
Fuselage ..... Balsa & Ply
Wing ..... Balsa, Foam, Fiberglass
Tail Surfaces ..... Balsa
Hardware Included In Kit ..... See text
Plan Size ..... 35" x 45" (1 sheet)
Building Instructions on Plan Sheets ..... Yes
Instruction Manual ..... No
Construction Photos ..... No
Kit Includes ..... Shaped Parts
Mfg. Rec. Flying Weight ..... 68 ozs.
Wing loading based on rec. flying wt. ..... 17.8 oz./sq. ft.

RCM PROTOTYPE

Weight, Ready To Fly ..... 69 Ounces
Wing Loading ..... 18.0 oz./sq. ft.
Covering & finishing materials used .. MonoKote, K & B Super Primer
Engine Make & Disp. ..... K & B .40
Muffler Used ..... Kavan
Radio Used ..... Westport Int. Variant
Tank Size Used ..... 8 Ounces

A Stand-Off Scale model of a two-seat, single engine, low wing jet of all metal construction with three wheel retractable gear. The model is designed for .60 or larger engines, four to five channel radio, with optional retracts.

CZECHOSLOVAKIAN L-39 ALBATROS

It is my opinion that all R/C modelers fall into one of two main categories. The first (and largest) group being those of us who prefer to build kits of established and proven designs, or the almost-ready-to-fly (ARF's) type of R/C aircraft. The second group is comprised of those modelers who are continually searching for something that is unique or different from the established designs. If it were not for this type of modeler, we would all be flying the same few designs. There would be, in all probability, no ducted fan models, canards, deltas, pushers, etc.

Admittedly, many models that are new or different do not always measure up to the designer's expectations. For every new successful design, there are many that turn out to be failures.

Herein lies the key to the intense satisfaction that can be realized by the building of a model that is different from the norm, and one which also flys well. While I build the established pattern designs for use in contests, my primary interest is in modeling new or different types of aircraft. The anticipation during the building phase, as to whether your new creation will fly as well as planned, is exceeded only by the satisfaction and pride one feels when the flight characteristics prove to be outstanding. I know of no greater thrill in modeling.

The L-39 Albatros is not really an unusual design except for the fact that it is powered by a pusher engine. I have always wanted to build a model of a jet and not spoil its sleek looks by conventionally mounting the engine in the nose. I selected the L-39 after seeing it perform low level aerobatics at an air show. It was my belief that the L-39 would be an ideal model for use in R/C model flight demonstrations and intermission shows at contests.

The full size L-39 is a two seat, single engine, low wing jet of all metal construction with three wheel retractable landing gear. It was designed for operating off of grass fields with a minimal amount of support equipment. Its basic specifications are as follows: Wing span, 31'; height, 15'-6"; length, 40'-5"; take-off distance on grass, 1837'; landing distance on grass, 2034'; net weight (without fuel), 7341 lbs.; speed, 466 mph; min. speed, 96 mph.

In designing my model of the L-39, the following criteria were established: (1) Keep the model as close to scale as possible. (2) Use a .60 (or larger) size engine. (3) Strive for good flight characteristics and aerobatic capability. (4) Keep construction methods simple.

My FAI pattern ship building experience was put to good use. The wing and stabilizer/elevator were enlarged slightly to compensate for an anticipated weight of about 8 pounds. Larger ailerons were also employed for better roll capability.

If you are interested in a Stand-Off Scale jet model that is different and guaranteed to attract high interest from your fellow modelers and spectators alike, the L-39 Albatros is recommended for your building and flying pleasure.

CONSTRUCTION

Wing: Cut all the wing and aileron ribs out of 1/8" sheet. (If a wing jig is to be used, the alignment tabs may be eliminated. This construction sequence will, however, be directed to those who are

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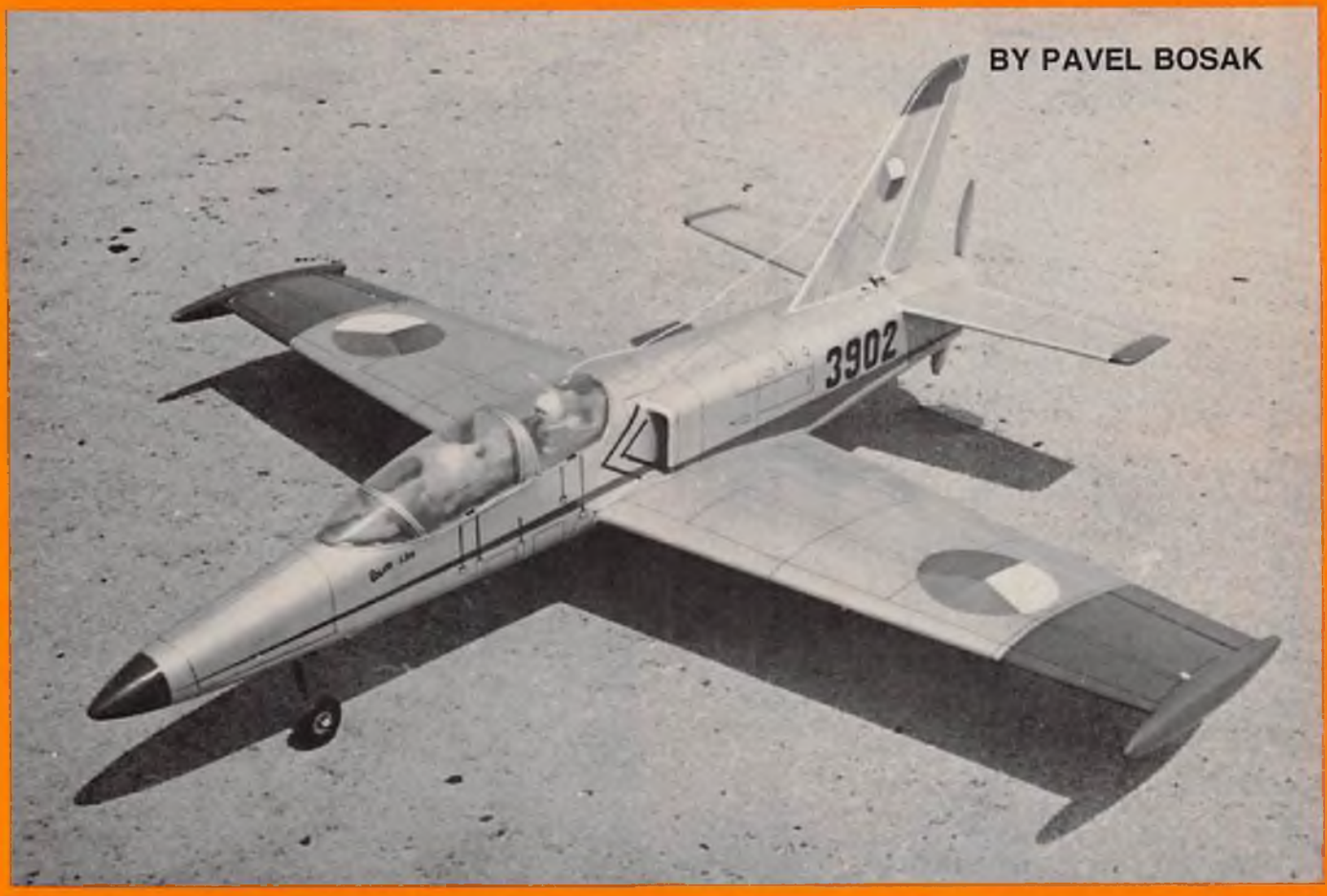
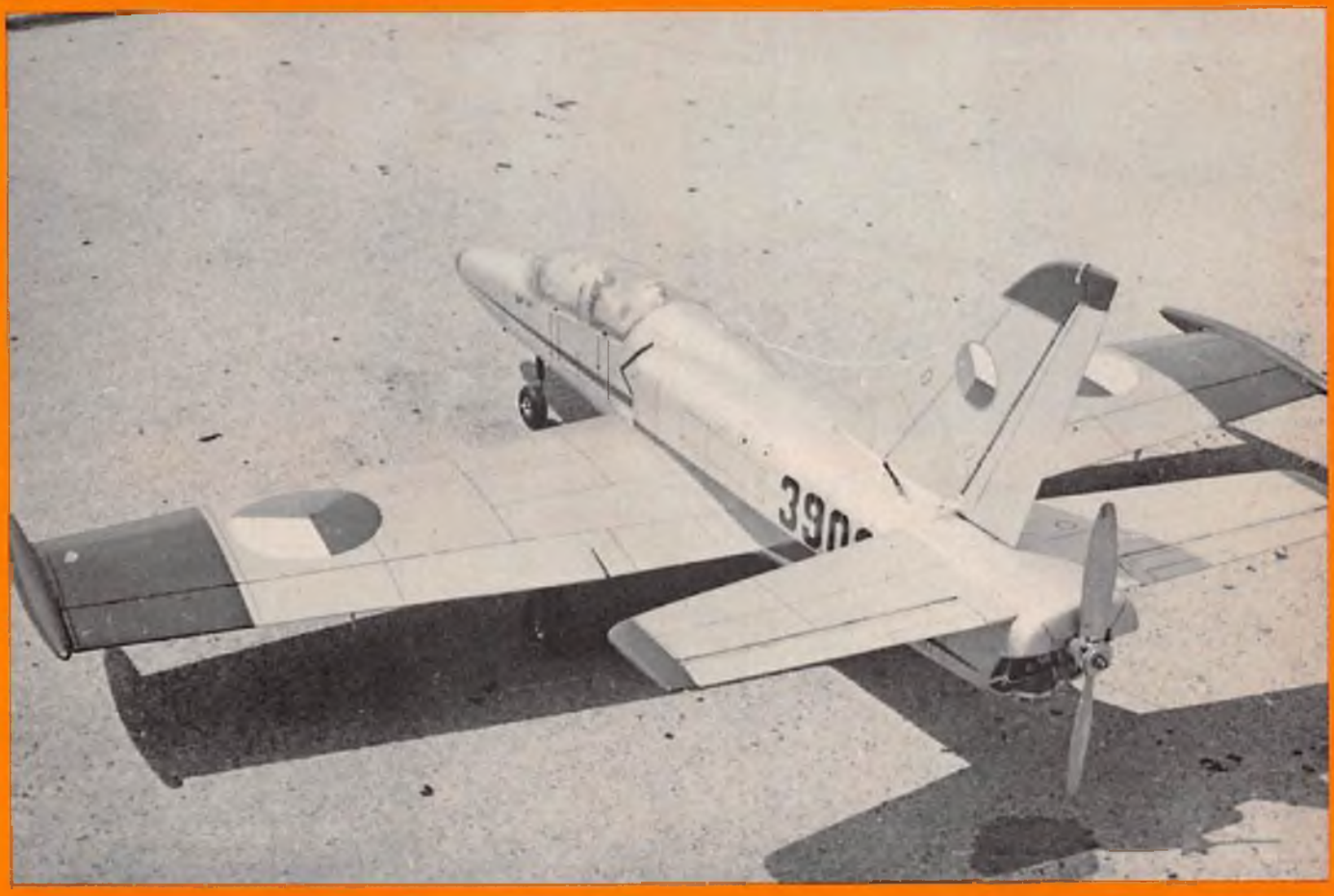
BY PAVEL BOSAK





building the wing on a flat surface.) Cut out all the plywood reinforcing plates and ribs. As the wing has no dihedral, it can be built as a single unit by splicing the wing panel plan sheets together at the wing root centerline.

The alignment tabs will produce the proper wing taper. Glue the plywood full W1 rib and partial W2 and W3 reinforcing ribs to the respective balsa wing ribs. Pin each wing rib in place over the plan with the 3/8" square wing spars in place along with the hardwood landing gear blocks; if fixed landing gear is to be installed. Glue this assembly together, making sure that all the ribs and spars are properly aligned. Pin and glue the 1/4" x 3/4" inner leading edge piece in place, after it has been trimmed to fit. Pin and glue the 1/4" x 3/4" aileron opening piece in place after it, also, has been trimmed to fit properly. Glue the center section plywood reinforcing plates (WR1, WR2 and WR3) in place. Install the two 3/8" hardwood dowel wing hold-downs and glue in place. Glue the hardwood servo rails in place, spaced to accept your brand of servo. The 1/8" music wire aileron torque rod, with tubing bearings, are now installed by notching ribs W1, W2, W3 and W4. The top 1/8" sheeting is now installed. When dry, remove the wing assembly and trim the alignment tabs from all of the wing ribs. The ailerons are constructed directly over the plan by pinning the aileron ribs in place and gluing the 1/8" sheet front piece to the ribs. Glue the 1/8" sheet aileron top sheeting in place. When dry, remove the ailerons from the plan sheet and install the aileron torque rod blocks and 1/8" bottom sheeting. The wing bolt stiffener blocks are now glued in place and the 1/8" bottom sheeting is added. Glue the 3/8" x 1" leading edge to the wing. The ailerons can now be fitted and installed into the wing. (If the wing is to be covered with silkspan, fiberglass cloth, or heat shrinkable film type covering, it is easier to cover the ailerons and wing separately, and then assemble

them permanently.) Sand the wing to the indicated airfoil contour and to a smooth finish. The wing center section should be reinforced with fiberglass cloth and resin (top and bottom) as shown on the plan. Cut the slots for the main landing gear and drill the holes for the landing gear retaining strap screws. The wing tip tanks are carved and shaped from two 3/4" x 2¼" balsa blocks, which have been tack glued together. After shaping to the indicated contour, the blocks are separated and the center portion is hollowed out, as shown. Re-glue the two halves together and glue in position on the wing tips. Add the small balsa pieces between the tip tanks and the ailerons and blend to a smooth contour. Set the wing aside for now.

Empennage: The tail surfaces are also constructed directly over the plan, using 3/16" x 3/8", and 3/16" sheet for the stabilizer and vertical fin. These pieces are then covered with 3/32" sheet on both sides. The elevators and rudder are cut from 3/8" sheet. Install the hinges and 1/8" music wire elevator horn. Sand the tail surfaces to the indicated contours and to a smooth finish.

Fuselage: The fuselage is the most difficult phase of the L-39 construction. Before starting, once again study the plan and familiarize yourself with its construction.

Cut the main fuselage sides and air duct sides out of 3/16" sheet. Cut out all of the fuselage formers and reinforcing pieces (from balsa and plywood as indicated). The engine mounting beams are to be located and spaced in formers F5 and F6, depending on the brand of engine that is to be installed. In some cases, a radial type of engine mount may be used.

Start by gluing the 1/32" plywood reinforcing pieces in place on the inside of each fuselage side. Install formers F1 through F4. Formers F5 and F6 and the maple engine mounting beams are now glued in place. Attach the steerable nose wheel gear to former F2. Add the 3/16" planking from former F3, forward to F1.

Be sure to provide access to the nose gear steering arm in the bottom planking. Install the nose gear steering pushrod. Glue the 1/8" sheet cockpit floor in place. Shape and glue the hardwood nose block in place. It is suggested that the nose block be hollowed out and an access hatch be made in it for the addition of balancing ballast, should it be needed. Remember that there are rather large weight differences between some .60 size engines. It is, therefore, difficult to say where your L-39 will balance out. The ballast hatch will make achieving the proper C.G. an easy matter.

Glue the stabilizer/elevator and vertical fin/rudder assemblies in place. Add the 3/16" fuselage top planking and block from former F3T aft to the tail section. Add the 3/8" sheet tail block. Glue the 1/32" plywood air duct floor pieces into the wing saddle and add the 1/8" plywood front air duct formers.

Glue the 3/16" sheet air duct sides and the 1/8" sheet duct top and floor pieces in place. Add the top duct 3/16" planking. Install the elevator, rudder and throttle control pushrods and the fuel tank. Remember when assembling your fuel tank that the clunk weight pick-up, should be at the aft end of the tank (closest to former F6) due to the pusher engine design. An easy method of accomplishing this is to simply make a long "U" bend in the brass fuel pick-up tubing inside of the tank. Add the 3/16" bottom planking from former F4B aft to the tail section as shown. It is recommended that slot openings be cut in the main fuselage sides aft of former F6 and 1/32" plywood baffles be installed inside the air ducts to divert some of the in-flight duct air flow into the engine compartment area for cooling purposes. Glue the hardwood wing mount blocks and the servo rails in place. Position the wing in place and drill the two holes through the wing and hardwood blocks with a #7 drill. Remove the wing and tap the holes in the blocks with a 1/4-20 tap. Drill out the holes in the wing to accept the 1/4-20 nylon wing bolts. Reinstall the wing and add the contour blocks to the bottom of the wing. The fuselage should now be contoured and sanded to the proper shape. The fillets, where the air ducts blend into the fuselage, are made with epoxy and micro-balloons. The canopy on my L-39 was fabricated from 1/32" clear plexiglass, which was heat-formed over a maple plug. Your canopy can be made in the same fashion, out of Plexiglass or butyrate plastic sheet, or a commercially available canopy can be altered and trimmed to fit. Install your canopy after the desired cockpit details have been mounted in place. The fuselage should be fine-sanded in preparation for finishing.

L-39 ALBATROS

Designed By: Pavel Bosak

TYPE AIRCRAFT
Stand-Off Scale
WINGSPAN
58⅛" incl. tip tanks
WING CHORD
Root 13" — Tip 7"
TOTAL WING AREA
581 Square Inches
WING LOCATION
Low Wing
AIRFOIL
Semi-Symmetrical
WING PLANFORM
Double Taper
DIHEDRAL, EACH TIP
None
O.A. FUSELAGE LENGTH
52 Inches
RADIO COMPARTMENT AREA
(L) 13" X (W) 3¼" X (H) 3¼"
STABILIZER SPAN
27¾ Inches
STABILIZER CHORD (incl. elev.)
5⅝" (Avg.)
STABILIZER AREA
158 Square Inches
STAB AIRFOIL SECTION
Flat
STABILIZER LOCATION
Top of Fuselage
VERTICAL FIN HEIGHT
10¾ Inches
VERTICAL FIN WIDTH (Incl. rudder)
7¼ Inches
REC. ENGINE SIZE
.60 or larger
FUEL TANK SIZE
12 Ounce
LANDING GEAR
Tricycle
REC. NO. OF CHANNELS
4-5
CONTROL FUNCTIONS
Elev., Ail., Rud., Throt.,
(Retracts optional)

BASIC MATERIALS USED IN CONSTRUCTION

Fuselage	Balsa, Ply & Maple
Wing	Balsa & Ply
Empennage	Balsa
Weight Ready-To-Fly	122.8 Ozs.
Wing Loading	30.5 Oz./Sq. Ft.

Finishing: My L-39 was covered with silkspan and six coats of sealer. The color coats were done in silver since the full scale L-39 was natural aluminum. All lettering was done in black and the trim color was red. The panel lines and rivet details were done with a technical pen and India ink. The Czechoslovakian insignia is red, white and blue. The red wedge portion of the insignia on the wings is always toward the fuselage and down on the vertical fin. The entire model was then covered with a coat of clear to fuelproof the ink detailing.

This was my finishing method. However, the choice of finishing materials and technique is left up to the builder as we all have our favorite methods.

Radio Installation: My L-39 was flown with a Sprengbrook Precision 6 radio system which, more than likely, very few of you American modelers have ever heard of. The radio compartment is large enough to accept all types of radio systems. Installation should be per manufacturer's installation instructions - - - after all, who knows your radio system better?

FLYING

Assuming that your L-39 has been built with all surfaces warp-free and assembled at the indicated incidence angles, you should not have any difficulty. Be sure that your model is balanced at the indicated C.G. point. Balance it with the fuel tank filled, due to the tank position being so far from the C.G. point. Under no circumstances should you at-

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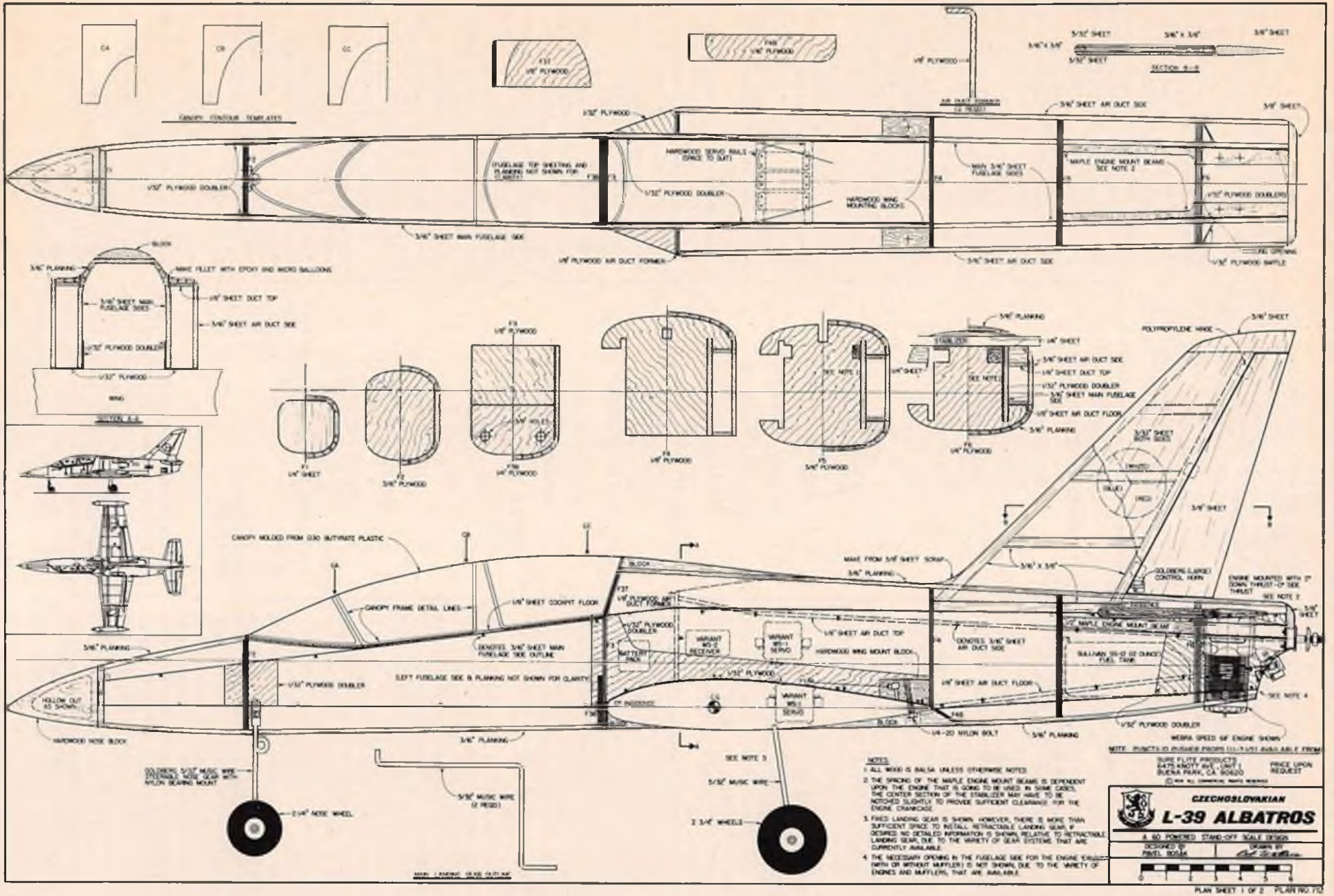
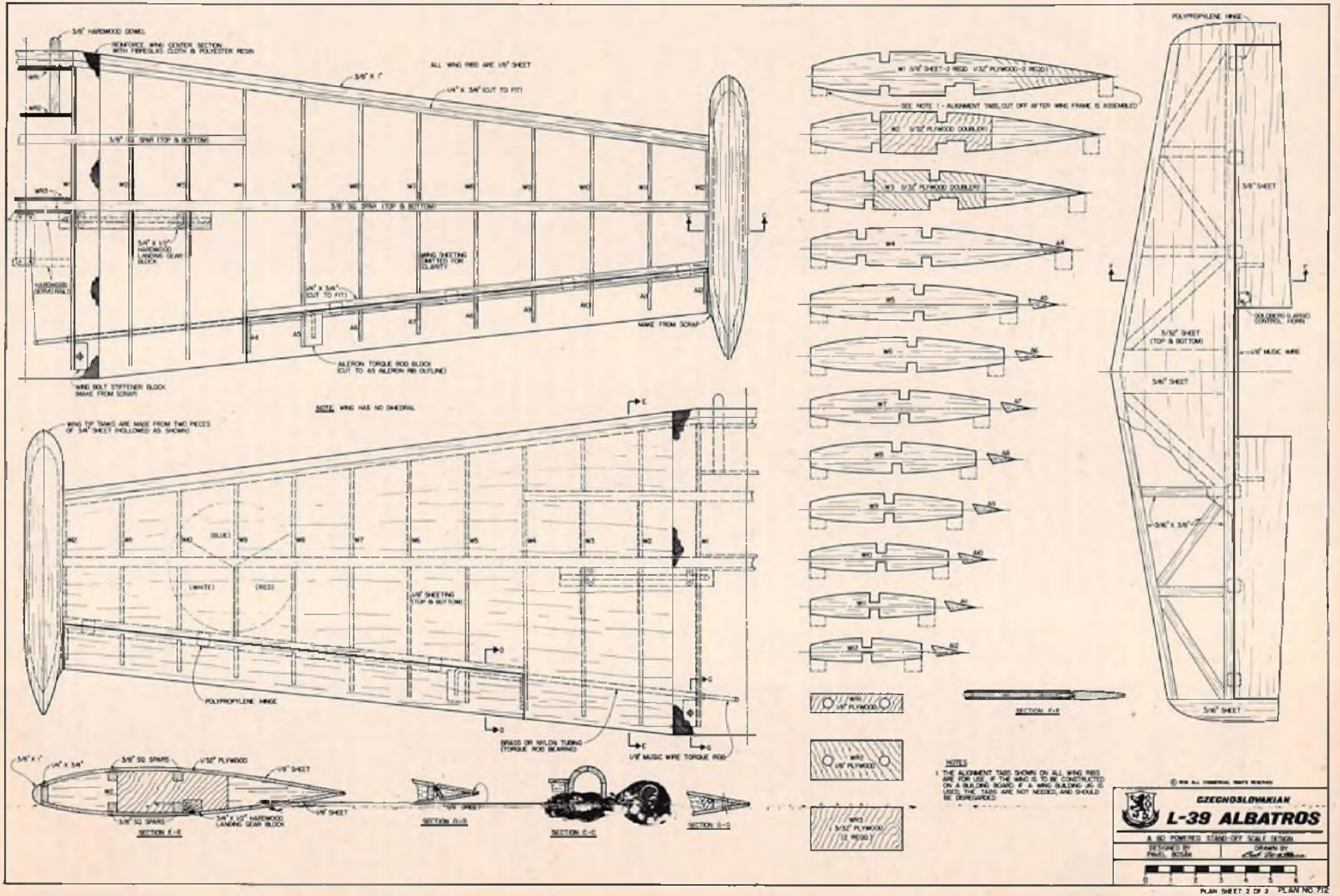
FULL SIZE PLANS AND TEMPLATES AVAILABLE — SEE PAGE 187




3/8" HARDWOOD DOWEL
REINFORCE WING CENTER SECTION WITH FIBREGLAS CLOTH & POLYESTER RESIN
ALL WING RIBS ARE 1/8" SHEET
3/8" SQ SPAR (TOP & BOTTOM)
1/4" X 3/4" (CUT TO FIT)
3/4" X 1/2" HARDWOOD LANDING GEAR BLOCK
WING SHEETING (NOTCHED FOR CLARITY)
MAKE FROM SCRAP
AILERON TORQUE ROD BLOCK (CUT TO AS AILERON RIB OUTLINE)
WING BOLT STIFFENER BLOCK (MAKE FROM SCRAP)
NOTE WING HAS NO DIHEDRAL
WING TIP TANKS ARE MADE FROM TWO PIECES OF 3/4" SHEET (HOLLOWED AS SHOWN)
(BLUE)
(WHITE)
(RED)
1/8" SHEETING (TOP & BOTTOM)
POLYPROPYLENE HINGE
BRASS OR NYLON TUBING (TORQUE ROD BEARING)
1/8" MUSIC WIRE TORQUE ROD
SECTION E-E
SECTION F-F
SECTION G-G
W1 1/8" SHEET-2 REQD 1/32" PLYWOOD-2 REQD
SEE NOTE 1 - ALIGNMENT TABS, CUT OFF AFTER WING FRAME IS ASSEMBLED
W2 1/32" PLYWOOD (DOUBLER)
W3 1/32" PLYWOOD (DOUBLER)
W4
W5
W6
W7
W8
W9
W10
W11
W12
1/8" PLYWOOD
1/32" PLYWOOD (2 REQD)
SECTION X-X
POLYPROPYLENE HINGE
3/8" SHEET
1/32" SHEET (TOP & BOTTOM)
3/16" SHEET
1/8" MUSIC WIRE
3/16" X 3/8"
NOTES
1. THE ALIGNMENT TABS SHOWN ON ALL WING RIBS ARE FOR USE IF THE WING IS TO BE CONSTRUCTED ON A BUILDING BOARD. IF A WING BUILDING JIG IS USED, THE TABS ARE NOT NEEDED, AND SHOULD BE DISREGARDED.
CZECHOSLOVAKIAN
L-39 ALBATROS
A 60 POWERED STAND-OFF SCALE DESIGN
DESIGNED BY PAUL BOWA
DRAWN BY

SHOULD YOU TEACH R/C PILOTING?

By
Prof. Arthur J. Sabin

So you've become proficient as a R/C pilot! Take-offs, landings, crosswind problems . . . you've got them all pretty well under control. You are proficient enough to have a rather sleek, low-winged pattern ship and can do a reasonable job with a number of pattern maneuvers. Your "hangar" also contains a bipe and you feel you have flown and can handle just about any plane. That high-winged trainer is well behind you.

You've also "paid your dues" in terms of having learned the essentials of good model construction, proper radio system installation and you know enough about engines to feel comfortable with your flying. You're getting good at detecting different kinds of problems as they might develop both on the ground and in the air; you've "dead-sticked" any number of planes with reasonable success.

Now you've had the experience of a couple of usually timid novices apologetically approach you and ask whether you might not take a look at their trainer-type plane and help them fly it. In effect, they are asking you to become their pilot instructor. Most often, they have taken their cue from **R/C Modeler** and have watched you do a reasonable set of maneuvers and greased that plane in for a beautiful landing, have decided that you fly well enough to be able to teach them.

Now comes the point to all of this, should you engage in being a pilot instructor? "Why not" you say, seeing that you have all the qualifications that have been already stated. Indeed, why not, in the sense that since you have gone through "the school" of becoming an R/C pilot and have been taught enough fundamentals so that you could solo with reasonable proficiency, why not engage in becoming a pilot instructor. After all, to some extent, every job, whether it be part of a profession or trade requires some amount of teaching; shouldn't that qualify you?

I believe that the answer to the "why not" is **don't**, unless you examine, not only your flying abilities, but your **teaching abilities** and can honestly respond after that evaluation, you should be teaching individuals how to pilot R/C planes.

Now, I'm not referring to the problem of knowing what to teach first, what maneuvers are best learned in what sequence or even what plane, radio equipment and the like to recommend. Indeed, you will find a great deal of variation in response to all of those common questions from novice pilots or from those who are just considering entering R/C modelling. The good R/C instructor will have in mind what he considers to be a valid set of answers to all of these problems. Similarly, he will be experienced enough to carefully evaluate whether the plane presented to him as the trainer is both safe and appropriate for training purposes. He will carefully examine construction, radio installation and will either help the student to correct errors that are noted or refuse to fly the plane because he has determined that it is not suitable in terms of safe flying or as a trainer-type airplane. But really, all of this has been covered over the years in many excellent articles appearing in **R/C Modeler**.

The theme here goes beyond all of what has been stated in the preceding paragraphs. In this article, the focus is upon what must be called the essentials of the "teaching personality". The point is that some individuals have it and some do not have it. Unless you are willing to examine whether you have that teaching personality, you may indeed be doing more harm than good in undertaking the instruction of anyone, young or old. If you don't have that teaching personality, why not just continue to build your flying proficiency and examine all the other facets of this fascinating hobby. But the point is, take seriously the matter as to whether you ought to teach anyone how to fly.

After a lifetime in the teaching field, two truisms have become evident to me. The first is the fact that you are proficient, really excellent at some skill does not in any relate to your ability to **transmit** that skill to others, in other words, to teach that which you know. I have known very fine attorneys, physicians, engineers men from every field of life who were recognized as outstanding in their work and yet they couldn't begin to teach to anyone else what they themselves can do with ease and excellence. Therefore, the fact that you can fly with proficiency does not automatically or necessarily become translatable into the ability to instruct anyone else.

The other truism that I have learned is that, for the most part, courses in teaching others to teach are a waste of time. I "suffered", as have thousands of others who are in the teaching profession at any of its levels, through some twenty-one hours of teacher training courses. The point became self-evident; you either had a teaching personality or you didn't. You could be taught some techniques, some rules and some steps in terms of motivating and evaluating your teaching process, but the essential, the **really** essential could not be taught . . . how to teach! Again, you either had it or didn't have it. The same is true with respect to teaching R/C flying. While there are courses in how to instruct, such as are given to those who would become Certified Flight Instructors for full scale aircraft, the necessity of evaluating whether you have "it" or don't have "it" is still just as essential. The individual who taught me how to fly, John Bishop, has all the proper characteristics and abilities of a truly good instructor, yet John hasn't had an education course in his life! This man must have been responsible for teaching well over a hundred individuals to fly over the past few years. Now John doesn't win pattern or bipe contests, though he certainly makes a respectable showing and sometimes comes out in that top three. On the other hand, what he can do is teach just about anyone willing to learn, and having the basic abilities which must be there to become a reasonably proficient R/C pilot, to achieve their flying goals. On the other hand, without mentioning names, there was a fellow who used to fly out of the local flying field of our club who was in the top ranks on a national level for a number of years. In his case, it was evident that he could teach no one any of the fine skills that he himself exhibited. No two individuals, even those trained as professional educators in any particular academic or trade area, would agree on a list of the attributes of the teaching personality. Therefore, the list that I would give is not necessarily that which any other individual who has been engaged in teaching as a way of life would list, but what is stated is, I believe, a fair statement of the attributes of the teaching personality. Here we go:

(1) You must really enjoy teaching, not look upon it as a "chore" or a "drag", but really enjoy the pleasure of imparting your skills in flying to others. This means that basically you feel "incomplete" unless you are not only improving your own skills and learning more yourself, but you are teaching others; it has to be that intimate a part of your involvement with R/C modelling.

(2) You must enjoy teaching "over and over again"; that means that the teaching personality is exhibited in an individual who enjoys teaching, not just on a "one shot" basis, but finds pleasure and satisfaction in undertaking that same teaching process over and over again. The satisfaction is not diminished for a number of reasons. For one thing, personality, talents and learning abilities combined in any one individual will vary significantly with any other individual. The intrigue is in tailoring the teaching technique to the personality and talent factors involved. Secondly, with each teaching experience, there is a deliberate attempt to improve the teaching techniques; to try new methods, new approaches and new ideas. Thus, it is not simply "repetition" for the person who really enjoys and understands the

fulfillment that can come from teaching. Regardless of what skill is involved, watch out for the person who is "bored" because they have to "repeat" the same material, as they see it, over and over again. Real teaching talent is not that much different from acting talent; did you ever wonder how a performer could deliver a splendid, moving performance on the afternoon or evening that you witness that performance and then realize that the next audience (sometimes twice a day) are going to see that same talented portrayal? The answer is talent and the talent in teaching is not different. To the actor, it is never "repetition", but challenge combined with an exciting demand to improve and perfect.

(3) Of primary importance is the need for patience. No one can successfully teach anyone anything without that necessary measure of patience that is both internal, as well as externally communicated to the student; you want them to learn, but you realize that the learning process is often confusing, sometimes overwhelming and can be painfully slow. You are patient because you want the student to succeed and understand the process of learning. In truth, without the necessary patience to deal with those who would seek to learn anything, you simply don't have the teaching personality.

(4) Closely associated with patience is that of encouragement. Without the willingness to encourage, the student simply will not satisfactorily progress. We all need that encouragement, that feeling that we are learning albeit slowly and perhaps haltingly. Every teaching experience, every lesson in piloting should end on a "high note" emphasizing that which was better than before. At times, when I have taught others to fly and could not honestly feel that that individual was doing any better or had done anything with any greater proficiency during this lesson than the former, I will at least emphasize that all "stick time" is good time in the sense that you must be learning, that you must be progressing. Plainly put, the learning process requires encouragement and without the ability of the teacher to honestly encourage the student, communicate that encouragement and mean it, again the teaching personality just isn't functioning or there.

(5) The teaching personality must essentially also be an honest personality; not everyone can master the skill of flying radio controlled models any more than any individual can master any demanding skill be it playing the violin or flying full scale aircraft. Honesty demands that we, at some point, state to the individual student involved that we do not believe that they have the correct perceptions, skills or patience to become a reasonably proficient pilot. Perhaps it is the dynamics between that particular student and the teacher; we have all had the experience of being able to learn from one individual and not from another. But the emphasis is honesty; you've got to honestly be willing to state that be it the fault of the student or the fault of the instructor or the "mix", it simply isn't working and you should terminate the teaching with that individual. Teach long enough and you find that you are not going to be able to reach every individual no matter how good an instructor you are; there will always be individuals that simply could not or would not respond to your teaching.

(6) Learn to recognize and help the student to recognize that the learning curve is just that — a curve, not an arrow pointing straight up. This is certainly true in acquiring the skill of flying radio controlled models. Plateaus are achieved in terms of learning skills. For example, you have finally gotten a decent take-off, but then one of two things might happen: The individual might slip back into doing it sloppily or incorrectly or, on the other hand, little progress is made in handling a more difficult take-off, for example, a cross wind as against anything but a direct, into the wind take-off. Of course, probably the most difficult plateau in that learning to fly sequence is achieving that reasonable proficiency called landing. Once again, the plateau concept must be kept in mind. There are going to be times when the student on one day can "do nothing wrong" and seems ready for perfecting skills by solo flights without further assistance or instructions. Then the next day, in the landing attempt, they will not even get close to the field. What's happened? The answer is in a combination of both subtle and obvious circumstances. Perhaps at the time of that previous lesson, everything was just "right" ranging from the mental attitude of the individual, the wind and atmospheric conditions, to simply the depth perception that were right on one day and wrong on another. What should be communicated is that individuals do learn on a plateau, on a step-by-step basis rather than straight up. Communicate the idea that at times there will be a "falling back"; sometimes it is described as taking two steps forward and one step back.

At the same time, the teaching should involve demanding a little bit more from the student than the student is able to completely and satisfactorily give at any one particular point. You always want to have an "edge", perhaps better described as a "carrot" for the student to keep reaching for, just outside of, but not too far away from, the plateau of learning at which the student stands. What you are looking for is that delicate balance between building confidence and impressing the student with the idea that there is still more to be learned, more to be demanded of his skills at that particular moment.

(7) Good teaching involves three basic steps in every lesson; they are: (1) reviewing where we have been, (2) what are we going to try to accomplish today, (3) what is our eventual aim for this day's work and for the next lesson as well. You must go through the sequence in which you remind the student where he's been and work the other two steps through in explanation and then in practice.

(8) Reward success with your confidence in the student; get that student to solo when indeed he is ready to solo and terminate the teaching experience by rewarding the student with your confidence in terms of words and actions. How well I remember how John Bishop communicated his confidence in me by walking away from me while I was controlling the plane, subtlely indicating that he no longer had to keep an eye on the plane every moment that the transmitter was in my hands. John also had a very special way of rewarding me when I completed my first successful landing; he had a small set of AMA wings which he presented to me after that successful solo. What a wonderful way of establishing rapport and confidence!

This essay on teaching techniques and the teaching personality is obviously designed for consideration by those who take the idea of teaching someone to fly a radio controlled model seriously. The person giving an occasional "pick-up" lesson is obviously going to be less involved with the progress of the student than will be that individual to whom these ideas are primarily expressed . . . the individual who is willing to undertake the essential responsibility of teaching another person how to fly. What has been said to the serious and consistent instructor is, however, worthy of consideration by the occasional teacher as well.

It should be kept in mind that students being taught to fly radio controlled models are generally individuals who are already successful at some skill, trade or profession. It is not always easy to accept the idea of suddenly becoming a novice, a rank beginner. The really good teacher, the person who should be involved in teaching others is sensitive to this situation, understands the ego involvement in mistakes that every student makes and knows how to handle the situation so as to prevent that student from being "crushed" by some failure or error.

Finally, if you undertake seriously the idea of being good enough to teach someone else how to fly, then you should take seriously the question of your qualifications as a teacher. Are you really a teaching personality? Should you be involved in teaching others or should you leave that to those who might not be as good a pilot as you happen to be, but who do indeed have and exhibit what can only be defined as a "teaching personality"? □

Who sez you can't teach an old dog new tricks? P-61 Black Widow was scratch-built by the author's father. Stand-Off Scale ship was then finished by Dad as he followed directions from his son.

FINISHING TOUCHES

THE FINE ART OF DECALING

By Ralph L. DeFalco III

How many times have you seen a really beautifully finished model ruined with decals?

Cracked, split, peeling, wrinkled and yellowed decals, don't do a thing for the final appearance of a model — sport or scale. Yet many modelers don't take decaling seriously. It seems so easy — deceptively easy. And the saddest part is, that the problems modelers often encounter in decaling are all too easy to correct.

Having worked with decals for the better part of 15 years, I've decaled everything from 1/32 scale minatures to 40 foot semi-truck trailers. In that time I've learned a few things that have proven to be a great help to other modelers I've shared them with. It's nothing fancy or tricky. In fact, it's just a few steps learned through hard experience and the tedious labor of trial and error, error, error.

Let's start with the basics. Decaling is an art, and the state of the art is much different now than it was 15, 20, 25 or 30 years ago. The use of vinyl and plastics, and self-adhesive coatings, have radically changed decaling. But some things never change.

Most decals used today fall into one of two broad categories. Decals are either self-adhesive (like striping tapes, MonoKote sheet and other appliques with a paper backing covering a sticky surface) or, water-activated (decals that must be immersed in water to remove the protective backing and activate the bonding agent). Some rare types of decals are activated by a chemical solution, but I've yet to hear of a modeler who has used them.

Some decals, and this is especially true of the water-activated types, have the colored designs silk-screened or printed onto a sheet of clear bonding material. Silk-screened decals are made in several operations — one for each color. Printed designs are machine-made in one continuous operation. These decals use colored inks.

Self-stick decals and MonoKote make use of colored synthetics like plastic and vinyl. While water-activated decals are usually much thinner than the self-stick variety, the newer plastics and other synthetics, are getting gradually thinner as the state of that art progresses.

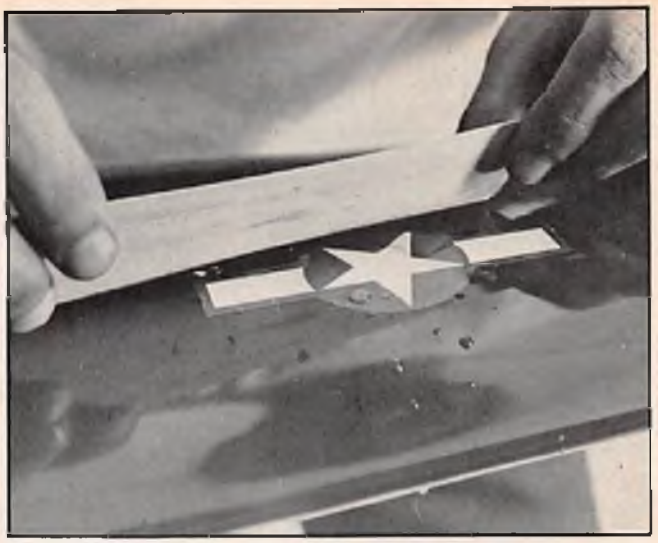
What's the difference? Plastic decals do wear better and plastic sheets are extremely versatile. But, self-adhesive decals are sometimes very difficult to apply and once down, they can't be moved. Water-activated decals move easily and they're relatively easy to apply.

This is not to say that one type of decal is superior to another. In fact, the best modelers will use a combination of water, self-stick, and paint, to finish a model.

But no matter what type of decaling material you're going to use, **do** get the tools to help do the job right.

I've seen dozens of modelers with a warehouse full of tools and gadgets for

Most decaling tools consist of a deep, stained kitchen bowl; a craft knife or single-edge razor and a roll of paper towels. This is one of the biggest mistakes a modeler makes. Take time to assemble tools that are really helpful when preparing, applying and preserving decals.



One of the basic rules of decaling: Blot, never wipe. Believe it or not thin sheets of balsa make the best blotters. Paper towels are linty, fragile and best left in the kitchen.

Trimming decals: This is a three step job. First the decal is cut out from the large decal sheet, and trimmed so that a border surrounds the numeral or letter. This figure is then taped – on all four sides – to the drawing board, making sure that at least one major horizontal line is parallel to the T-square. Cutting is then a 1, 2, 3 process. All horizontal cuts are made first, top to bottom. Vertical cuts are made next. The last cuts are the diagonals.

building and flying. By contrast, most decaling tool collections consist of a deep, stained kitchen bowl; a craft knife or single-edge razor blade; and a roll of paper towels.

Give the same consideration to decaling that you give to other aspects of building and flying your birds. Take some time to gather materials that are really extremely helpful when preparing, applying, and preserving decals, like:

Masking tape, sizes 1/4" to 3" widths.
Scotch Brand Magic transparent tape.
Painter's tack rag.
Soft cloth rags (diapers are great).
Sponges (soft, in sizes from just 1" square to as big as your hand).
Sheet balsa (1/16" and 1/32").
X-Acto knife #1 or similiar tool.
Sharp scissors.
Felt-tip marker.
Soft lead pencils.
Ball point pen.
Waxed paper.
Rules — cloth tape measure, 6" and 12" rulers (clear, flexible rulers are best because you can see through them and you can measure around curves, humps, bumps, etc.)
Tape measure.
Kite string.

Drafting tools, including protractor, compass, plastic triangle, stainless steel T-square, drafting board and tracing paper.

Brushes, including a good #3 and a variety of sizes running as wide as 1".

Small bottle of dope, clear epoxy, Aironamel or polyurethane varnish (depending on decals).

Soaking bowls.

It might not be immediately clear why all these tools are necessary; some aren't. You may find them extremely useful but you don't absolutely have to own them.

I keep all my decaling tools stored in a small fishing-tackle box. That makes everything easy to organize.

Don't fret over the drafting tools. They do represent an investment, but there's more than one way to use something without paying for it. First, check out your friends and neighbors — there may be a kind architect, draftsman or engineer in the crowd; or get your club to buy the drafting materials. The club can then rent materials for a fee, or check them out (like library books), to be paid for if lost or damaged; or build your way into the materials (for years I used a bread board as a makeshift but adequate drawing board).

Preparation:

When I talk about preparation I'm talking about what you do before you even see the decals, and about what you do just before applying them.

First things first - - - decide, specifically, what decals you're going to use, how and why. This part of the job is simplified for the scale builder; he usually has a specific bird in mind or a picture, profile or other reproduction to work from.

The sport builder has things a little different. He can always follow the design on the kit box or he can be adventurous. If you're not sure what type of finish you want, make a tracing of the illustration of your model. Trace the actual plan layout or the design and diagrams on the box. Then draw in stripes, checkerboards or other finishing

touches on the sketch with colored pencils, crayons or felt-tip markers.

Experimenting on a tracing (or several) is a lot cheaper and less frustrating than experimenting on your model.

This then is the first stage of preparation: deciding where things go and how. Another part of preparation is what I call surface preparation.

Remember that decals are a finishing touch; that is, they touch the finish.

If the overall finish is poor, even the world's best decal job won't help the looks of your bird. The surface has to be clean, dry and well done. No decal in the world will hide paint that has sagged, chipped, run or peeled. And decals will not cover holes, gouges and other surface irregularities.

If you're truly finished with the finish on your model, only then are you ready to decal.

Now, back to more preparation.

Many sport builders and some scale buffs will have to resort to manufacturing their own decals. I've found that they just don't make all the decals you need in all the sizes you need. In the last few years my godsend has been sheets of colored, self-stick.

These sheets are available in a wide range of colors and can be mixed to provide specific appliques as needed. Don't shop for this material only in your local hobby shop. Browse through the hardware store or building supply store. You'd be surprised what a browse and some imagination can do for a model.

And, when making your own decals, it's time to break out the drafting tools. Almost any design can be constructed with a ruler, a protractor and a compass.

You can also use these sheets to make striping tapes and mirror-image decorations.

To make striping tapes, place the upside-down color sheet on the drawing board with the help of the T-square. The sheet must be parallel to the square. Mask both ends of the sheet to the board. Then mark out the width of the stripes you need with a ball pint pen and the T-square. If you only need a few stripes you can cut through the tape at both ends. If you're going to use half a sheet or more, stop cutting before you get to the tape (so your color sheet looks like a sheet of balsa stringers). Then go back and make two vertical cuts along the edges of the tape. If you don't work this way the sheet will move while you're cutting. Cutting like this also points up the advantage of buying a stainless steel T-square. Wood and aluminum squares nick easily when you cut with them. A nicked square is almost useless.

Mirror-image decals are also a breeze with colored sheets. Fold a sheet in half or place two sheets so that the colored sides face. Tape both sheets to the drawing board, masking all four sides, then draw your design. When you cut, be sure to cut deep enough to go through both sheets.

This method also works for symetrical letters and numerals (like 0, block I, A, H, I, M, O, T, W, etc.) Don't try this short-cut for letters or numbers that are not symetrical - - - you'll end up with something you'll never use, no matter what kind of model you build.

You can also put your drafting board and square to work preparing water-activated decals. Each decal must be trimmed right to the color line. The clear edge surrounding the decal has to be cut away — you don't need it, and unless you're very lucky, it will always show on the model. While you can cut many decals with scissors and a steady hand, the board and square are best for letters, numbers and many-cornered designs (swastikas).

To trim, start by cutting the decal out from the backing sheet, leaving enough room to tape it to the board on all four sides. Again, use the T-square to line up the figure, making sure that at least one prominent horizontal line is parallel to the T-square. Once you've done this carefully cut all horizontal lines in the figure with the edge of your square and your knife (I use a #1 X-Acto blade for this work).

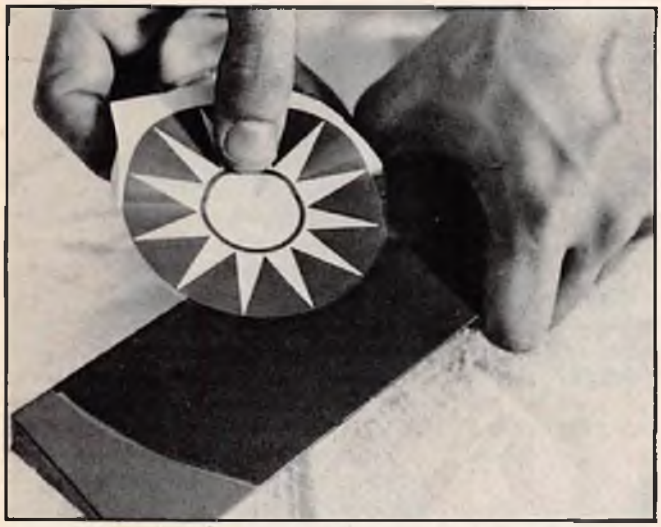
Always work from top to bottom. When all the horizontal lines are cut, place a triangle at the top of your square. With the edge of the square below the design, move your triangle from right to left, cutting behind it on all the vertical lines as you move along. (A not to lefties: You southpaws should move the square from left to right. Move with your right and cut with your left. The idea is not to cross hands.)

Once you've done this, all your letters, numbers and designs should be color only with no tell-tale border. Don't worry if you've cut off some shreds of color. Many silk-screened decals have ragged edges. Just be careful and work slowly to get the hang of it.

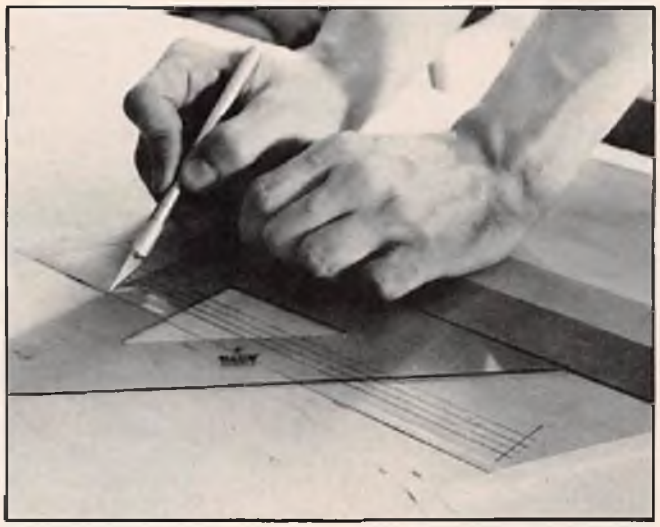
The only other preparation that needs to be done now is a color-bleed check. I call it back coloring. On models that have a dark, mottled or camouflaged finish, this finish sometimes shows through decals — this is especially true if the decals are white or light colored. The finish pops through and doesn't let the true color of the decal show. The only way to prevent this is to give the decal a neutral color base.

By painting a white silhouette on the model - - - in the shape of the decal you intend to apply - - you can easily get this neutral base.

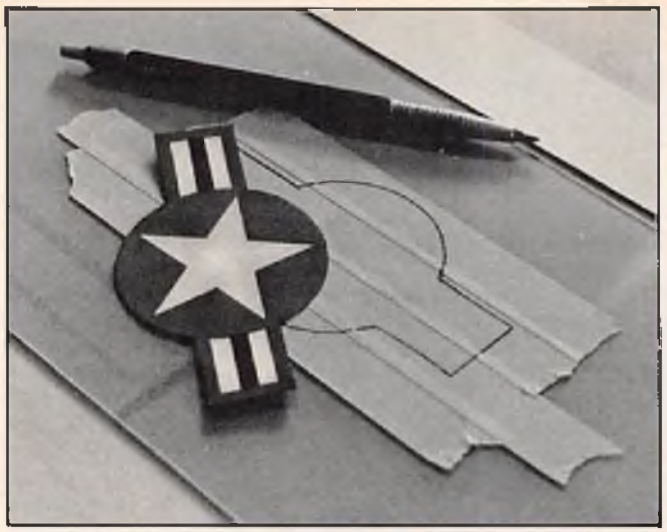
An easy way to silhouette is to transfer



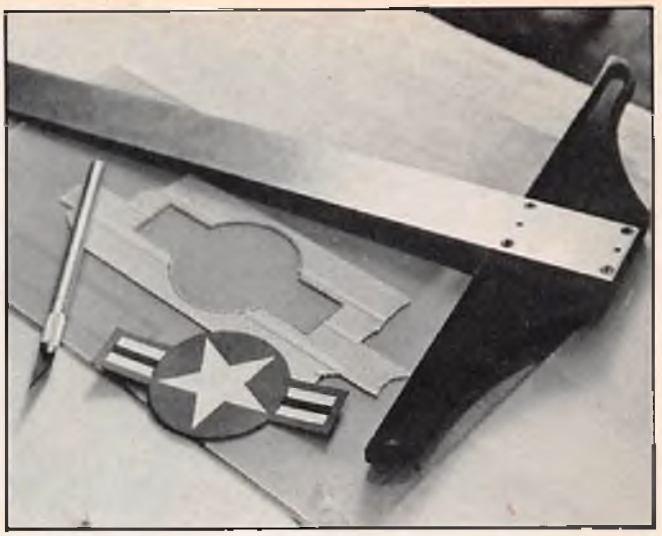
The Test Bed is a cheap, non-hair-pulling method of testing ways to finish the model. Cover and finish a large scrap of balsa in the way you intend to finish the plane. Test a decal or two on the bed. If you make a mistake, remember that this is only a test and more importantly, learn from that mistake.



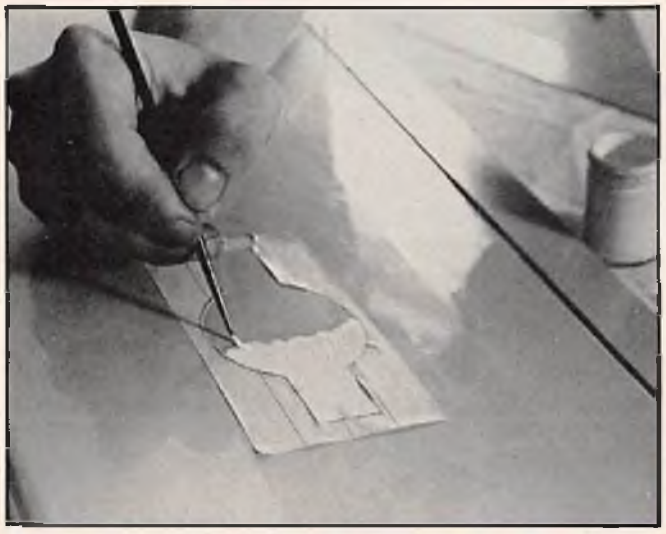
Perfect stripes can be cut every time if you treat the color sheet as a sheet of balsa stringers. The sheet is taped on both ends to the cutting board. The T-square and a ruler are used to mark out all horizontal lines, and these are the first cutting lines. When all the horizontal cuts have been made, a single vertical cut, at the appropriate lengths on each end, yield perfect striping tapes.



The first step of silhouetting. The fully trimmed decal is traced on a piece of masking tape that's been placed on waxed paper or a sheet of plexiglass. (Oops, even smarty-pants "how-to" writers make mistakes. Several overlapping pieces of tape were used because author misplaced wide roll of tape at the time of shooting.)



In the second step of the silhouette process, the traced area is cut away. Remember to cut inside the traced line as the silhouette should be the same size, or just smaller than the decal. Use your drafting tools for nice, clean straight cuts.



This is the third stage of the silhouette process. The masking outline has been taped to the model and serves as a painting mask. You can either spray or brush on the neutral white color that is used to "true" the decal colors. This is especially true on models that are dark-colored, mottled or camouflaged.

In the last step of silhouetting, the decal is placed over the neutral color silhouette. The silhouette serves as a placement guide too.

the shape of the decal to a wide piece of masking tape. Place a piece of tape on a sheet of waxed paper that's taped to the drawing board. Trace around the decal with a soft lead pencil. Next, cut inside the traced line. Remember, the silhouette has to be only as big as, or a little smaller than, the decal. You can peel the masking tape from its waxed paper backing. (You can also substitute a sheet of plexiglass for waxed paper if the tape has a tendency to stick fast.)

Now apply the masking tape border to the model in the exact location for decal placement. You can either brush or spray white into the unmasked area. Brushing means you don't have the worries of over-spray. Spraying means a nice even coat and no brushes to clean. Take your pick.

But whatever you do, remember also that you've now changed the finish of your model. Most likely you have a raised surface to contend with. I compound these areas lightly to smooth them back into the finish.

Once these silhouettes are in place, you have a road map for decal placement. If you didn't need to silhouette you can still help yourself along.

For example, kite string is a great aid for lining up stripes. Just use masking tape to put the string in place and get it just right. The decal can be slipped right under the tight string.

Masking tape is a sure-fire aid for lining up decals too. Make a tape box on the model the same size as the outer edges of the insignia or roundel, then center the decal in the tape on the box.

This technique can be applied to letters and numbers too. Trace the letters or numbers, in the appropriate order, with the spacing you want, on a single sheet of tracing paper. Then take the tracing paper and hold it over the area on the model where the decals are supposed to be placed. This will tell you right away if your spacing is off. If the spacing is good, put down two lines of tape as far apart as your figures are high.

When you decal, simply place the figures in the space between the two horizontal lines of tape. Use the tracing paper as a guide for spacing. A tiny pin prick or two helps with the spacing. Pin through your tracing right on the leading edge of each traced figure. Decal over the tiny holes.

If you've prepared well, decaling is all downhill from here out.

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My workshop occupies a corner of the spare bedroom. A 20 year old Hallicrafters, Model S-38C shortwave set is my window on the world.

For a different hobby that is compatible with R/C, try DX'ing.

By Jim Kitchen

Looking for something to help while away those workshop hours spent building, finishing, and repairing your models? Try DX'ing!

What is DX'ing, you say? It is our distant cousin. DX'ing is the hobby of listening to shortwave broadcasts with particular emphasis on international transmissions. A shortwave receiver can be your window on the world bringing into your workshop such far away places as London, Moscow, and Quito, Ecuador. English language broadcasts from Radios: Havana, Japan, Moscow, Netherlands, Peking, Switzerland, and others can usually be heard each evening. The British Broadcasting Corporation (BBC) World Service in London, Radio Canada International in Montreal, radio stations in South Africa, Australia, New Zealand and, of course, our own Voice of America and Armed Forces Radio Service regularly broadcast in English.

Shortwave programming is primarily news or entertainment. There are no commercials because shortwave stations are usually government supported. Propaganda in the form of slanted news emanates from some stations, but then that in itself can be a form of entertainment. If you like religious oriented programs, there is Station HCJB, the Voice of the Andes, in Quito, Ecuador. My favorite is BBC because I enjoy the English sense of humor, and think they are past masters of the understatement.

Another favorite is Radio Netherlands, the Dutch World Broadcasting System in Hilversum, Holland. Their English language broadcasts can be heard daily for one hour and twenty minutes beginning at either 2:00 or 5:00 hours Greenwich Mean Time. These transmissions are relayed via Bonaire in the Netherland Antilles with the earlier one being directed at the eastern part of North America and the latter at the western part on frequencies 6.165 and 9.715 MHz.

The frequency range between 3 MHz and 30 MHz is called the shortwave range, because of its potential for very long distance transmission. Frequencies in this range are refracted (bounced) off of the ionosphere returning to earth thousands of miles away. The height of the ionosphere above the earth varies from approximately 60 miles in the daytime to 175 miles at night. Long distance reception is best in the nightime because the greater height provides longer "bounces". Wintertime reception is also better than summer. Therefore, the best listening season conveniently coincides with our building season.

Figure #1 is a Shortwave Reception Guide which gives you a general idea of frequencies, origin of broadcasts, and listening times here in North America. I have had the best luck finding international broadcasts in the 5.95 to 6.2 MHz, 9.5 to 9.775 MHz, and 11.7 to 11.975 MHz frequencies. Most stations use multiple frequencies so you may find the same transmissions at different locations on your tuning dial. You can then

pick the best frequency for reception. You will also find that some shortwave programs are re-broadcast several times each day in order to reach different listening areas during their evening hours.

I discovered this hobby by accident about three years ago. While visiting a friend, I happened to notice an old Hallicrafters shortwave receiver gathering dust, and commented that I had always wanted a shortwave set so that I could listen to foreign broadcasts. My friend promptly offered me the use of his, saying he was only using the AM band, and had other radios. A trip to the local Radio Shack store for antenna materials and I was suddenly about to realize a latent ambition.

Radio Shack had antenna kits selling for about $5.00. Being of an economical frame of mind, I purchased a 50 foot coil of 7-strand copper antenna wire and two nail knob insulators for less than $2.00. My antenna consists of this copper wire strung between an insulator mounted outside of the window on the roof eave and another on the roof at an opposite corner of the house — a distance of about 40 feet. The antenna enters the house through a 3/8" hole drilled in the corner of the aluminum window casement. Heat shrink tubing provides insulation where the wire passes through the casement. A word of caution for those of you who live in areas of thunderstorm activity, a lightning arrester should be installed.

If you think you might enjoy "DX'ing", there are several possible sources of equipment. You kit builders might want to investigate a Heathkit model selling for about $80.00. Electronic stores specializing in amateur radio gear may have either new or used equipment available. Radio Shack has the model DX-160 Communications Receiver which sells for $159.95. For those economy minded individuals, I would suggest a visit to the local pawn shops. I was able to purchase a receiver indentical to my loaner for $30.00. You should be able to find something in the $20.00 to $50.00 range depending on how shrewd a bargain you can make. There are also multi-band transistorized portable radios, but I am not familiar with any of them. Look for a regular radio with shortwave bands or a general coverage shortwave receiver. Make sure that you have the standard AM band (535 KHz to 1603 KHz), so that you will have the use of AM for daytime listening and sports broadcasts.

If I have stimulated your interest — before rushing out to buy equipment, I would suggest an investment of .97¢ in the booklet, "Introduction to Short-Wave Listening" by Louis M. Dezettel, available at Radio Shack stores, stock #62-2052.

Good DX'ing! □

My $2.00 antenna installation as viewed from the lead-in insulator. This photo reminds me to install a lightning arrester.

SHORTWAVE RECEPTION GUIDE

Band	Frequency	Time	Zone
80 M	3.5 MHz	All day	U.S. Amateur & Marine
49 M	6 Mhz	Evening	Latin America & Europe
40 M	7 Mhz	Late afternoon	
		Evening	Europe
40 M	7 Mhz	Morning	U.S. Amateur
31 M	9 Mhz	Morning	Asia & Australia
31 M	9 Mhz	Afternoon	Europe & Africa
31 M	9 Mhz	Evening	Europe & Latin America
25 M	11 Mhz	Morning	Asia & Australia
25 M	11 Mhz	Evening	Latin America
20 M	14 Mhz	Late morning,	
		Afternoon	U.S. & For. Amateur
19 M	15 Mhz	Late morning,	
		Afternoon	Europe & No. America
19 M	15 Mhz	Evening	No. & Latin America
16 M	17 Mhz	Afternoon	Europe
	17 Mhz	All day	U.S.
	17 Mhz	Evening	So. America
13 M	20 Mhz	Afternoon	Europe
	20 Mhz	All day	U.S.
	20 Mhz	Evening	So. America
11 M	27 Mhz	All day	Local citizens band
10 M	28 Mhz	Morning	Europe
	28 Mhz	All day	Central Amer. & U.S. Ama.
		Evening	Asia

These reception conditions prevail in the spring and fall of the year. They are also subject to varying atmospheric conditions, sun spot activities, and to some extent, weather conditions. In the winter, reception generally will be best on the lower frequency bands. In summer, reception will be better on higher frequency bands.

(Courtesy of Heath Company)

Figure #1
This Guide provides a general idea of frequencies, origin of broadcasts, and listening times here in North America.

STOW'N GO

By Mike Corbett

The inspiration for the Stow'n Go began with an article by Pete Reed in March 1971 *Model Airplane News* called "The Complete Flight Box." My brother, Mark, and I each built one and liked it so well, we passed the plans around. Several of our friends tried Pete's box and were impressed with its button up and stow away features. The flight box presented here incorporates refinements and modifications allowing the flier to carry everything he needs in it except the wing and fuselage. Quite a bit of cardboard and hot glue were consumed jigging up prototypes to arrive at the final design.

There were several objectives:

(1) It must be relatively cheap. Not much over $5.00.

(2) Materials should be ordinary and available at the local discount department store.

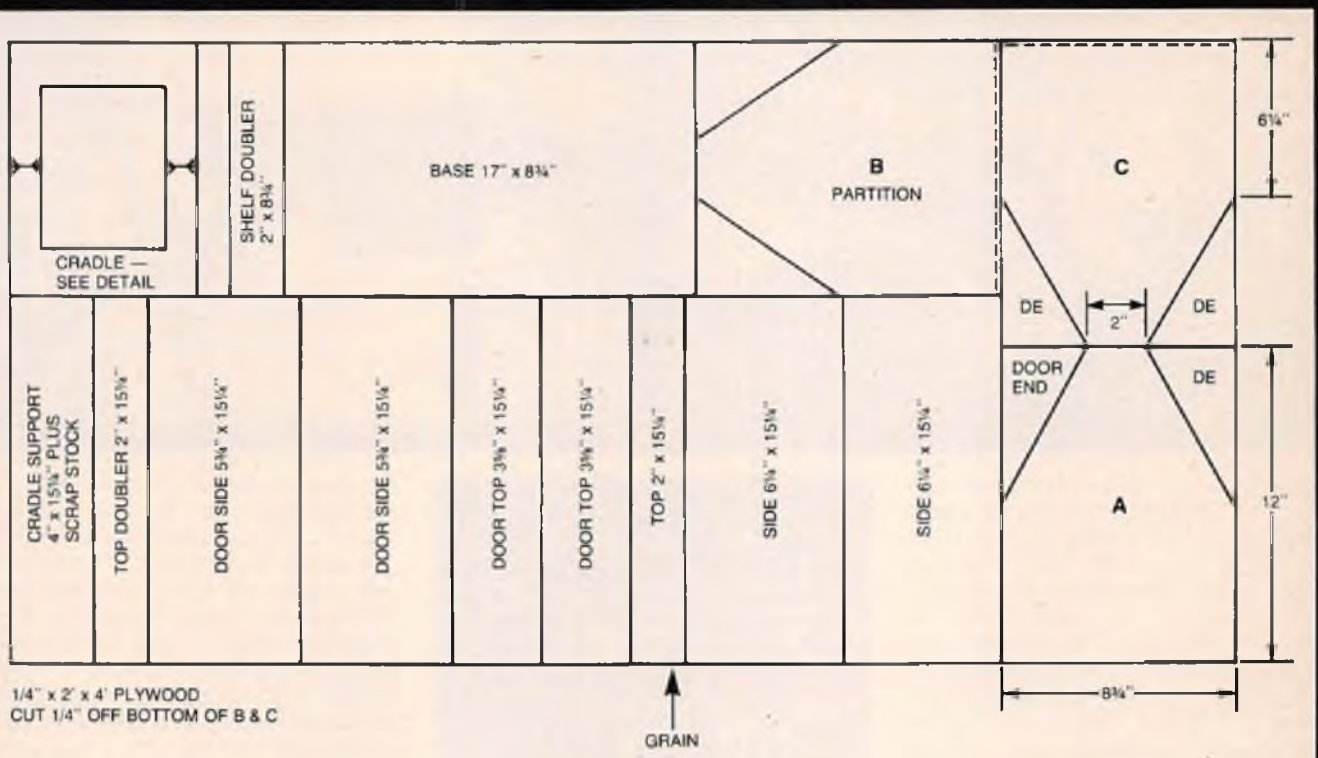
(3) It should be kept as light as possible. Add a battery, starter and a gallon of fuel to an already heavy box, and you have a back breaking load.

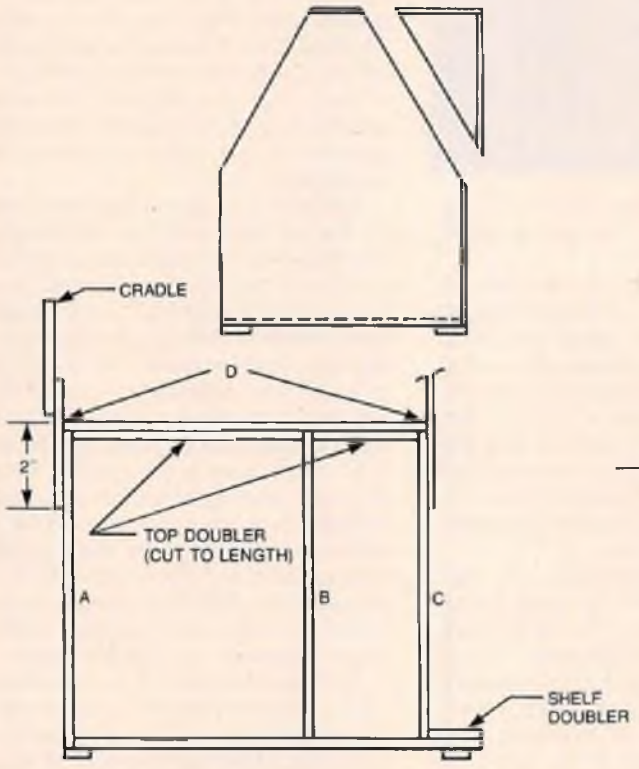
(4) It must be easily built by the average modeler with ordinary tools. I used a bed slat "C" clamped on the material as a straight edge for my sabre saw. It could, conceivably, be cut out free hand.

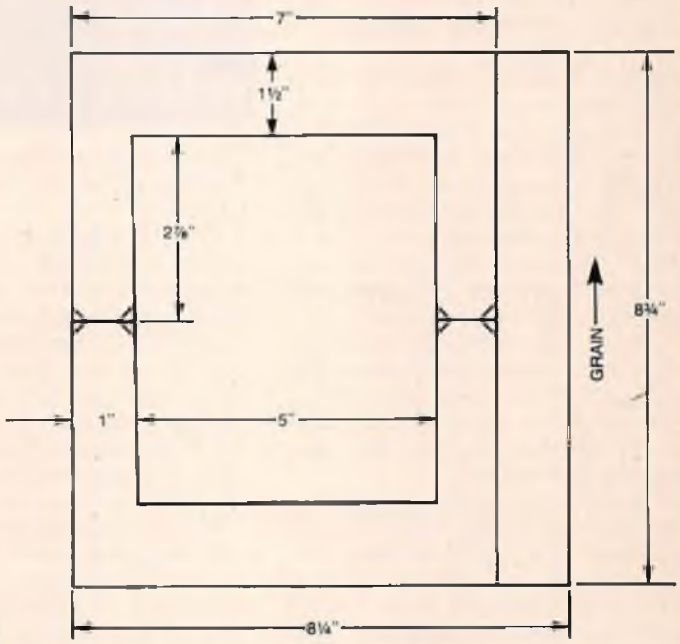
(5) Not too big. Not too small.

(6) It must hold spray cleaner, paper towels, transmitter, props, wrenches, screwdrivers, and all the odds and ends we carry around.

(7) It must close up to protect the transmitter and be easily kept clean on the outside for possible storage in closets or other areas of a home or apartment.







CRADLE DETAIL

(8) It must look good. I haven't seen any fishermen or golfers carrying their gear around in cardboard boxes, so it must look like a sportsman's equipment.

(9) Arrangements should be made for a "U" shaped cradle for holding airplanes.

Not a wholly unique list of objectives, I'll admit, but the Stow'n Go does them all. Let's get started.

Construction

The 1/2" x 2' x 4' ply is the only thickness used. Pick a good quality piece that's not warped and has straight edges. Draw the parts on the board, making sure everything is square and leave room for the saw kerf. This is important if the box is to line up properly.

Label the pieces lightly in pencil, then cut them out. In retrospect, it may be a good idea to tack ABC together for cutting the triangular pieces off. Then separate them and cut the required thickness off the bottom of "A". Now check for straightness of cuts and compare sizes of duplicate parts. Lay the center partition B aside for now and see how the parts fit together. The original Stow'n Go's were assembled with 5-minute epoxy and a couple of good TV shows, but 1/2" brads and white glue will do fine. After assembly, fill all gaps and end grain and trial fit the doors. Sand the box, being sure to knock the corners off, lest you gouge your leg, car upholstery, or worse, your plane!

Partition B can be installed wherever best fits your needs. Twelve volt battery users can section off the end of the box opposite the gas can to distribute the weight more evenly, or you can use cigar boxes and children's school boxes as I did for storage. Just tape a 1/8" piece of wood to one end of the cigar box as a spacer and use this to gauge the position of B. Nail and glue in place.

Measure and cut the dop doubler to length, then glue and clamp in place. Cut out four 2" square legs from leftover stock and glue in place, or use rubber stick-on feet after painting. Glue and clamp the shelf doubler.

Be alert for ordinary items that can be used. My plug wrench holder is a leg clamp from a defunct TV tray. An empty 8 oz. glue bottle with both ends removed makes an excellent prop holder. I servo taped mine beside the transmitter after flattening it some to provide clearance for my Cirrus radio. Go to your scrap lumber pile to find something to use for glue blocks. (No balsa please.) I used 1/2" square pine leftovers from a Kwik Stik sawed diagonally. Place them around the bottom and up the sides. These are very important if you plan to carry a battery and starter inside. Blocks won't be necessary inside the doors if you've done a good job. Install rails for your slide-out tray (if used) and get out the paint. I used two coats of Super Poxy, but polyurethane varnish, epoxy enamels, or plain old fuel-proof dope will do the job.

BILL OF MATERIALS

(1) 1/4" x 2' x 4' plywood	2.37
(2) magnetic catches	.68
(4) 1" x 3/4" brass hinges	.57
(1) 5¼" door pull (handle)	.83
paint, filler	2.00
(1) 1/8" Sullivan foam adhesive one side or adhesive foam weather stripping	.70
(1) pkg. 1/2" brads	.35
2' foam refrigeration tubing 5/8" I.D.	.50
Total	8.00

Miscellaneous

Sandpaper.
(2) 1/2" screw eyes.
White glue or epoxy.
(2) Cigar boxes or school boxes.

Hinge the doors and mount the fuel can by hooking rubber bands through the partly opened 1/2" screw eyes. It's a good idea to protect the box with a strip or two of foam tape between it and the can. Put all your gear in the box and balance to see where to mount the handle. Have the fuel can at least half full. Place strips of foam tape in the Tx section. A cigar box placed in the bottom will keep the Tx in place.

The doors on my box have a kitchen cabinet type magnetic latch which is easily adapted by holding the metal plate with vise grips and tapping with a hammer until a 90 degree angle is achieved. The reader can easily see the precision tools that comprise my workshop: bed slats, hammer, vise grips, two "C" clamps, etc.

I used a metal fuel can, thinking it a little safer, but a plastic jug can be used by making a wider shelf doubler. Don't omit or modify partition B, as it must glue into the handle to carry its share of weight.

For you fellows who need more rugged equipment, the dimensions can be juggled slightly to accommodate 3/8" ply. Just be sure to leave at least 11" vertical height for the roll of paper towels. It's a good idea to add 2" glue blocks at points "D". If you plan to use a cradle, the 4" x 15¼" scrap piece can be used to make the support arms. Check the height of your cradle before gluing permanently to make sure the wheels or fuselage clear the top of the box with the doors shut. Mine works fine with the bottom of the "U" 1½" above the box. Check your local refrigeration supply house for foam insulation tubing. You need two feet of 5/8" I.D., half inch I.D. will work, however. This will cost about 50 cents. Cut into two equal lengths and slit each down the middle to within 2½" of each end. Use plenty of hot soapy water and carefully slide the tubing onto the cradle. No adhesive should be necessary.

The Stow'n Go is an adaptable design for the flier with ambition and imagination. Bob Reuther suggested a small box containing the battery and starter be attached to the end so that it could be lifted up to unlatch and carry to the flight line or two an ailing airplane. An automatic make/break electrical arrangment should not pose too many problems for box mounted meters, power panels and such, if you care to pursue that idea. I originally envisioned a stool that would fit neatly over the box and could flip inverted to form the cradle, but I couldn't pass up the one in the photo at $1.69. It shouldn't be difficult to build a double cradle for wing and fuselage, leaving room in-between to grab the handle.

All sorts of tools and accoutrements can be mounted inside the doors ready for your use quicker than you can flip a prop. Just remember these items will be upside down when you close the door.

For fliers with limited time who want a Stow'n Go, I've arranged to furnish the wood kit only for $15.00, postpaid in the continental U.S. Write Mike Corbett, 406 Tampa Dr., Nashville, Tennessee 37211.

There you are fellow fliers — the Stow'n Go. May it see you through many happy flights. □

is shown in Figure 3.

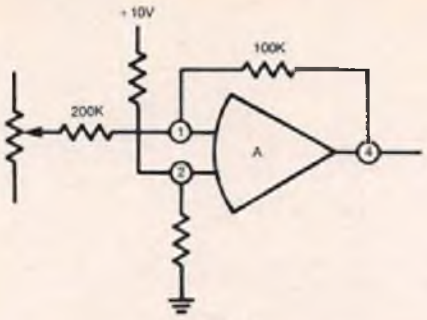


FIGURE 3

If pin (2) is at 5V, then pin (1) will drive to 5V. If the pot wiper is at 5V, then no current will flow in the 200K input resistor. Threrefore, no current can be flowing in the 100K feedback resistor so the output must also be at 5 volts. Some of you may be getting ahead of me and recognizing the possibilities. If we split the 200K into two resistors, one of which is a pot, and put a switch across the pot, we have our dual rate capability. This is shown in Figure 4.

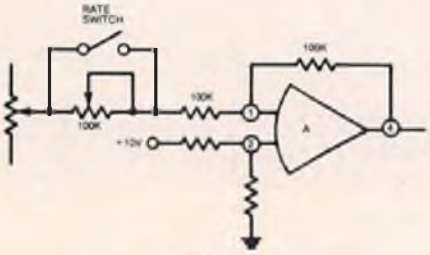


FIGURE 4

Referring back to the equation in Figure 1, we can see that the gain will be lower with the rate switch opened, which increases the input resistance Ri . This causes a lower output voltage for a given command which results in less servo travel for a given stick travel.

Another feature of the OP amp is what is called "summing". More than one input can be connected and the output will be a function of the sum of the input voltages divided by their respective input resistors. This is shown in Figure 5.

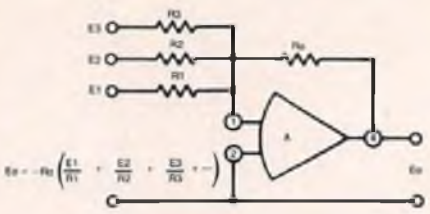


FIGURE 5

This feature allows us a simple means of introducing trim and/or switched functions such as roll buttons.

Hopefully, you are now beginning to appreciate the features of OP amps. Next month we will talk about how we can multiplex or switch many controls into one OP amp as is required in a multi channel system.

★ ★

Dear Mr. Oddino,

Recently I read about the Royal Products receiver-decoder kit. The writer described it as a good one to build for the experience of building a kit, if for nothing else. I would like to have a second receiver to use in gliders and radio-assist free-flight models. Do you think the Royal receiver would be suitable?

To further complicate matters, I have several older Controlaire 4S servos (M.A.N.) that are in fair shape. Would the Royal receiver, with its IC decoder, work these older 4 wire servos?

Perhaps my wisest choice would be an Ace receiver kit and a couple of their servos. I can build kits, and need to spend as little as necessary to get a reliable system. My present radio is a World Engines Expert on 72.400 MHz. I plan to use this transmitter for both airborne systems (whenever I get a second airborne).

May I voice an opinion (for what it is worth) about electric flight? Although the Astro system is probably very good, it seems to me that research along different lines would be worthwhile. Suppose a 12 volt motor with power pak that could be recharged from a car battery were used. I believe a much simpler and inexpensive system would result. Then I believe they would be competitive with small internal combustion engines. Even if two were needed, there are a lot of twins that modelers are "itching" to build – electric power would be ideal!

Warren D. Behymer
Wilmington, Ohio

I don't have any personal experience with either the Royal or the Ace kits but I would think that either would fill your needs. They could be used with four wire servos but I would not recommend using them (the four wire servos) in any aircraft that you valued. They just don't provide the reliability that the newer three wire servos have. However, if you do have them and want to use them, there should be no problem. You will have to provide a means of getting that other "wire", which is actually another battery voltage, from the battery pack to each servo. What this might look like is shown in Figure 6.

Notice that the white wire goes through the receiver physically, but is not connected. The white wires from each of the cables can be tied together in mid-air by stripping the ends, twisting them together, soldering and insulating with thermal shrink tubing or tape.

There could be one other problem. Some four wire servos (and I think Controlaire was one) used negative going pulses instead of the positive going pulses that come out of the new decoders. So be sure you know what you've

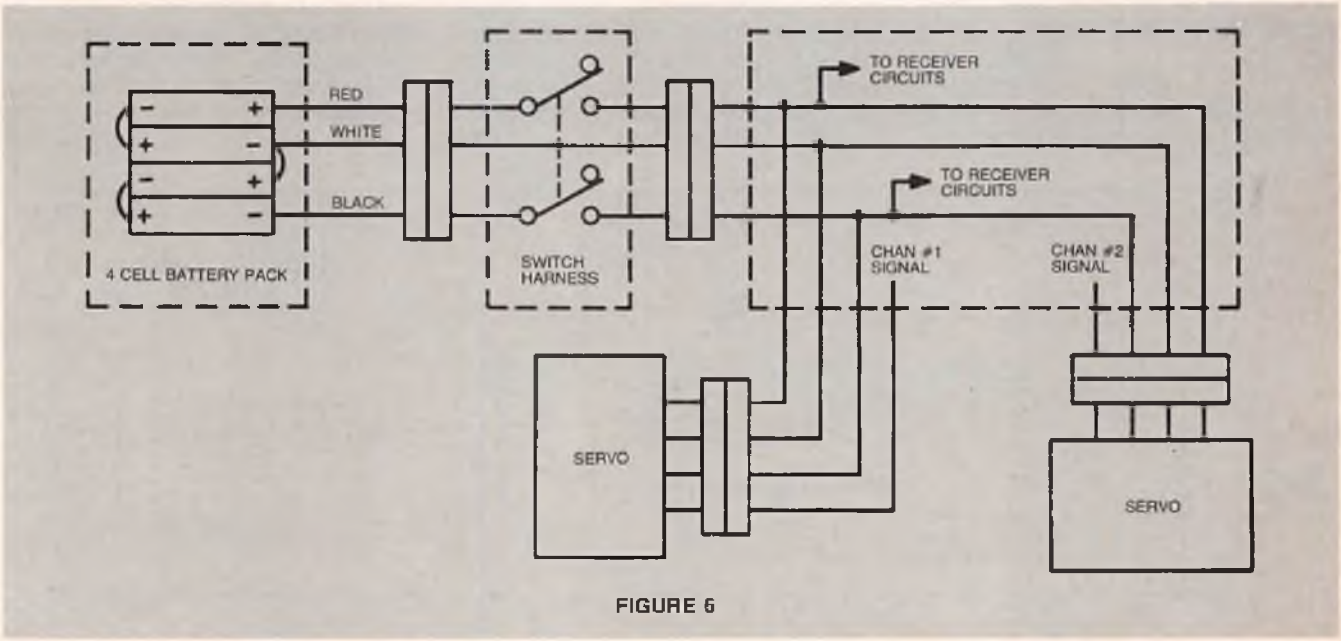


FIGURE 6

got. I think Ace can solve this problem for you too, with an inverter, but remember that the more you add, the more things you will have to fail.

I'm not sure I understand your comments on electric propulsion. Astro Flight does have a system that can be recharged from your car battery and they do have twin motor electric systems in which two motors run off of a single battery.

If you are suggesting that 12 volts be used and converted up to higher voltages for the larger Astro Flight motors, you might have a good idea. However, converters will have efficiencies around 60%, which means shorter flight time per pound of batteries and lots of heat to get rid of in the plane, plus the cost, weight and volume of the converter. For those of you who are not familiar with the Astro Flight systems, the following charts might answer some of your questions on electric propulsion.

These systems are real and they do work, and in many applications are competitive with internal combustion engines. If there is a better way to do it, I'm sure Astro Flight will offer it.

★ ★

Dear Jim,

I have a three channel Sport Three Cirrus radio and a three channel Kraft KP4 B. I have three servos that came with my Cirrus and a two channel brick with my Kraft radio. I have questioned both manufacturers if I can use my third Cirrus servo on the third channel of my Kraft but neither will give me any answer if it is even possible.

I probably would have bench tested the Cirrus servo and the 3rd channel on my Kraft but the Cirrus has 3 wires going into the servo and the Kraft has 4 wires going to the servo connection from the receiver.

I would appreciate any suggestions you can give me or perhaps tell me how I can bench test a 3 wire to a 4 wire system. Thank You.

Walter Grant
Walnut Creek, California

I hope we really take care of this 3 wire/4 wire servo business this month.

ELECTRIC FLIGHT SYSTEMS

Motor	RPM	Prop	Motor Wt.	Battery Wt.	Charge Volt	Fuse	Power Duration	Wing Area	Flying Wt.
020FF	11,000	5¼x3	55 gm	63 gm	6 volts	8 amp	1½ min	200 in²	225 gm
020RC	12,000	5¼x3 7x3½	55 gm	120 gm	6 volts	8 amp	5 min	200-300 in²	450 gm
050	12,000	6x4	158 gm	235 gm	12 volts	10 amp	5 min	230-350 in²	1 kg
075	14,000	7x4 8x4	186 gm	368 gm	18 volts	10 amp	5 min	300-400 in²	1 kg
10	11,000	7x4½ 9x4	250 gm	368 gm	18 volts	10 amp	5 min	350-600 in²	1.25 kg
15	12,000	8x5	250 gm	450 gm	24 volts	10 amp	5 min	400-600 in²	1.5 kg
25	9,500	9x6	350 gm	2@409 gm	24 volts	14 amp	8 min	600-800 in²	2.25 kg
40	11,000	10x5	387 gm	1000 gm	30 volts	20 amp	5 min	700-800 in²	3.5 kg

MARINE ELECTRIC SYSTEMS

Motor	RPM	Prop.	Motor Wt.	Battery Wt.	Charge Volt	Fuse	Power Duration	Boat Size	Displacement
05M	9,000	05*	65gm	205 gm	6 volts	6 amp	15 min	DV-10	1 kg
10M	9,000	10	262 gm	409 gm	12 volts	8 amp	15 min	DV-20	2 kg
15M	12,000	15	262 gm	2@409 gm	24 volts	10 amp	10 min	DV-20	2.5 kg.
25M	10,000	25	390 gm	2@409 gm	24 volts	14 amp	10 min	DV-40	2.5 kg

*Marine propeller size equivalent to glow engine size propeller.

TWIN MOTOR ELECTRIC SYSTEMS

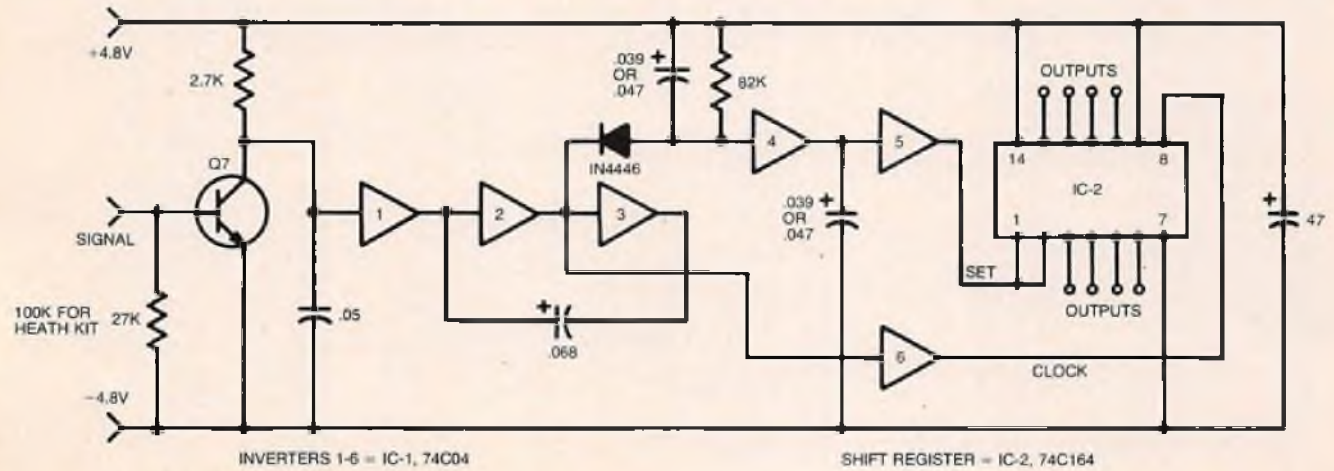
Motor	RPM	Prop.	Motor Wt.	Battery Wt.	Charge Volt	Fuse	Power Duration	Wing Area	Flying Wt.
02T	11,000	5¼x3 6x4	2@55gm	205 gm	6 volts	8 amp	5 min	300 in²	1 kg
05T	12,000	7x3½ 8x4	2@158gm	409 gm	12 volts	10 amp	5 min	400 in²	1.7 kg
15T	12,000	7x4½	2@250gm	2@409gm	24 volts	10 amp	5 min	600 in²	3 kg
25T	12,000	8x6	2@390gm	1000 gm	30 volts	20 amp	5 min	700 in²	4 kg

This is obviously the opposite problem of the previous letter and it might seem that the answer is obvious. If your servo doesn't require the voltage from the battery center tap (white wire), and obviously it doesn't if there is no fourth wire, then you should be home free. Just forget it and interconnect the red, black and signal wires. But hold it; don't get too excited. Many of the early decoders, in particular pre-1972 Kraft, had what might be called "shabby" pulse shape. It didn't matter then because the servos were compatible with the decoder. However, the integrated circuit servo amps didn't like this pulse shape and were really not compatible. You could have this latter condition. I would recommend that you try it out and see what happens. If it works on the bench, it should work in the air. Be sure and look for interaction with the other servos. In some systems the fast rise times associated with the integrated circuit servo amps put transients on the battery voltage that affected other channels.

★ ★

While we're on the subject of mixing up equipment from various manufacturers, let's try another one. I believe I've received other letters on this same subject so it must be a solution to a problem that really exists. If you sent me this idea two years ago I'm sorry I didn't recognize it as something that might solve some-

to page 128

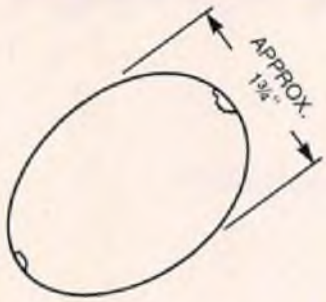


INVERTERS 1-6 = IC-1, 74C04

SHIFT REGISTER = IC-2, 74C164

ONE "EGG-A-TON" BOMB

By Bob Huisinga



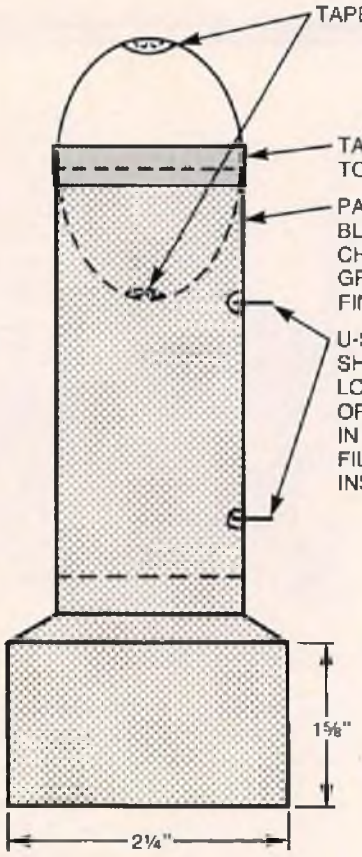
DOES NOT GO BOOM, JUST GOES WOOF!

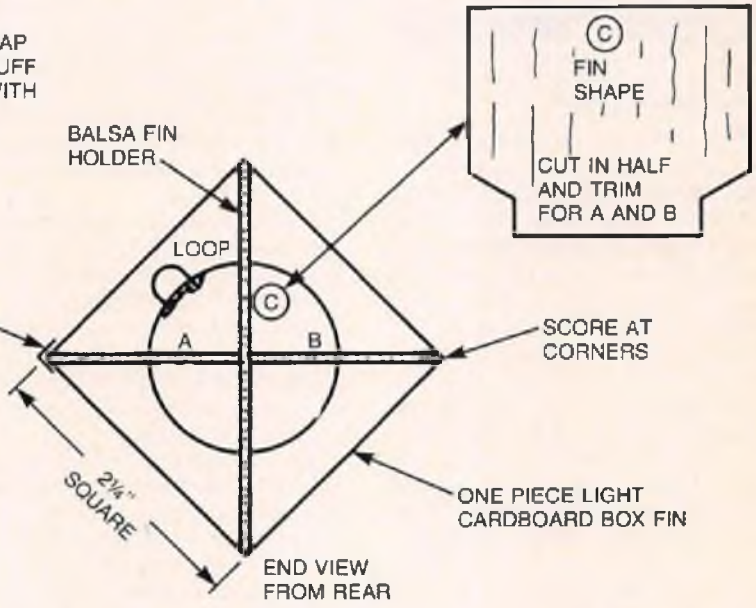
DRAIN CONTENTS OF EGG BY MAKING A SMALL HOLE IN EACH END OF SHELL. BLOW CONTENTS OUT INTO DISH & WASH OUT. DRY IN WARM PLACE.

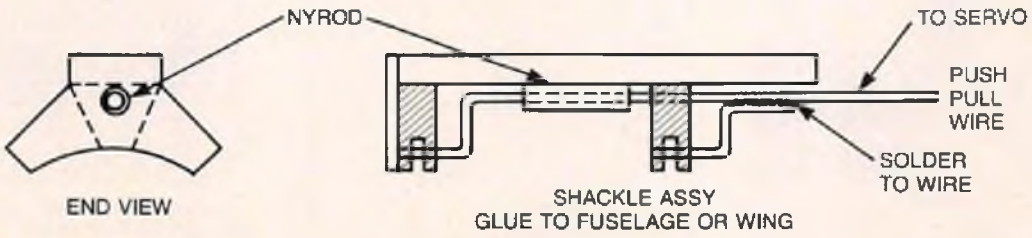
FILL EGG SHELL WITH WHITE TILE GROUT POWDER OR SIMILAR HEAVY WHITE POWDER. COVER HOLES WITH TAPE OR ZAP & PAPER.

MOUNT EGG TO END OF PAPER TUBE. ROCKET BODY OR SIMILAR TUBE OF 1¾" I.D. CUT TO 4¼" LENGTH WITH BOX FIN ASSEMBLY MOUNTED ON OPPOSITE END.

TRY TO DROP BOMB FROM ABOUT 200 FT. ALTITUDE AT ABOUT 30 MPH AIRSPEED. A STRAIGHT LINE DROP ANGLE OF ABOUT 45° WILL PUT IT ON TARGET. DON'T FORGET TO FIGURE THE WIND DRIFT. CAN BE CARRIED ON THE CENTER SECTION OF THE LOWER WING ON A BIPLANE OR RIGGED FOR ANY OTHER TYPE AIRCRAFT. IT'S VERY SPECTACULAR TO SEE IT BREAK LOOSE AND DOWN TO ITS FINAL BURST.







RCM VISITS

By Grady Howard

THE GREATER CINCINNATI R/C CLUB FLYING CIRCUS

28 year old Taylorcraft flown by Gary Trout opens each day's activities.

Friday at noon at Fountain Square downtown Cincinnati is the scene of helicopter demonstrations.

The efforts of the GCRCC in putting together a terrific public relations show is unsurpassed by any effort of any other organization. I say this with the knowledge that some clubs may take offense to this statement, but that's only because they have not seen or participated in this flying Circus.

This year's Circus was the 14th event in a line of many successful shows. A little background is in order here to give credit where credit is due to the organizers. The Circus started out in 1961 as a fun fly get-together that was sponsored by John Maloney, President of World Engines. John had invited manufacturers, hobby dealers, and some modelers from all parts of the U.S. The get-together was called the "Slobs Event" (I can't figure out if "slobs" referred to the flying or the flyers.) The event caught on with manufacturers and experimental modelers to the point that they began to show new products and projects at the meets. Carl Goldberg, for instance, introduced his now famous "Skylane 62" at this event. Also, Dave Gray flew, in public for the first time, his experimental Whirlybird 505 helicopter here in 1970. This is when Du-Bro Products and Dave joined together to commercially produce the U.S.'s first radio controlled helicopter.

As the event grew, John called on the Greater Cincinnati Radio Control Club for assistance. This and the beautiful people like Father Ric Schneider of the St. Francis Seminary, were a big help to the future success of the Circus. The flying field is located on the campus of St. Francis with a paved runway and beautiful clubhouse.

The members of the GCRCC say that they consider John Maloney to be one of the major pioneers in model aviation and class him as Mr. Model Aviation of the U.S. This year, the club presented John with a beautiful plaque during the flying Circus. Everyone there was just as thrilled to see John receive this award for his hard work as he was to receive it.

Lots of effort went into the planning and advertising for this year's Circus. Television coverage was available for the Friday noon flying on the square. Arrangements had been made with the city of Cincinnati to have the Du-Bro Helicopter Team fly at Fountain Square from 12 noon until 2 p.m. The area was roped off and the flyers did tasks such as hoop pick-ups and going through gates with 12" of clearance. There was a large crowd on hand to see the flying along with the TV people. Announcements

Russ Brown is the announcer who is known as "Ole Golden Throat". Brownie keeps the interest at a high pitch with his exciting descriptions of what is going on in the air.

Dave Gray of the Du-Bro helicopter team flies his Du-Bro Hughes 300 at Fountain Square.

Circus events director, Gary Trout, with his 28 year old Taylorcraft.

AMA booth sported NASA's model of the space shuttle and 747. Both were built and flown by R/C flyer John Kiker of NASA.

Nick Zaroli had his own designs there with the new Midwest ducted fan unit. Midwest unit is called RK-40 Axiflo.

Nick's Henkel He 162 lifts off on a fantastic flight of high speed and aerobatics.

Noted pattern flyer Don Lowe also flies helicopters. Here with a Du-Bro Shark .60.

Here is the inspiration for all the club members and their guests, Father Ric Schneider of the St. Francis Seminary.

Just two of the beautiful airplanes shown at the circus. These belong to Bob Bell.

Jesse White's beautiful F8F Bearcat flew as good as it looked.

Gere Bipe flown by Don Anderson looks very realistic swinging a 22" prop on a Du-Bro Prop Driver unit.

Just a few of the estimated 30,000 spectators who viewed the circus.

The slow pylon race was for 8' wing span or over airplanes. Here four very large airplanes just about hover in formation.

Bob Bentley lands a 10' wing span all-cardboard airplane.

The Spirit of America Show team thrilled the crowd with exploding buildings and exciting flying.

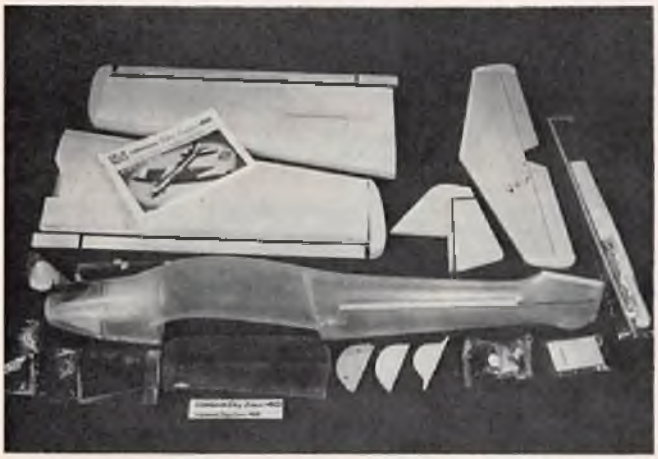
Snoopy and Woodstock came prepared to do battle with the Red Baron.

Snoopy's Doghouse makes direct hit on the Red Baron's hangar. This makes Baron verrrrry mad.

The Red Baron and Snoopy do combat until the death. "The Red Baron lost".

RCM PRODUCT TEST

I.M. Products CORSAIR SKYLINER-40



IMPRESSIONS	E	G	A	F	P	IMPRESSIONS	E	G	A	F	P
Packaging	●					Pre-Shaped Parts	●				
Plans			NA			Parts Match to Plans			NA		
Written Instructions		●				Overall Parts Fit	●				
Quality of Hardwood	●					Ease of Assembly		●			
Quality of Fiberglass	●					Fidelity to Scale			NA		
Other Materials		●				Flight Performance	●				
Accessories		●				Overall Appeal	●				
Die-Cutting			NA								

E=Excellent / G=Good / A=Average / F=Fair / P=Poor

The Corsair Skyliner 40 is manufactured by I.M. Products of Japan and distributed in the U.S. by Model Rectifier Corp.

The kit is absolutely complete to the last detail, including an Enya 40TV with muffler. The kit can be purchased without engine, if desired. It has an epoxy glass fuselage that is light in weight but also strong. It has a spar stiffener molded into the fuselage for additional strength. The nose gear mounting bracket is screwed into place. All bulkheads are epoxied in place along with engine bearers at the correct offset and down thrust. The slots for fin and stab are already cut in fuselage and are true. The tail group is already sheeted with square form leading and trailing edges, and the tip blocks, glued in place, ready for sanding to shape. The foam wings are completely sheeted with the tip blocks glued in place and need only to be joined and the center section wrapped with fiberglass tape. The wing has the main gear hardwood mounting blocks glued in and flush with the skin sheeting.

Our prototype was finished with K & B Super Poxy. The wing and tail group were given 2 coats of K & B butyrate dope and covered with silk span. Several more coats were sprayed and sanded, then K & B primer and paint added. D.J.'s wide multi-stripe gold along with gold, white and black pin striping was added with a final coat of K & B clear. As noted in the photos, this was one aircraft that wasn't going to leave RCM. That's the reason for the personalized paint scheme. We applied several modifications which we felt were beneficial to the builder, however, not essential. The holes pre-drilled for the nosegear steering linkage were moved to the opposite

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SPECIFICATIONS

Name	Corsair Skyliner-40
Aircraft Type	40-45 FAI Pattern
Manufactured By	I.M. Products of Japan
Distributed By	MRC 2500 Woodbridge Ave. Edison, New Jersey 08817
Mfg. Suggested Retail Price	$225.00 w/engine; $175.00 w/out
Available From	Retail or contact MRC
Mfg. Recommended Usage	Competition/General Sport
Wing Span	58 Inches
Wing Chord	11½ Inches at Root
Total Wing Area	560 Square Inches
Fuselage Length	49 Inches
Radio Compartment Dimensions	(L) 11½" x (W) 3½" x (H) 4"
Wing Location	Low Wing
Airfoil	Symmetrical
Wing Planform	Swept L.E.
Dihedral	1/2 Inch
Stabilizer Span	24 Inches
Stabilizer Chord (incl. elev.)	7½" at Root
Total Stab Area	122 Square Inches
Stab Airfoil Section	Flat
Stabilizer Location	Mid-Fuselage
Vertical Fin Height	6½ Inches
Vertical Fin Width (incl. rud.)	10 Inches
Mfg. Rec. Engine Range	.40-.45
Mfg. Rec. Fuel Tank Size	8 Ounces
Landing Gear	Tricycle
Recommended No. Of Channels	4
Recommended Control Functions	Rud., Elev., Throt. & Ail.
Basic Materials Used In Construction:	
Fuselage	Fiberglass
Wing	Foam & Balsa Sheet
Tail Surfaces	Foam & Balsa Sheet
Hardware Included In Kit	See text
Plan Size	See Text
Building Instructions on Plan Sheets	See Text
Instruction Manual	See Text
Construction Photos	See Text
Kit Includes	Shaped Parts
Mfg. Rec. Flying Weight	82-96 Ounces
Wing loading based on rec. flying wt.	20.7-24.2 oz./sq. ft.

RCM PROTOTYPE

Weight, Ready To Fly	92 Ozs.
Wing Loading	23.7 oz./sq. ft.
Covering & finishing materials used	See text
Engine Make & Disp.	Enya 40TV
Muffler Used	Enya Stock
Radio Used	MRC 775 — 5 channel
Tank Size Used	8 Ozs.

RCM PRODUCT TEST

Michigan Hobby Hangar
SMALL WONDER

IMPRESSIONS	E	G	A	F	P	IMPRESSIONS	E	G	A	F	P
Packaging	•					Pre-Shaped Parts		•			
Plans	•					Parts Match to Plans		•			
Written Instructions	•					Overall Parts Fit		•			
Quality of Hardwood	•					Ease of Assembly		•			
Quality of Fiberglass			NA			Fidelity to Scale			NA		
Other Materials	•					Flight Performance	•				
Accessories	•					Overall Appeal	•				
Die-Cutting			NA								

E=Excellent / G=Good / A=Average / F=Fair / P=Poor

SPECIFICATIONS

Name	Small Wonder
Aircraft Type	Parasol
Manufactured By	Michigan Hobby Hangar 460 W. Bloomfield Rd. Mt. Pleasant, Michigan 48858
Mfg. Suggested Retail Price	$28.95
Available From	Both Mfg. & Retail
Mfg. Recommended Usage	General Sport
Wing Span	46 Inches
Wing Chord	7 Inches
Total Wing Area	320 Square Inches
Fuselage Length	28 Inches
Radio Compartment Dimensions	(L) 7" x (W) 2½" x (H) 2.5"
Wing Location	Parasol Wing
Airfoil	Flat Bottom
Wing Planform	Constant Chord
Dihedral	1½ Inches
Stabilizer Span	16 Inches
Stabilizer Chord (incl. elev.)	4½ Inches
Total Stab Area	72 Sq. In.
Stab Airfoil Section	Flat
Stabilizer Location	Top of Fuselage
Vertical Fin Height	5¼ Inches
Vertical Fin Width (incl. rud.)	5 Inches
Mfg. Rec. Engine Range	.09-.15
Recommended Fuel Tank Size	4 Oz.
Landing Gear	Conventional
Rec. Number of Channels	3
Recommended Control Functions	Rud., Elev., Throt.
Basic Materials Used In Construction:	
Fuselage	Balsa, Ply, Spruce
Wing	Ply & Balsa
Tail Surfaces	Balsa
Hardware Included In Kit	Very complete
Plan Size	42" x 30" (1 sheet)
Building Instructions on Plan Sheets	Yes
Instruction Manual	Yes (7 pages)
Construction Photos	Yes
Kit Includes	Shaped Parts
Mfg. Rec. Flying Weight	36-40 ozs.
Wing loading based on rec. flying wt.	16-18 oz.

RCM PROTOTYPE

Weight, Ready To Fly	41 Ounces
Wing Loading	18.6 oz./sq. ft.
Covering & finishing materials used	Flite-Kote, K & B Super Poxy
Engine Make & Disp.	O.S. Max .15
Muffler Used	Slim Line
Radio Used	Heath Kit
Tank Size Used	4 Ounce

The Small Wonder is a look alike replica of one of the parasol wing EAA Homebuilts that prevailed in the early 30's. It was designed and kitted by George F. Jennings of Michigan Hobby Hangar.

Our kit had an excellent selection of wood. The various parts were labeled and taped together to make the building easier. The radio compartment hatch on the bottom of the fuselage is held in place with screws. This was a definite plus.

We covered our model with red Flite-Kote on the wing and tail surfaces. On the fuselage, we used a combination of blue K & B Super Poxy on the forward area which included the cabane struts and finished the rear area with white Flite-Kote.

One modification we made was to make the fuel tank floor removable. This was done in order to remove the tank after construction in case of a problem. A triangle shaped shelf was added to the rear of the firewall. The tank floor sits on top of the triangle and is held up in place by foam around the battery pack. We did find the wing rib spar notches too large.

The building instructions were very easy to follow along with being complete. They are written so that as each step is completed, that step can be checked off. This method, if followed, should keep one from building any part out of sequence. There was also a list of all necessary material not included in the kit which is needed to complete the model.

The kit is engineered to put the "fun back in flying" and we concur. There were no trim adjustments necessary on our model. If everything is checked for alignment and balance is correct, yours should fly the same. The parasol configuration adds to the stability of the aircraft and this makes it an excellent

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RCM BUILDS THE

REV-OLUTION II

BY GRADY HOWARD

The Rev-olution II is a .60 powered helicopter produced by American R/C Helicopters, 23811 Via Fabricante, Mission Viejo, California. The kit comes in red or blue or green metal parts as a basic kit or a complete kit which includes a K & B .61 engine and a Superr-Quiet Muffler.

Our kit was the complete kit and in blue color. All parts were packaged in compartments cut into polyfoam. This makes for a very neat and shock-proof package.

A full-size plan sheet and a photo instruction book is all that is needed for construction. The actual building time is very fast with only a few minor instruction changes needed. These changes will be covered in the photo construction section as they come up in the construction sequence.

Construction starts with the two side frames being bolted to the main long channel. Be sure that the flat side is down. Next comes the two front channels that are bolted below and above the cut-out for the fuel tank. These are mounted with the flat side toward the front.

Next, mount the angled engine brackets, but leave them loose as they will be adjusted when the engine is mounted. Now mount the landing gear struts to the bottom of the main channel. Leave them loose for positioning after the skids are mounted. Now mount the skids using the clamps around them and bolt them to the struts. Fore and aft alignment can be seen on the full size plan sheet.

Now make up the engine and the clutch-cooling fan assembly. Follow instructions as to the sequence of installation of parts. After the assembly is complete, install it on the engine brackets with the mounting blocks supplied. Do not tighten at this time, as this will be done when aligning the clutch bell and drive gears. Put the starting belt over the fan. Slip the bell and pinion over the clutch. Lower bearing block has been installed at the factory with the tail rotor drive pully also installed. Install bolts into the lower bearing block, but leave loose. Install upper bearing block, but do not tighten.

Now comes the tricky part. With the bolts slightly tight, start to align the engine and clutch assembly. Be sure that the spacing is equal all the way around the clutch bell. After this is complete, then tighten the engine and the lower bearing block.

Now, remove the upper bearing block in preparation for installation of the tail boom and drive belt.

Pull the belt out the front of the boom and twist 90° to the left, while viewing from the rear of the tail boom. Be sure the tail rotor shaft sticks out the left side when viewed from the rear. Now slip the tail boom between the frame and the drive belt over the pulley. Install bolts into the tail boom, but do not pull the belt tight at this time.

Now, reinstall the upper bearing block over the shaft and tighten securely. Pull back on the tail boom to tighten the belt and secure to the side frames. If slip-

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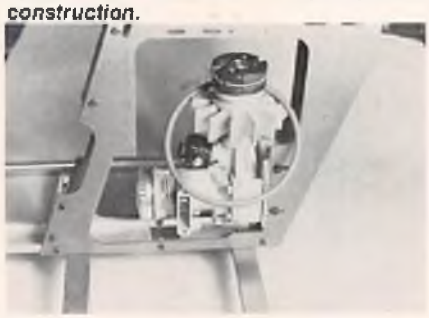
Parts of kit before assembly.

Main frame assembled after only 15 min. of construction. Du-Bro ball wrench and opened end 5/16" wrench very helpful in construction.

Landing gear and skids installed, also motor mounts.

Fan and clutch installed on Veco .61 engine.



Engine loosely installed to frame.

Clutch bell and bearing blocks in place. Now tighten engine after lining up clutch so there is no drag.

Tail boom and drive belt installed.

Main shaft bearing blocks installed. Do not tighten yet.

Main shaft through the bearing blocks.

Main gear installed on main shaft. After getting proper gear mesh, tighten the bearing blocks.

Cooling shroud cut out to fit.

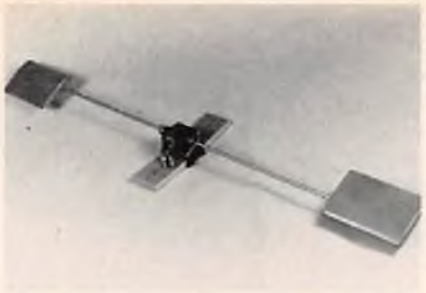
Shroud installed around fan. Be sure that no fan blades touch the shroud.

Swash plate mounted on main shaft.

Anti-rotation link installed and swash plate follower installed above the swash plate.

Rotor head parts before assembly.

See-saw and hub completed.



Fly bar and control arm installed along with paddles.

Rotor blades covered with holders in place.

Rotor blades installed to complete head assembly.

Bellcrank mount and tail skid installed.

5 hours after starting construction this much completed. This time includes time out for supper and reading the local newspaper.

Plywood former installed.

Canopy taped to former in preparation to fit cabin bottom.

Cabin bottom, after trimming to shape and painting, is installed.

With fuselage removed, make servo trays and cut-outs. Note Du-Bro "J" bolts for tank installation.

Tank installed using rubber bands across "J" bolts.

Tail rotor pitch control rod hooked to bellcrank.

Pushrod guide held in place at the rear by the fin clamps. Do not tighten too tight as you can get a bind here.

Nothing was said in the instructions about tying down the front of the guide tube. Here I used a landing gear clip with one lug cut off. Fasten under tail boom bolt.

Throttle servo tray made up to bolt to the bottom channel.

Throttle servo installed in tray.

Tail rotor servo installed.

Cyclic servo installed for fore-aft operation.

Throttle servo installed to bottom channel and receiver stuck down with servo tape.

Cyclic pushrod installed.

Seat and console painted and ready to install.

page occurs during flights, then more tension will be needed.

Next, install the two front bearing blocks that the main shaft runs in — do not tighten just yet. Now slip the main shaft through the bearings and slip the large steel washer over the lower end of the main shaft. Now install the large white gear on the main shaft. Now comes the most important part if you want the gears to last. By shifting the bearing blocks back and forth, line up the main gear with the small gear on the clutch shaft. Do not jam the gears too tight together — just tight enough for only a little gear backlash.

Next, you will have to use a good pair of scissors to cut out the cooling shroud. Cut and fit as you go until you have the fit required. Slide the shroud up and down until it is centered around the fan with no contact with the fan. Cut-outs will be needed for throttle arm and fuel line connection. When the fit is right, drill through the flanges on the cover and attach with the bolts provided. This thing is beginning to look like a helicopter now, isn't it? So we will now start on the control parts. The swash plate gives all cyclic controls to the main rotor, so this must be done right. Place the short piece of brass tubing on the main shaft, followed by the swash plate with the large ring down. Now the long piece of brass tubing. Make up the swash plate follower using the rods and collar provided. Slip the follower over the shaft down to the tubing. Tighten slightly now, as adjustment will be made later. Now with the swash plate in position with a ball to the front and to the left and right, make up the anti-rotation rod and install on the left side of the swash plate and to the left side of the main frame. Adjust length of rod to line up the swash plate so that the front ball is straight ahead. This completes the swash plate assembly.

The main rotor hub is very simple in that the hub is pre-assembled and all that is needed is to assemble it to the see-saw. This is done by fastening one side support to the see-saw and then sliding the hub control shaft through the hole and then putting the other side on the see-saw. Tighten the bolts securely and make sure that the hub moves freely between the sides. Check to make sure that the set screw up inside of the main shaft hole is good and tight. This screw holds the hub centered on the control shaft. Set aside now and proceed to cover the blades.

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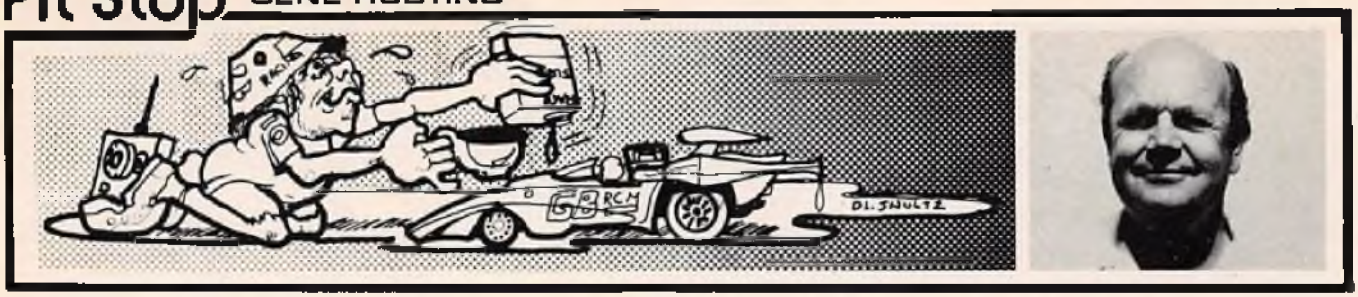
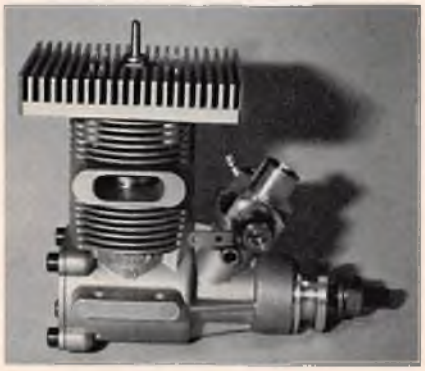
Completed and ready for test hop.

Here the Rev-olution II is doing what it does best. First flights needed only minor changes in pushrod adjusts and increased main blade pitch.

Pit Stop GENE HUSTING



In the May 1977 issue of RCM, the Pit Stop column featured various engines used in 1/8 scale RC cars. We now have a few more additions to add to the field.

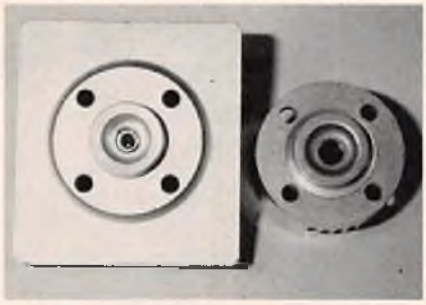


The Webra 21 (3.5cc) Schnuerle engine now comes in an R/C car version complete with one piece head-heatsink.

The Webra 1019 RC Speed 20 (3.5cc) engine is now available in RC car form, from Model Rectifier Corp., with a new one piece head-heatsink. The head-heatsink has a very large cooling area and should give very adequate cooling in RC cars. The piston-cylinder fit and cylinder port timing have been changed from the original version to give a little more power increase. A very well made engine, but the biggest drawback is the steel piston, whose excess weight, in comparison to ABC aluminum pistons, causes excessive vibrations which really hurt a car's performance in the corners.

Enya has just released this new 21 (3.5cc) Schnuerle R/C engine suitable for R/C car use.

Enya has released a new 21 size Schnuerle ported engine also available from Model Rectifier Corp. The basic design of this engine is very similar to the earlier Taipan 21 design. The two-piece case is split right below the exhaust port. The exhaust port comes out the R.H. side. This engine also has a steel unplated sleeve and a steel piston. The piston has two notches to aid in port breathing; the rod big end is bushed. The crankshaft runs in two ball bearings and has a large counterweight to help cut down on piston vibrations, but has a smaller hole in the crankshaft than the Webra. The crankshaft has 6mm threads. Because of their steel pistons, the performance of both of these engines in R/C cars would be below the K&B 3.5 (21), OPS 3.5 (21), and Super Tigre 3.5 (21).



The Webra one piece head-heatsink, on the left, with the Enya head. Both have similar squishbands and dished compression chambers.

The Enya crankshaft, on the top, has a larger counterweight to help smooth out the weight of the steel piston, compared to the Webra crankshaft, but it has a smaller bore. Both have 6mm threads.

The Enya crankcase is 2 piece and looks very similar to the older Taipan 21 engine.

The Enya sleeve is unplated steel. The steel piston is notched for better fuel flow. The rod big end is bushed, but has no oil hole.

At the R/C Car World Championships in Pomona, California, July 2, 3, and 4, 1977, there were 47 foreign drivers, plus 65 Expert and Amateur Class drivers from the USA. The race was run at Thorp Raceway which has super traction, allowing maximum use of available horsepower. Before the race, there were stories coming back from Europe about the super powerful Super Tigre motors from Italy that were much faster than the K & B 3.5 (21). As 99% of the Expert racers in this country were running the K & B 3.5 (21) engine, we were very concerned about these stories. The horsepower of the foreign entries was unknown to us and, naturally, our horsepower was unknown to them.

The nine member Italian team came eight days early for practice. Among the

Another engine suitable for R/C car use is the H.B. 20 engine from Germany. This engine is somewhat similar to the Veco 19, except it has a 2 piece case and comes with a Perry carb.

One of the reasons for the super fast pit stops now is this new "Flip Top" fuel filler cap from Associated and Thorp. The cap has a rubber seal making it ideal for pressure and chicken hopper tanks.

For those of you who want your tanks already assembled, this one is now available from Associated – part #SP62.

Italian team was Leonardo Garofali, who does the research and development for Super Tigre. The whole Italian team naturally ran the Super Tigre engines. The Super Tigre engines did not have the bottom end torque or the top end rpm, which are the same results we had obtained from our prop testing. In talking with Mr. Garofali, he said their Super Tigres had been as good as the K & B's in their testing; he felt maybe the K & B engines he tested were not up to specifications. He bought six K & B engines from Thorp and said when he got home he would do further testing and make improvements to the Super Tigre to make it competitive with the K & B 21.

The English team arrived next and it was obvious they were the best prepared. They had heavily modified K & B 21's, Super Tigres, and OPS 21's. They were ready! On top of that, they had another secret weapon! They had a special oil which allowed them to cut down on the normal 20% oil mixture, to a 7% to 10% amount. This, in itself, would naturally make the fuel mixture more efficient; but, to add to this, they were also running 50% nitro!! Their first day on the track was spent trying the different type engines, and they finally decided to race the K & B's. I had just seen Phil Greeno's P.B. car fly down the straightaway, and it looked very impressive, easily as fast as anything else on the track at the time. In talking with Phil, he told me he raced Formula I planes, in which he usually runs 65% nitro, which is normal. Planes and boats have much more efficient cooling than cars so, therefore, can safely run more nitro. But he always runs 50% nitro in the cars. This is very unusual compared to the cars in the USA. I know the Associated cars, which placed 1st thru 7th in the race, only ran 20% nitro, and I only know of a handful of guys who run more than this. It looks like we might have a bit of more testing to do.

Now, please don't rush out and try 50% nitro in your car. You'll probably not only be disappointed, you'll probably also burn the engine up. If the fastest R/C cars in the world can do the job on 20% nitro, so can you. Another very important point, which I've stated before and I'll be stating again and again - - - use fuel with castor oil - - - NOT with synthetic oil. Castor oil can take more heat than synthetic oil before breaking down, so you'll get better lubrication at the higher critical temperatures. Most fuels state what kind of oil is used. If you use the K&B fuels, use the K & B 100 or the K & B 1000. Do not use the K & B fuels that have the small cross with an "X2C" in it. The "X2C" is K & B's name for their synthetic oil. It works very well in airplanes and boats, but not in cars. Do not use the K & B 500, as it also contains synthetic oil. Use the K & B 100 or 1000 that DOES NOT have the "X2C" markings.

There were a variety of different carbs used at the World's Championship Race. The Perry carb was the most popular, but there was also a lot of slide valve carbs used: Delta, Thorp, and P.B. The Italian team used the Super Tigre carbs, and there was also a few OS carbs used and one Kraft. They all seemed to put out good power and work well, so the choice was just one of individual preference. Most carbs had a paper element filter, such as Fram CG7, which keeps the carbs from sticking and makes the engine last about 10 times longer. Du-Bro's new ball joint linkage was seen on a lot of carbs.

Pit stops were super fast, in the one second bracket, or less, thanks to the quick-fill systems being used, such as Delta's plastic cap system and the latest metal "Flip Top" cap used on the Associated and Thorp cars, and others.

Something that I'd like to recommend for beginners, is that they resist the urge to get a large carb as soon as they start driving. The combination of a K & B 21 with a 60 size carb and 20% nitro, for a beginner to learn how to drive an R/C car, is the very same thing as asking a 16-year old boy, who's ready for his first driving lesson in the family station wagon, to change the station wagon to a fuel burning, blown Chrysler drag engine in a VW chassis! If you can remember the first time you learned to drive the family car, the last thing you needed, was so much horsepower you'd light up the tires by just touching the gas pedal. It would take a very experienced racing driver to be able to handle a 1,500 horsepower Chrysler engine in a VW. Likewise, it would take an experienced R/C car driver to be able to handle a K & B 21, with a 60 size carb and 20% nitro.

As a further example, here in Southern California, we are just finishing our second Series of races. In these Series, we added a combined Expert-Amateur Super Stock Class allowing any 21 size engine, Schnuerle's included, but the carb was restricted to Perry 21 and 10% nitro. The car weight minimum was also upped from 5 lbs. to 5½ lbs. These cars definitely do not look as fast as the Open Class cars, because the Super Stock cars look much smoother on the track and, therefore, look slower; whereas, the Open Class cars, with their excess horsepower, are doing as much sliding sideways as accelerating and visibly appear faster. But the eyes are deceiving and the clocks tell another story. In the eight races to date, running in the Super Stock Class, I have averaged about 3 seconds slower than the Top Qualifier in the Open Expert Class in the 10-lap Qualifying races. This would average out qualifying 2nd or 3rd in the Open Class! Also, Bill Watson, an Amateur running in the Super Stock Class, has been turning qualifying times that would be **better** than the Amateurs running in the Amateur Open Class!! The reason for this is that the cars are much easier to drive on the correct line without making any mistakes and losing time. So, you beginners, please think carefully about what carb to use when you're getting your new car. You'll be able to go much faster, sooner, if you'll leave that stock 21 size carb on the engine. Good luck in your racing. □

RCM PRODUCT TEST

Techni Models BABY DRAGONFLI

IMPRESSIONS	E	G	A	F	P	IMPRESSIONS	E	G	A	F	P
Packaging	•					Pre-Shaped Parts		•			
Plans			•			Parts Match to Plans			•		
Written Instructions		•				Overall Parts Fit		•			
Quality of Hardwood			NA			Ease of Assembly			•		
Quality of Fiberglass			NA			Fidelity to Scale			NA		
Other Materials		•				Flight Performance	•				
Accessories		•				Overall Appeal			•		
Die-Cutting			NA								

E=Excellent / G=Good / A=Average / F=Fair / P=Poor

Techni-Model's Baby Dragonfli is a low wing aircraft with a fuselage of conventional balsa and ply construction, utilizing a double tapered foam core wing with balsa planking. The tail surfaces are of sheet balsa. In addition, a molded plastic canopy, aileron torque rod horns, formed landing gear wires and mounting blocks, pre-drilled Bridi .05 engine mount along with miscellaneous screws and glass tape are included.

Our prototype was covered with orange MonoKote on the fuselage and tail. The wing was done in chrome, however, after flying the aircraft with the chrome wings, it was entirely too difficult to keep it orientated, due to visibility. After the first flight, an elongated diamond pattern in D.J.'s red trim sheet was added to the wing. This helped the visibility problem. We added a 1/8" dowel into the leading edge of the wing and drilled into the F2 ply bulkhead to key the wing into place. This was done to prevent the wing from shifting during flight. On our prototype, we also moved the firewall forward 1/8" to allow the use of the Goldberg spinner. In attaching the canopy, use extreme care, as there is very little latitude for error. After flying our prototype several flights, we found that after each landing there was a tendency for the vertical fin to loosen and also for the landing gear to pull out from the foam wing. Be sure to securely epoxy the gear into the foam wing. Our suggestion on the tail would be to epoxy a small ply and wire tail skid under the fin. As mentioned in the instructions, most 1/2A modelers don't bother with a landing gear. Hand launching is fairly simple and you can usually land in the grass alongside the runway. One point of caution - - - remember, if you do hand launch, keep the nose pointed down slightly until you have

to page 112

SPECIFICATIONS

Name	Baby Dragonfli
Aircraft Type	1/2A
Manufactured By	Techni-Models P.O. Box 9382 Glendale, California 91206
Mfg. Suggested Retail Price	$21.95
Available From	Both Mfg. and Retail Outlets
Mfg. Recommended Usage	Competition: Pattern, Sport, and 1/2A Racing
Wing Span	36 Inches
Wing Chord	5⅝" (Avg.)
Total Wing Area	202 Square Inches
Fuselage Length	30½ Inches
Radio Compartment Dimensions	(L) 4⅞" x (W) 1⅞" x (H) 2"
Wing Location	Low Wing
Airfoil	Semi-Symmetrical
Wing Planform	Double Taper
Dihedral	1/4 Inch
Stabilizer Span	14 Inches
Stabilizer Chord (incl. elev.)	4⅝"
Total Stab Area	63 Sq. Inches
Stab Airfoil Section	Flat
Stabilizer Location	Top Of Fuselage
Vertical Fin Height	3½ Inches
Vertical Fin Width (incl. rud.)	5⅜ Inches
Mfg. Rec. Engine Range	.049-.051 cu. in.
Recommended Fuel Tank Size	SS 2 Ounce
Landing Gear	Conventional
Recommended No. Of Channels	2
Recommended Control Functions	Elevator & Ailerons
Basic Materials Used In Construction:	
Fuselage	Balsa
Wing	Foam & Balsa
Tail Surfaces	Balsa
Hardware Included In Kit	See Text
Plan Size	35" x 23" (1 sheet)
Building Instructions on Plan Sheets	No
Instruction Manual	Yes (6 pages)
Construction Photos	Yes
Kit Includes	Shaped Parts
Mfg. Rec. Flying Weight	21 Ozs.
Wing loading based on rec. flying wt.	15 oz./sq. ft.

RCM PROTOTYPE

Weight, Ready To Fly	22 Ounces
Wing Loading	15.7 oz./sq. ft.
Covering & finishing materials used	See Text
Engine Make & Disp.	Cox .051 T.D.
Muffler Used	No
Radio Used	Futaba 2 Channel
Tank Size Used	2 Ounces

RCM PRODUCT TEST

RAM QUICKEE 18

IMPRESSIONS	E	G	A	F	P	IMPRESSIONS	E	G	A	F	P
Packaging	•					Pre-Shaped Parts		•			
Plans			NA			Parts Match to Plans			NA		
Written Instructions	•					Overall Parts Fit		•			
Quality of Hardwood			NA			Ease of Assembly	•				
Quality of Fiberglass			NA			Fidelity to Scale			NA		
Other Materials			NA			Performance	•				
Accessories		•				Overall Appeal	•				
Die-Cutting			NA								

E=Excellent / G=Good / A=Average / F=Fair / P=Poor

SPECIFICATIONS

Name ..... Quickee 18
Boat Type ..... Air Boat
Manufactured By ..... Radio Controlled Models (RAM)
3631 N. Kedvale Ave.
Chicago, Illinois 60641
Mfg. Suggested Retail Price $24.95
Available From ..... Mfg. & Retail Outlets
Mfg. Recommended Usage ..... Sport or Sport Racing
Simple Club Racing Rules .....(1) 18" or larger air boats
(2) course to suit the pond or lake
(3) class A .049, B .051-.10, C electric
Radio Compartment Area ..... (L) 5½" x (W) 7⅜" x (H) 2¼"
Overall Length ..... 18 Inches
Mfg. Rec. Engine Range ..... .049-.10 cu. in. glow engines
05 electric
Recommended No. of Channels ..... 1 or 2
Rec. Control Functions ..... Rudder or rudder & throttle
Basic Materials ..... All molded plastic

The Quickee 18 is an A.R.F. (Almost Ready to Float) Air Boat for .049-.10 aircraft engines or 05 electric motors. It is all-molded plastic, ready to assemble with no trimming or shaping involved.

The kit comes with all the required hardware. All that is required is the engine of your choice along with your radio.

The kit offers easy, step-by-step building instructions complete with photographs for each step along the way. From our evaluation, even the first time modeler should have no problem completing the air boat. It builds quickly and is suprisingly easy, as is the radio installation. The recommended flotation chamber offers virtually a sink-proof boat.

We used a Cox .049 Golden Bee with muffler on our boat. It buzzed around the pond at our local golf course at a good pace. We had good control and handling at all times. There could be some very exciting times had by putting several of these air boats in the water and setting up a race course. If you are the only one with a boat, set up a course to follow and have someone time you. You can race against your own time and practice beating yourself.

If a larger engine is used, the tank has to mount behind the pylon. An engine tank mount will not work if the hatch is used because it puts the engine forward enough so the prop comes in contact with the blister on the hatch.

This product test, to our surprise, proved to be a complete and new type of R/C fun. The little boat really does its job. The hatch cover design kept our boat completely dry inside. Another unusual feature which pleased us was the plastic prop guard supplied in the kit. It is recommended if there is any possibility of youngsters getting too close to the prop. If the boat is to be used in a pond, we would recommend using the air rudder instead of the water rudder. Both versions are shown on the instruction sheet. The reason for this is to keep the boat from getting hung up on any weeds. We have had that happen many times with regular inboard and outboard powered boats. If you have a nice clear lake to use, there is no problem.

We decided to paint our model, however, it is not necessary. It comes in white plastic and could be trimmed with striping tape only. We sanded ours and then added a coat of K & B Super Poxy primer. After sanding that, we added white and silver dope. It was then striped with Bridi Hobby Striping Tape in blue and orange. By using one of the cyanoacrylate adhesives, you can buy it, build it and go boating all on the same day. Neat!!

We have given some thought to the possibility of using it on snow or ice. By using the air rudder, it could work quite well. At least it's a thought for some of those modelers who have those long winter months when they can't fly. If anyone tries the snow or ice boating, we're sure the manufacturer would be interested in the results.

This kit is priced at $24.95 and, as mentioned, opens up a whole new experience in R/C with very little time involved to get you in the water. □

A BETTER WAY

By Bob Mayhew
(reprinted from Indian City
R/C Club newsletter "Tom-Tom")

The razor saw is a useful tool for constructing model aircraft. Its purpose is to make fine line precision cuts.

Two popular brands of razor saws on the market are X-Acto and Zona. Both of these saws are manufactured with the teeth pointing away from the handle, so that the cutting occurs when the saws are **pushed** across the wood.

My suggestion is to reverse the blade so that the teeth point toward the handle. In this case, the cutting occurs when the saw is **pulled** or **drawn** across the wood. I have found that this gives much better cutting control. The saw will not suddenly jerk or gouge into the wood. This is also true of a coping or scroll saw - - - install the blade so that the teeth point toward the handle.

If you use a Zona razor saw by FAI Model Supply, it is easy to reverse the blade. Zona blades are replaceable. Remove the blade from the holder and install it with the teeth pointing toward the handle.

If you prefer the X-Acto razor saw, reverse the blade in this manner:

Place the blade assembly down flat on a piece of hard wood so that the two holes in the blade holder are up. Use a small blunt punch and a hammer to depress both dimples, which retain the blade — Figure 1. Remove the blade and install it in reverse so that the teeth will point toward the handle — Figure 2. Make sure that the two holes in the blade line up with the holes in the holder. Place the blade assembly down on the wood with the holes down. Use a pointed punch to reset the dimples — Figure 3. The blade assembly may bend out of shape slightly, but it can be straightened easily by hand.

I believe that you will find the saw's performance to be well worth the effort it took to convert it. □

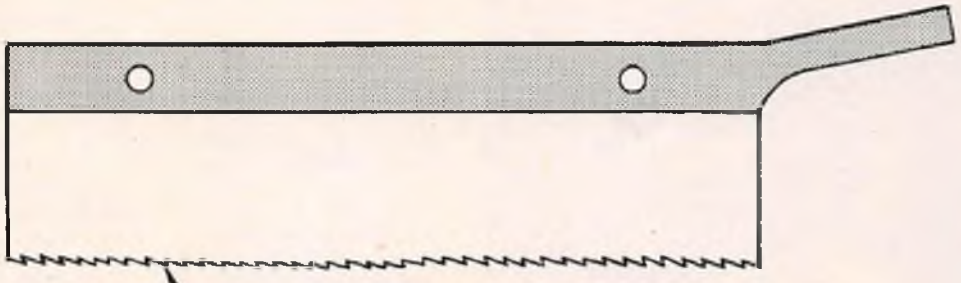


FIGURE 2

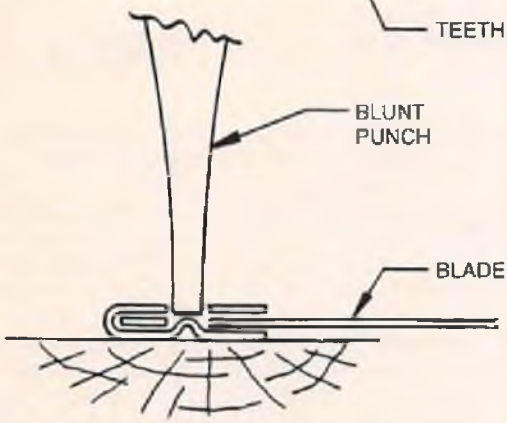


FIGURE 1

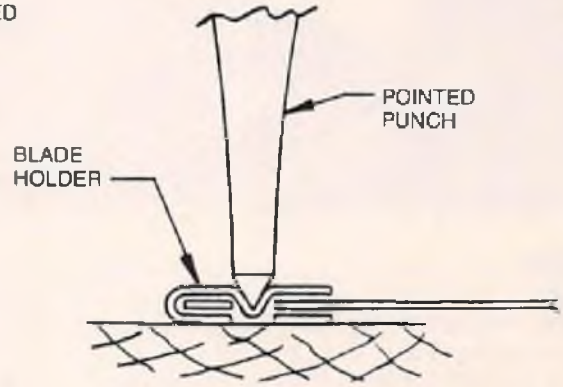
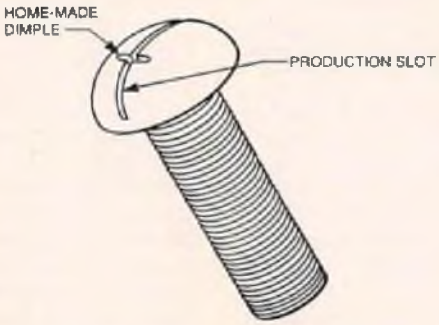


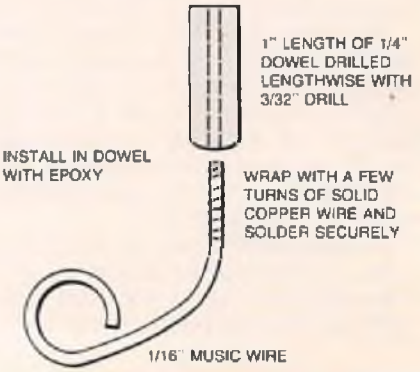
FIGURE 3

By Frank Jepson

Those commonly used 1/4" x 20 nylon wing mounting bolts can quickly be modified to prevent a screwdriver from slipping out of the slot and damaging your finish. Simply use your standard pencil type soldering iron with a screwdriver tip to impress a 3/16" wide dimple in the head at 90° to the production slot. Force your favorite screwdriver tip into the molten nylon and allow to cool and solidify. (The screwdriver blade will not stick.) When the head hardens, you will have a custom tailored slot which will engage your screwdriver without danger of slippage. The finished project should resemble the drawing.



Flexible, shock absorbent tail skid, nose skid and/or wing tip skid devices can quickly be fabricated as shown. The completed skid can be installed anywhere merely by drilling a 1/4" hole and inserting the device with epoxy. □



CADET

UT-1

COMPLETE CADET UT-1 KIT, $34.95 AT YOUR HOBBY DEALER.

The Cadet UT-1 is a Stand-Off Scale model of a World War II training glider used by the U.S. Armed Services. It's a 2-channel sailplane with a 62 inch wingspan that's ideal for general sport flying and competition. (By the way, we recommend using the Cox/Sanwa 2-channel system.)

In overall performance the Cadet UT-1 is surprisingly similar to most non-scale designs of this size. And now with the interest in Stand-Off Scale sailplanes rising, as seen at the August '77 LSF Tournaments, you'll be seeing a lot of Cadets on the field. With its unique combination of performance and nostalgic heritage, the Cadet UT-1 will be the only Stand-Off that really stands out.

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WHEN YOU FLY WITH COX.
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CONVERTING THE DUMAS P-51 MUSTANG CONTROL-LINE KIT TO R/C

By Richard D. Metlen

With hundreds of fine RC kits of every type, size, and description on the market, why try to convert a control line kit to radio control operation? I had several reasons, which are enumerated below, and if any of these seem valid to you, this article could be what you are looking for.

First I wanted to build a Stand-Off Scale Mustang for a .29 engine I had which wasn't being used, and the only kits I could find were for 1/2A's or .40 to .60 kits. Second, I was getting tired of just following the numbers, and wanted something with a little challenge involved. Third, I had just bought a Dremel Moto Shop, and was dying to play with it. Fourth, Hobby Barn was selling the Dumas Kit for $13.99 (R/C Modeler — Jan. 1977), which I doubt even covers the cost of the balsa wood.

The modifications needed are few, and easy to perform, and after I got into it, I found that this Dumas kit had also been used to build the P-82, with a great deal of success. The plans are straightforward, so I won't repeat them here, but I will refer back to them as necessary. The modifications needed are as follows:

Wing: The plans call for connecting the wing spars together with the plywood braces, and building the wing as one flat unit. We will want a dihedral in the wing, so discard the plywood braces, and build the two wing halves separately. The spars included in the kit are a little delicate for radio control, so I substituted basswood for the balsa supplied in the kit. One could just as well use larger balsa spars, but this would require recutting all the ribs and, since each rib in each panel is of a different size, this could be a chore. Frame up each panel except for the leading edge and center sheeting. Take out all knock-outs in the ribs (holes will be used to run the aileron pushrods, and also lighten the wing).

The landing gear needs beefing up. The one that the kit is designed for will rip out on the first rough landing (I consider one bounce landings as major achievements). A package deal is available, which has the hardwood rails, ply doubler material, metal straps, and screws for about one dollar. (This brings the price of the kit up to $15.00 for those of you who are counting.) Extend the rails from rib #2 to rib #4, using the plywood doublers on the outside of #2 and the inside of #4, and notch the balsa ribs #2, 3, and 4 to accommodate the hardwood landing gear rails. The rail is placed so that it is butted against the aft edge of the spar and, when epoxied into place, extends from the plywood doubler on rib #2 across the cut-out on rib #3, and to the plywood doubler on #4 (see illustration). Smart money says; use ribs #2 and #4 to trace out the doublers before installing them into the wing panels. This will save a lot of fitting and sanding later (care to guess how I came to this conclusion?).

WING SPAN
48 Inches
TOTAL WING AREA
408 Square Inches
DIHEDRAL (Each Wing Tip)
1½ Inches
TOTAL WEIGHT
4 Pounds
WING LOADING
22.5 Oz./Sq. Ft.
REC. ENGINE SIZE
.29-.35
REC. NO. OF CHANNELS
Four
CONTROL FUNCTIONS
Rud., Elev., Throt., Ail.

With the landing gear in place, the framework completed except for the leading edge and center sheeting, put the two halves together with a 1½" dihedral at each wing tip. With the two halves together, construct a plywood brace at the spars for strength, and complete the wing sheeting, leaving open the area between ribs #1, from the spar to the trailing edge.

The kit comes with a full length aileron, which was originally coupled to the elevator. This proved to be too much for me to handle when used as an aileron, so I used just half of it and cemented the inside half directly to the wing. Bellcranks were used to run the ailerons, and were connected together by 1/16" piano wire. I tried to use my NyRod, but the bends were too sharp so the inner rod didn't run smoothly.

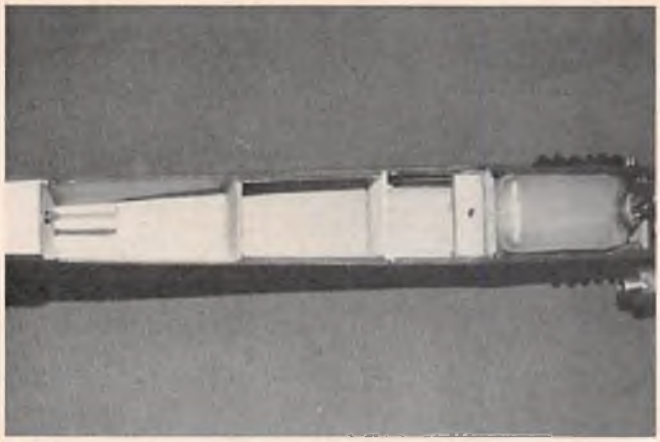
The aileron material in the kit is not of sufficient width to conform to the scale on the plans, so you can fudge a little at the root end, as I did, or purchase wider material.

For a smoother top aileron surface, countersink the top of the control horn brace, and fill in with micro-balloons and resin (see illustration).

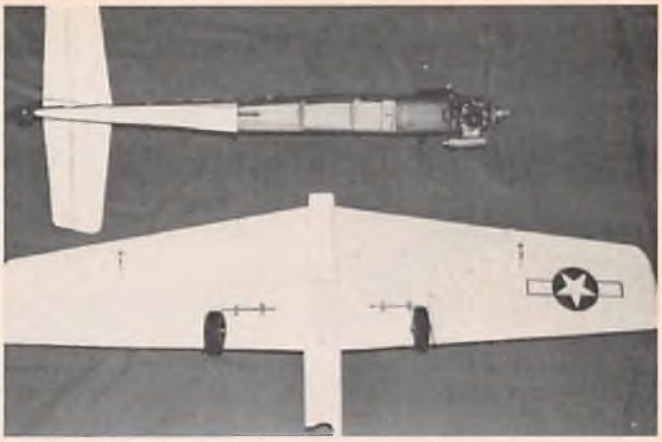
The landing gear wire included with the kit is used to determine the dimensions of the gear from the wing to the wheels. Bend the new 5/32" wire to fit the hardwood rails installed in the wing earlier, making sure that the center of the wheels are even with the leading edge of the wing, unless you enjoy ground looping. Make sure the wheels are parallel to each other, or toed-in slightly, but *not* toed-out.

Fuselage: The kit comes with hardwood motor mounts which I used as per instructions for strength, but I cut out the wood at the engine compartment and installed a Kraft motor mount. The firewall furnished with the kit I had was die-cut incorrectly. One of the motor mount rails came out higher than the other. Since this is a die-cut part, you may find the same situation in the kit you buy, so watch for it or you will have a devil of a time aligning the fuselage.

The distance from the firewall to the

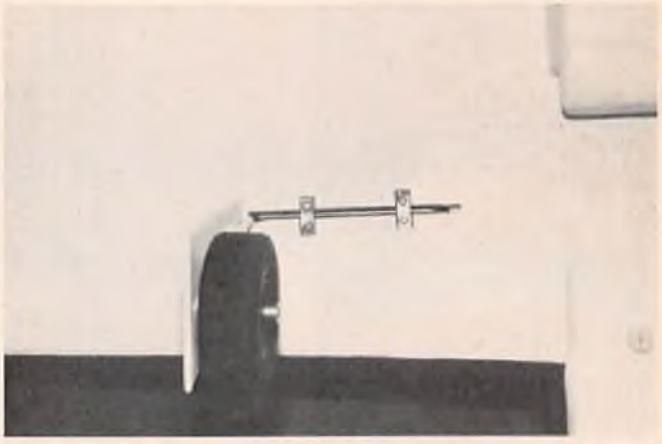


Fuselage before radio installation.



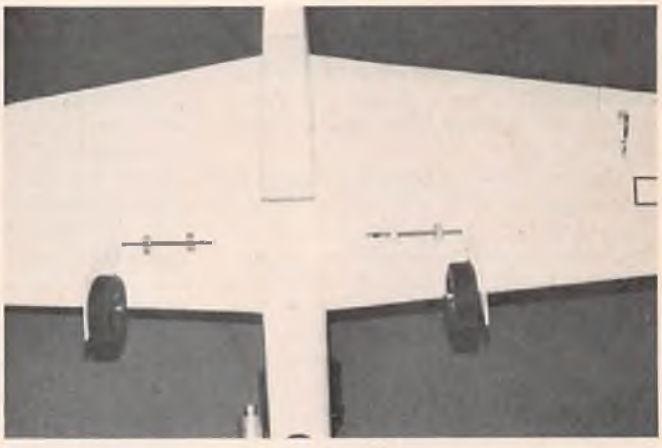
Fuselage showing extent of removed wing assembly.

Wing assembly showing 1/16" piano wire connecting bellcranks of ailerons and nylon bolt hole.



Landing gear installation.

Aileron with screws from control horn covered.

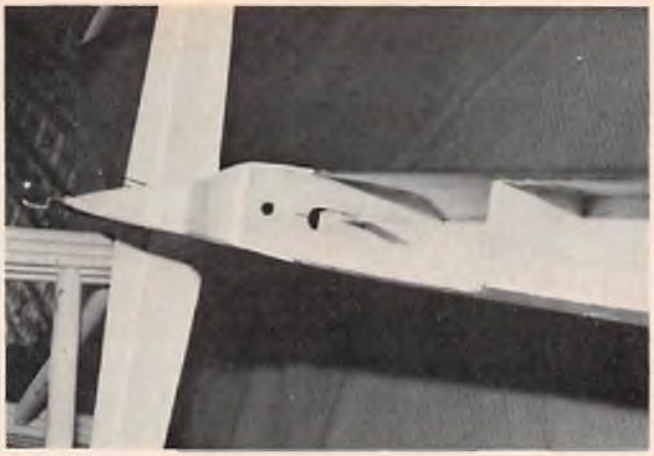


Wing and fuselage together with nylon bolt. Correct position of landing gear wheels in reference to leading edge of wing.

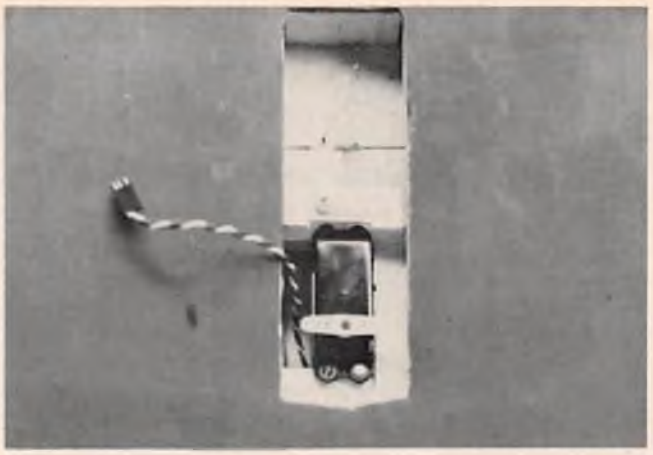
next bulkhead is too short to accommodate a 6 oz. clunk tank, but for the time being, use it as is. Before installing it though, trace its outline, minus the tags that stick through the fuselage, on another piece of balsa wood of the same thickness.

The bulkhead that is positioned just to the rear of the wing seat (and at the end of the canopy) needs to have the bottom portion (the part that sticks out from the main body to form the air scoop) duplicated twice in 3/32" plywood. These are the parts that will hold the dowel in place when the wing is seated.

Now comes the fun. Of course, the control line kit makes no provisions to get into the aircraft after it is built. With a choice of a removable canopy and a fixed wing, or a removable wing, I chose the latter and, as you can see from the photos, I included everything from the trailing edge of the wing to the prop. There are three reasons for this choice: First, whenever I have a plane where I can't get to the fuel tank, that's the plane that is going to have a clogged fuel line in

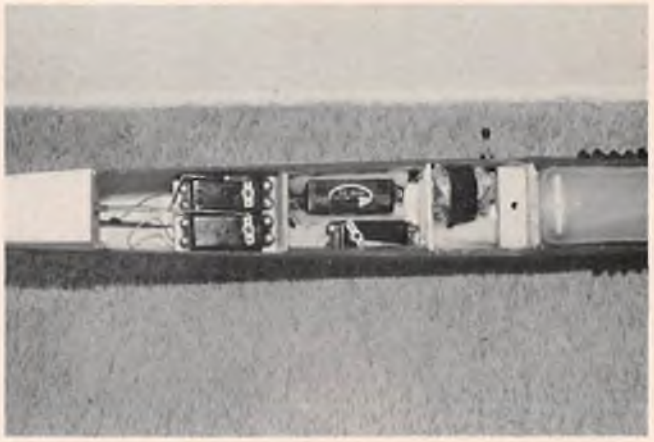


Balsa bulkhead with 1/4" hole to accept dowel from wing assembly. Tail wheel and bracket assembly. NyRod pushrods for rudder and elevator.



Aileron bellcrank and servo installed.

Rudder and elevator servo installation.



Completed radio installation.

the tank! Second, it's hard to get a plane with the wing attached in and out of the back seat of a two door car, and third, and most important, the radio installation is easier.

The fuselage is constructed according to the plans with the following modifications: The tail wheel is moved back so that it is on a direct line with the rudder. Some scale effect is lost, but the installation is simplified. A bent 1/16" wire is fed through the fuselage, through a nylon tail wheel bracket, and bent again for the tail wheel. The nylon bracket is cemented to a small hardwood wedge (motor mount material cut out of the area where the Kraft mount was placed) which is cemented to the fuselage (see illustration).

Put the sides of the air scoop in place, and adjust the forward half for the wing. Then, with the wing in place, the scoop sides are cemented in place on the fuselage *only* along with their bulkheads and one of the plywood doublers previously made, to the back of the bulkhead it was duplicated from. When this dries, place a sheet of Saran Wrap against the front of the original balsa bulkhead, and the other plywood doubler against the Saran Wrap. This ply doubler is cemented to the sides of the air scoop but *not* to the original balsa bulkhead (the Saran Wrap will help you keep the glue off the balsa bulkhead). Finish up the air scoop and cement the front section (in front of the balsa bulkhead) to the wing. When the cement has dried, drill a 1/4" hole through the two ply doublers and the bulkhead. This hole will be used for the dowel that will anchor the wing assembly. For ease of removal, slant the hole down slightly. Now with a sharp X-Acto blade, slice between the forward ply doubler and the balsa bulkhead. The wing with the forward part of the air scoop should now separate from the fuselage with its plywood bulkhead leaving the balsa bulkhead, with its plywood doubler attached to the fuselage.

The fuel tank is now fitted. Cut out as much of the second bulkhead as needed to make room for the tank, and use the duplicate bulkhead previously cut to end the compartment. This is a good time to make sure that the engine and tank compartment are sealed off from the radio compartment. Glass the engine and fuel compartment.

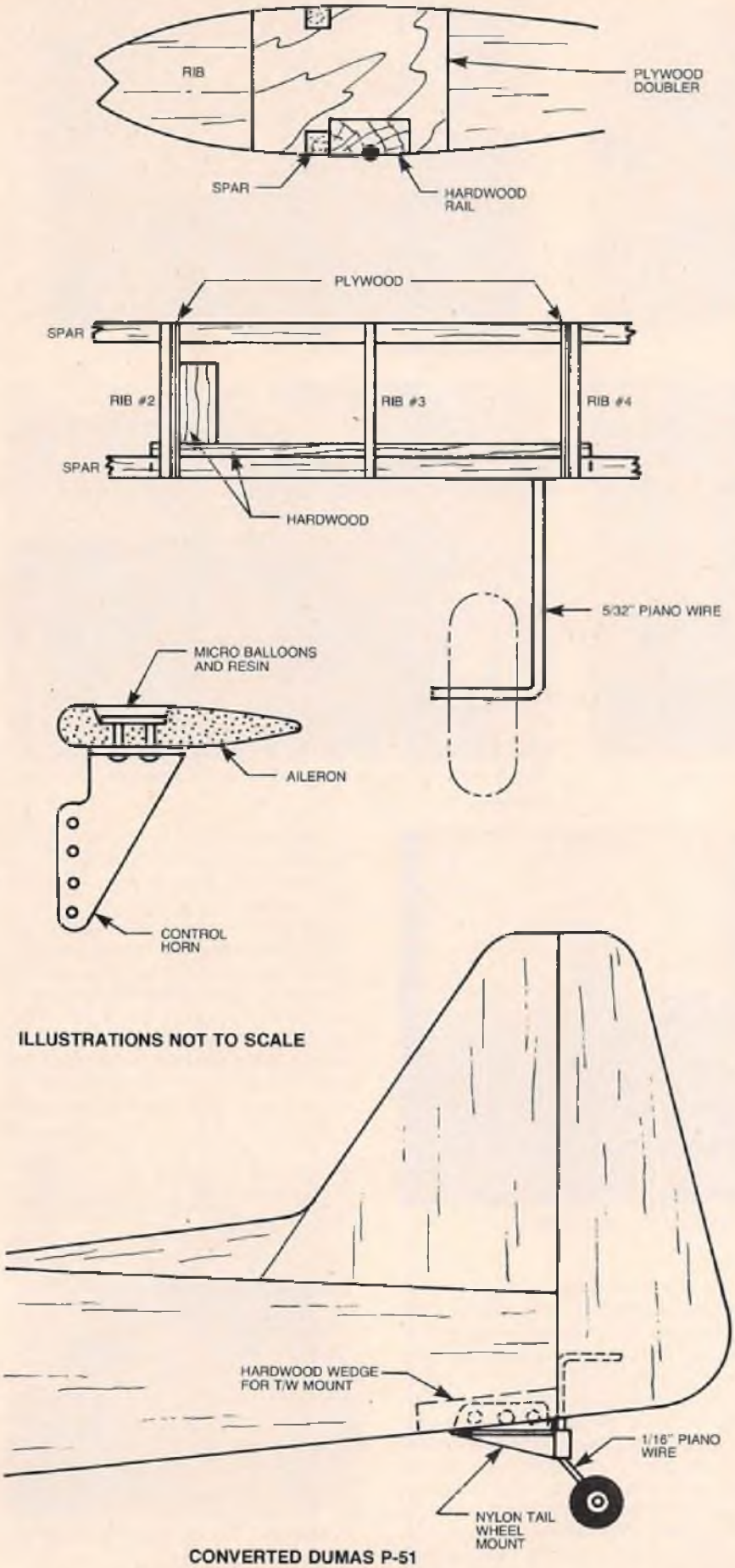
Replace the wing on the fuselage, and fit and contour the bottom balsa block around the engine and muffler, fuel tank, and wing. When finished, epoxy the bottom piece to the wing only. A nylon hold-down bolt fitted to a tapped hardwood brace, finishes the job.

Finishing: The wing and horizontal stabilizer were finished in Permagloss Coverite, and the fuselage, ailerons, elevator, and stab were finished with glass cloth, finishing resin, and Hobbypoxy flat paint.

Radio: The photos show the radio installation. Note that the aileron servo is recessed into the air scoop, and uses a bellcrank to operate the 1/16" connecting wire. Even with three servos far back of an ideal Center of Gravity, my model balanced at about 1/3 of the way from the leading edge of the wing. Note also, that a floor of 1/8" balsa was added to the pilot compartment to contain the radio. The pilot seat was also thickened and contoured for show.

This project was a satisfying one, and a conversation piece at the flying field. I'd love to hear your stories from this project - - - write to me in care of RCM.

□



CONVERTED DUMAS P-51

STORAGE SHED SHOP

By Paul Denson

● Recently, due to a transfer to a new school, it was found necessary to move to a new location in the Northern part of San Diego County. With retirement coming in a few years, it was decided to give the mobile home idea a try. Mobile homes are not nearly as small as we thought, in fact, a double size home is as large or larger than the average three bedroom house. Giving up the two car garage that was the original Balsa Dust Factory was quite a hardship. Mobile homes have only carports, no garages. However, everyone in the park has a steel or aluminum storage shed out in back. Was it possible that a storage shed could be used as a workshop?

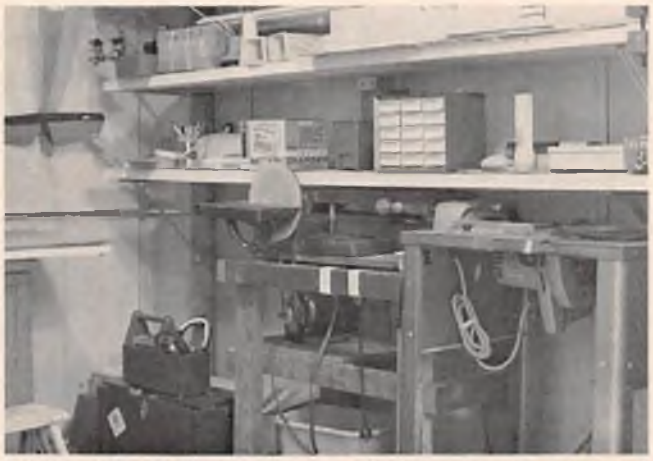
It took quite a bit of searching before we found the proper one for my purposes. Most storage sheds have a low roof so you can move only about two feet each side of center before your head strikes the unyielding steel roof. This particular model purchased from Montgomery Ward, is approximately 10 feet by 10 feet, which is about the size of an average bedroom. The door from threshold to top is a generous 5 feet 9 inches. From the top of the dor to the roof crown is two feet. The average person can walk to any wall without even coming close to the roof. It is necessary that you assemble the shed yourself, thus accounting for a shed name I read recently, "Many tears have been . . ." Jeri and I found the assembly was not too difficult and the only tears that were shed were the results of sore muscles when Jeri fell off the ladder. We do highly recommend that you do not try to assemble the shed in a high wind.

The whole of one side is covered with 12" shelves which start about 4 feet from the floor and go to the ceiling. The power saw and balsa dust sander are stored under the shelves. The back and other side are lined by workbenches. I use two old buffets with particle board surfaces for the workbenches, the particle board extends into the common corner. Just inside the door to the left is a 4 drawer cabinet I bought at a garage sale. It was originally used by the Navy for blueprint storage. I find the three foot long drawers just fabulous for storing things model-wise. The top drawer is for miscellaneous, the second drawer is for balsa wood strips and sheets. It is di-

"Air conditioner" going full blast.

Workbench area.

Left side of shop: tools, paint and dope storage.



Right side of shop: storage shelves, power saw and sander.

vided lengthwise and new wood goes on one side, the other is for cut-offs and scraps. The third drawer holds plastic covering materals, rolls and scraps, and the bottom drawer holds rolled plans. The wall above the side workbench is covered with pegboard which is used for holding the more common hand tools.

Heavy duty tools such as pipe wrenches, smoothing planes, etc., are located in the bottom drawer of one buffet. Engines have their drawer, sandpaper and plywood scraps their drawer, small electrical tools such as soldering irons, chargers and other things electrical share the same drawer. Drawing tools, drills and files also have a separate drawer.

As you can see, the Balsa Dust Factory is also used as my photography studio, I have black and white paper that I can drape across the workbench at the back, set up my lights and camera as shown, and photograph small parts as they are constructed. There, Dick Tichenor, eat your heart out! The magazines mentioned in a previous article are necessarily stored in the mobile-home in the den which contains my desk, the typewriter and table, a drawing board and the music center. Most of the wings are stored in the den on a rack attached high on one wall. The rack is made from aluminum U-channels

"Burning the midnight oil."

that screw to the wall and take the shelf brackets in slots cut in the channel. Just to show you the overhead storage possibilities in the shed, the wee hours of the morning shot shows just the wheels of an Antic Parasol hanging from the ceiling. The Antic Parasol has a 4" projection above the cabane strut used on the Antic Bipe, it takes up every bit of the two feet of distance from the top roof beam down to the door level. I have never yet hit my head on the wheels. Pulleys on the ceiling allow you to hoist the plans up out of the way.

Space in a mobile home is at a premium, it is almost a necessity to carry on a hobby in a workshop outside the home, especially if you only have a single-wide. There is usually enough space outside to put up a storage shed. For those of you who live in a conventional house, consider a storage shed in the backyard, since it keeps the shavings and dope smell out of your wife's domain. We purchased an intercom that plugs into the 110V AC and used the power lines as an antenna, a push of the

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Workbench set up for photography.

HOW TO IMPROVE YOUR BUILDING SKILLS, OR . . . Confessions Of An Insecure Builder

By Jim Kitchen

I have yet to build a model aircraft without making some mistakes during construction. Until recently, my mistakes have never caused any flight problems that couldn't be overcome with normal trim adjustments. But eventually, the law of averages catches up, and in my case, the resulting goof cost me a favorite model, the Sure Flite Piper J-3 Cub.

The "After" picture of my J-3 Cub poses the question, "What caused the crash?" You keen eyed members of the Accident Board probably have observed that the metal elevator link is detached from the pushrod end. A logical deduction would be that the crash was caused by loss of elevator, but how did the link become detached? Answer: Vibration caused the nylon pushrod to screw itself loose because I had thoughtlessly used adjustable metal links at both the servo and control horn connections. Warning! Do not let this happen to you. It flew successfully for several months, but a change from a long to a short elevator control horn contributed to my undoing. A nylon link, solder link, or lock nuts would have saved my model.

Eleven models built over five years of R/C modeling must have taught me something, but I still keep making mistakes. Not that I'm accident prone. I consider myself a typical builder, neither perfect nor slovenly in my model construction. Except for the J-3 Cub which was my ninth model, all have given long and faithful service. We have either parted company by mutual consent, or there were no tears shed when they have finally bitten the dust.

Our mistakes reflect the state of our confidence. Overconfidence leads to carelessness. Lack of confidence causes us to worry, and when we worry, the things that we worry about are more likely to happen, especially when we have — or think we have — some control over the situation. Model building, for example. Assuming that there are no errors in the plans and building instructions, and the model is a well-proven design, then the finished product represents a cooperative effort between our brain and hands.

Most of us have been guilty of starting a kit without properly familiarizing ourselves with plans, building instructions, and parts. We have also completed a kit with a few parts left over. To control a tendency to carelessness, a good rule to follow is the old carpenter's adage of "measure twice and cut once."

BEFORE: A sure Flite Piper J-3 Cub.

AFTER: What was the cause of this crash?

Lack of confidence is a malady common to many newer model builders. If you feel weak in the knees, try this: When you are worried about something, you should think of the worst mishap that could possibly happen if all your worries came to pass. You should then ask yourself what you would do under such circumstances. Since it is unlikely that things would ever get that bad, this should help you to relax, thus making mistakes less likely and helping you to cope with any that do come along. Should your worst fears actually be realized, accepting them will be made easier because you have already thought of a contingency plan. Suppose you are worried about building a straight wing. If the worst should happen, the wing would be so badly warped as to be useless. You would then throw it away and build another. If you anticipate such a possibility and exercise normal precautions in building the wing, there should be no problem with warpage; and if there were, it could probably be corrected by steaming or the application of heat to a plastic film covered wing.

My mistakes are of two types: (1) Those that can be fixed during building, such as broken, missing, or misplaced parts; sloppy fits; poor alignment; and so on; and (2) those that are not discovered until the model is completed, or if they are detected earlier, a decision is made to go ahead and hope for the best. These mistakes usually involve final alignments and finishing.

Mistakes of the first type lend themselves to the technique I have discussed. The worst thing that can happen if

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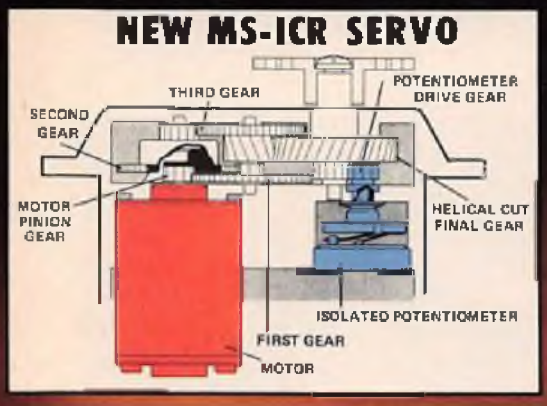
CIRRUS Hobby Shack 700 Series



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Featuring the new innovative design utilizing "Helical Cut" final gear in a servo allowing more bearing surface for smoother mesh, less noise, better wear for ultimate reliability. This is a compact three wire servo that is still rugged and lightweight provident high power output with high resolution and low power consumption. It has two monolithic IC's, 74 transistors, 13 diodes, and 79 resistors for a total of 165 parts. Size - L: 41.5 mm, H: 35.5 mm, W: 19.5 mm.

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any parts are missing, misplaced, broken, or a sloppy fit, is that you have to make new ones using a pattern and the proper materials. You can also damage some parts in breaking them apart because of poor alignment, or you may decide to start over on a particularly bad sub-assembly. You can use the broken or sloppy fitting part for a pattern, or one can be made from the plans. Full scale detailed plans are essential for this purpose, as well as for any future repair work.

The proper materials will usually be the correct size of balsa or plywood sheet. Your mind will be further eased by maintaining a supply of the various balsa and plywood sizes. There could be a problem with stockpiling balsa stock such as that normally used for wing spars, leading and trailing edges, longerons, and so on, because of the many different sizes used for these purposes. My practice is to get several extras of the same size balsa stock whenever I need a particular piece. You can also make your own stock from sheet balsa using a balsa stripper. I have found that triangular stock is especially useful for reinforcing joints such as firewalls, landing gear platforms, fuselage formers, and sometimes rudder and elevator attachments.

This technique should help minimize your mistakes which can be both expensive and time consuming, if you've done something like mis-drilling a motor mount or fouling up a gas tank. I carry this stockpiling concept a step farther by including extra motor mounts, gas tanks, wheels and pushrods; as well as links, keepers, couplers, retainers, etc. This may seem like an unnecessary expense, but think of it this way: You are just getting a head start on your next model, and if you goof up one of these items on your current model, you have saved time and a special trip to the hobby shop. Nylon-glass motor mounts have a habit of breaking in crashes, so you may end up using your spare sooner than you think. I have also had brand-new nylon gas tanks split at the seams, and I usually manage at least one kink in the brass gas tank tubing in any but the simplest installations.

The biggest problem is if you mess up an item unique to a particular kit, such as the canopy for a Platt Spitfire or Top Flite P-39, an ABS molded cowling, some other specially molded part, or a foam wing. About all you can do is to write the manufacturer and hope that he is prompt in answering his mail.

The second type of mistakes are more difficult to deal with. There is no substitute for taking your time, and carefully visualizing how the work that you are doing fits into the total model. To paraphrase that carpenter's adage, think twice and glue once." This is where our individual personalities come into play. One person may be exact near perfection before moving on to the next building step, while another may only be interested in sticking the pieces together. Most of us are somewhere in-between.

FIGURE I
RC MODELS BUILT AND FLOWN
March 1972 to February 1977

Model #	Type	Power	Controls	Purpose	Disposition
1	Top Flite Headmaster	O.S. .19	3	Primary Trainer	Totaled Equipment Failure
2	Top Flite Headmaster	O.S. .20	3	Backup Trainer	Given to Flight Instructor
3	Sterling Fledgling	O.S. .35	4	Ailerons & Breezy Weather	Sold
4	Bridi-RCM Basic Trainer	O.S. .25	4	Ailerons & Tail Dragger	Sold
5	Hotlines Mini-Commanche	O.S. .35	4	Advanced Trainer Low Wing	Totaled Equipment Failure
6	RCM Plans Fokker DVII	O.S. .20	4	Plan Built Biplane Tail Dragger	Inactive Reserve
7	Bridi Super Kaos .40	O.S. .40	4	Advanced Stunt Trainer	Inactive Reserve
8	Bridi-RCM Sportster	O.S. .25	4	Low Wing Turtle Deck Tail Dragger	Back-up Model
9	Sure Flite Piper J-3 Cub	O.S. .15	3	Nostalgic Semi-Scale Tail Dragger	Totaled Installation Failure
10	Mark's Windward	Cox .049	2	Sailplane Trainer	Primary Model
11	Wing Drone	O.S. .40	4	Sport Foam Wing & Plastic Moldings	Primary Model

Lucky for us, perfect alignment and finishes are not requisites for flight. We have all observed models, and wondered how they could fly. Some couldn't, at least not for very long, but surprisingly others did. Those trim tabs on your transmitter and adjustable clevises at the control surfaces can do wonders to overcome minor alignment problems. Of course, your model could be a handful during its first flight, and you can't expect outstanding flight characteristics if permanent trim is going to be needed.

Alignments that may give you concern are: engine offsets, wing dihedral, wing and stabilizer incidences, control surface hinge lines at right angles to the fuselage center line, stabilizer parallel to the fuselage bottom, and rudder fin perpendicular to the stabilizer. I don't fully understand the inter-relationship of all these alignments, but my point is that minor variations should not make that much difference in the flying of a sport or general purpose model. Just take your time, follow the plans, do your best with the available tools, and the odds of ending up with a respectable model are with you.

If you are not satisfied with your model's flight performance, seek the advice of the flying site resident expert. You can always repair the offending problem, but I have found that this is frequently a case of the cure being worse than the illness. Just make a mental note to include this correction the next time your model is out of commission for repairs, and to avoid making the same mistake in future models.

We can all appreciate a beautifully finished model, but many of us lack the patience to produce a similar finish on our own models. We tend to forget that the primary purpose of a finish is utilita-

Model #8, a Bridi RCM Sportster.

Model #10, a Mark's Models Windward sailplane.

Model #11, a Wing Drone.

Tom Vincent, Club Safety Officer, checks the Drone equipment installation for possible mistakes.

Tom Vincent and I make a final control check as the Drone leaves the pits for its first test flight.

The Drone proved to be an excellent all-around sport model.

rian. It protects the airframe from fuel soaking. An ideal finish has both utility and beauty, but utility should be the prevailing consideration.

The plastic film iron-on finishes are a godsend to our hobby. These finishes make it possible for a beginner to produce a creditable finish his first time out. Their advantages are lighter weight, convenience of application (and repair), and the lack of offensive odor. On the con side, they are not as durable and fuel soaking is more of a problem. Their advantages far outweigh their disadvantages, especially to the newcomer who is struggling to get his first model in the air, and to the average modeler who loves airplanes, but lacks the dedication to produce a show-type finish.

It's my theory that lack of confidence is the culprit for many of our mistakes, and experience is the best way to increase our confidence. Sounds just like learning to fly R/C doesn't it?

Have you ever thought about the marked similarity between building and flying skills? For example, the choice of a Royal P-38 as your first R/C model would be unwise from the standpoint of both building and flying. One of the proven trainer type models makes better sense because of less complicated building and their inherent flying stability. The progression of our flying skills gives us the incentive to build more sophisticated models, in turn strengthening our building skills. These building skills are also put to an early test by the repair work necessary to maintain our trainer models in an operational status.

We can further enhance our skills by choosing models that are challenging to both our flying and building know-how. Nothing builds confidence like success. Therefore, we must be careful in our choice of models so that the added challenges, in either building or flying, are within the range of our developing abilities. In other words, "Don't bite off more than you can chew!"

I have tried to select my models so that each model presented a new and unfamiliar feature. This philosophy was touched on briefly in my story "Building Your First Model From Plans", RCM April 1976. This story included a listing of my first five models and my purpose in choosing these particular ones. Figure #1 is an update of this listing to include the eleven models built during my five years as an R/C'er.

My thinking is illustrated by the selection of model number 11, a Wing Drone. I had used my Super Kaos 40 in several club fun flys. There was adequate steering for take-offs, but it didn't handle too well in the slalom taxi events. It flew squirrelly in the bomb drop, and landed a little fast for spot and limbo landings. At the time, I thought about building a sport model that is adaptive to fun fly competitions. Some features that I thought desirable were simple construction, high wing, semi or symmetrical airfoil, medium sized uncowled engine, tricycle landing gear with plenty of nose wheel movement, and perhaps a nose wheel brake.

The Wing Drone caught my eye when it first appeared in kit form. It seemed to satisfy all my requirements, and RCM gave it a good product report in their January 1976 issue. Since Wing's thing is foam wings, I decided that the time had come for me to build a foam winged model. Other features of the kit are: aluminum arrow shafts for pushrods, and plastic moldings for the wing saddle and aileron fairing. I have always used nylon Gold'N-Rods for pushrods, so this looked like a good opportunity to give rigid pushrods a try. The use of plastic moldings would also be a first for me.

It took me nearly a month to screw up my courage to tackle the Drone foam wings. I was particularly leery of using contact cement to apply the cardboard wing coverings; you only get one chance to do it right. This was also my introduction to contact cementing. Some of my worries were that I might apply the cement too thick or too thin, I might skew the placement of those large cardboard sheets, or I might end up with air blisters and wrinkles in the coverings. A fellow modeler gave me encouragement and some helpful hints. He suggested that I prepare the core surfaces by sanding with 200 grit sandpaper, and that I place the newly covered wings back into the core block and weight them down with heavy books to reduce the possibility of warping while the cement cured. I had a few touchy moments during the covering operation, but I am satisfied with the completed foam wings, so my worries were for nothing.

Besides foam, other recent innovations in building techniques have included the use of molded fiberglass and ABS plastics, but balsa and plywood remain the primary building materials. Most modelers tend to stay with familiar materials and techniques which have worked well for them. But I think you owe it to yourself to try some of these new innovations. You may not like them, but

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SAVE THOSE FOAM EGG CARTONS

Before and After. The "egg carton" tops provide an almost unliminted supply of material for fabricating wing ribs. They are stronger and lighter than a standard balsa wing rib.

The basic tool for cutting the foam ribs is a small hot wire foam cutter. Rib templates are fabricated from plywood and the appropriate number of foam blanks for one-half of a wing are stacked between them.

The stack is properly aligned and then held together by two long shaft bolts with nuts.

A completed set of wing ribs is ready to be installed in a sailplane wing. Tapered plan forms present no problems, just be careful of moving the hot wire at the correct speed to reach spar cut-outs, leading and trailing edge locations at about the same time on each template.

Test ribs were fabricated from open cell foam (left), balsa (right), and closed cell "egg carton" foam (top). The relative weights are in grams. The "egg carton" provided the best trade-off of strength and weight.

A typical wing is shown here using the foam rib. On a wing of the size shown (48" span, 9" chord), over three dollars is saved by using foam instead of balsa.

A DIFFERENT TWIST

By Larry W. Sward

● Have you ever noticed the unlimited supply of free wing rib material that is available in your wife's kitchen?

Take a second look at those foam egg carton tops. There is an excellent sheet of 1/8" thick foam just begging to be used for wing ribs in a model airplane rather than be thrown in the garbage. Not only is the foam free, but it is lighter, stronger, easier to build with, and less susceptible to damage than balsa. I have been using "egg carton" foam ribs in everything from sailplanes to pattern aircraft for the last three years and needless to say, I am sold on them.

To prepare a stack of ribs, make two plywood templates and place an appropriate number of foam "blanks" between them. The ribs are then cut using the standard hot wire technique. Thirty minutes is all that is required to make a stack of ribs that are ready to use. The wing (or stabilizer) is then built the same as an all-balsa structure. Spars, sheeting and capstrips are added to complete the flying surface.

On an average size sport plane (.19 to .35 engine), over three dollars can be saved just on wing ribs. This may not sound like much, but over the course of a few planes it does add up.

A weight and strength comparison was made between closed-cell foam (egg carton foam), open-cell foam (florist type foam) and 1/16" balsa. Test ribs nine inches long and of a 15% thick symmetrical airfoil shape were cut from each one of these materials and then capstripped with 1/16" x 3/16" balsa. Each of the foam ribs were 1/8" thick and were assembled using Titebond. (An aliphatic resin glue or some other foam compatible glue must be used.) The results of the test indicated that the open-cell foam was the lightest, but it didn't take impact loading well. The balsa rib was the heaviest (by almost 20% compared to the open-cell foam rib) and would shatter and split badly on impact. The close-cell foam was about 8% heavier than the open-cell foam but impact resistance was excellent. The close-cell foam ribs are just flexible enough to absorb shock without any tendency to split or crack. Their strength is equivalent to, or better than, the balsa rib and substantially better than the open-cell foam rib. In my opinion, the "egg carton foam" wing rib is superior to any other rib I have used.

The proof of their superiority came one afternoon when I flew a .19 powered pattern ship into a tree. The balsa portion of the wing shattered, but the foam ribs only compressed slightly with no signs of structural failure. After two hours repair work, the airplane was ready to fly again. Had the wing been built with balsa ribs, I am sure an entire new wing would have been necessary.

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Modified small hub pulley and bracket assembly mounted on an entrenching tool anchor to avoid unnecessary tow line drag.

By Ed Harris

● I would like to think of R/C Soaring as a sensitive, subtle, and silent approach to flying model aircraft. In that light I expect a greater attention and concern with the total efficiency of the flight system — the sailplane, the electronics, and the launching machinery — than I see in general practice. It is this concern that led me to find a way to modify the conventional bicycle hub turn-around generally used with electric winches. I observed many hub pulleys in operation. They were nailed to the ground. One could clearly see the added ground drag of the line induced by that low anchoring point. One could watch the moving tow-

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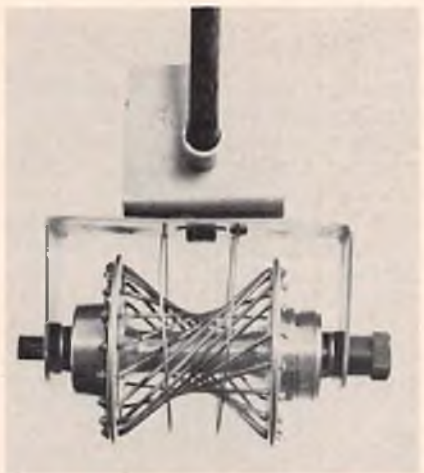
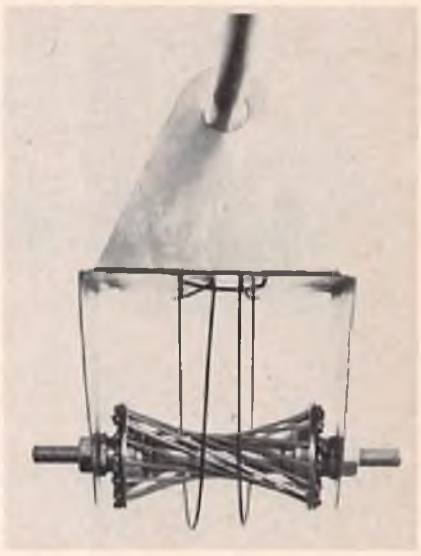


Detail – Top view of large hub pulley.



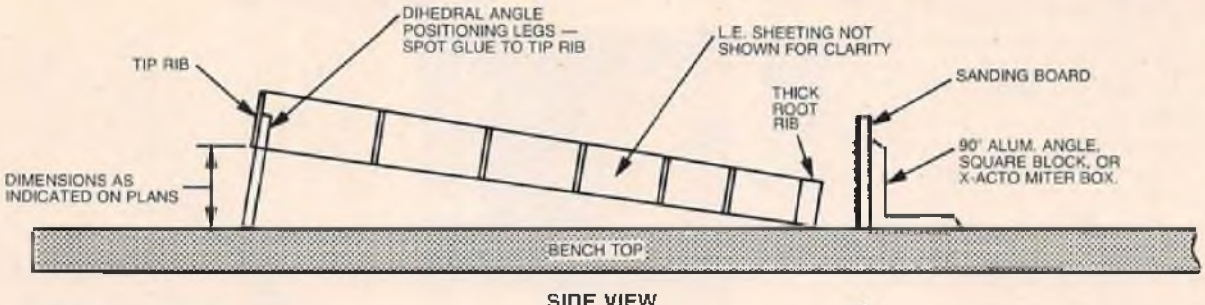
Detail – Top view of small hub pulley.

Detail – Turn-a-round pulley as modified from large bicycle hub.

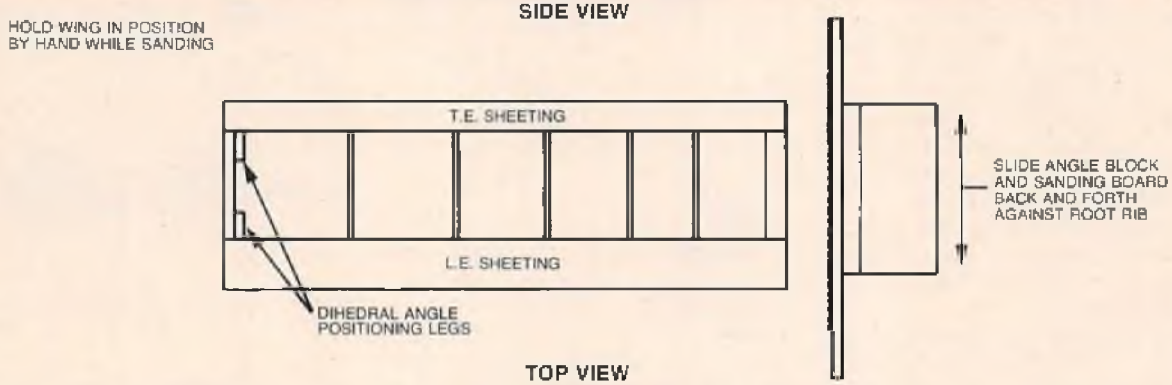
Modified large hub pulley with bracket assembly mounted on a steel rod Z-bent anchor.

Modified small hub pulley and bracket assembly mounted on a steel rod Z-bent anchor.

FOR WHAT IT'S WORTH



SIDE VIEW

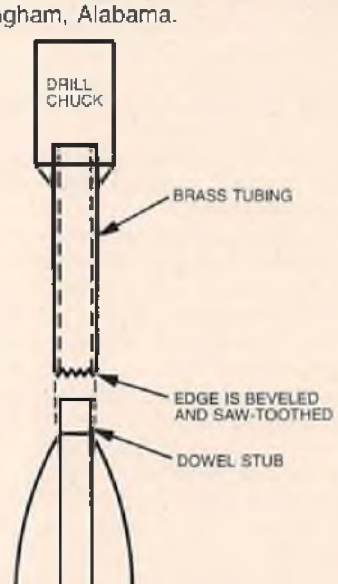


TOP VIEW

Faced with the problem of making a tight, straight 4° angle on his Quickie 500 wing roots, D.G. Mayor devised the method shown on the attached sketch. For sanding tasks, he keeps several sanding boards on hand, each with different grit sandpaper contact cemented to it. 1/4" x 1" lattice wood, which is available at all lumber yard, is excellent for the purpose. Set the wing up on a reasonably flat bench top as shown. Grip the angle or square block with the right hand while holding the sanding board tightly against it with the thumb. Steady the wing gently with the left hand and work the sanding block back and forth until the entire root rib face shows evidence of sanding. You now have an absolutely perfect dihedral angle cut with no curves and perfectly parallel to the ribs. Repeat for the other wing half. The same basic set-up can be used to properly align any thinkness of root rib.

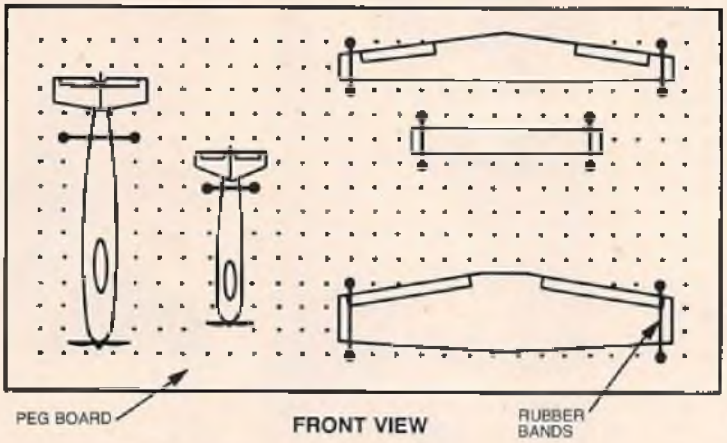
Now you can make your Carl Goldberg Tote Box do double duty for you according to this idea from Dale Hallett of Lyons, Ohio. First, obtain one piece of 2" x 4" x 14" and one piece of 1" x 3" x 20" hardwood. Fasten the two pieces together in the form of a "T" square with the top of the "T" being the 2" x 4". This may be fastened with glue and a couple of wood screws. Drill a hole on each end of the 2" x 4", about 1" in from the ends. With a C-clamp, fasten it to your work bench. Then remove the wire cradles from your C.G. Tote Box, placing them in the holes drilled in the 2" x 4". This allows you to work on your plane, with the wing on or off, on its side or upside down, without danger of banging the fin and stab into the work bench. With a 20" board, you can move the cradle away from your bench, still being secure. It makes a dandy place to sand and outfit a new plane, as the sponge rubber covered wires prevent any damage to a new plane under construction.

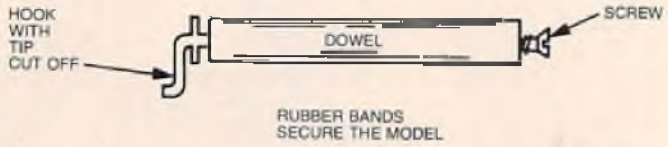
Here is another method to use when you are faced with the problem of a broken wing dowel which usually requires a great deal of effort to remove. A quick and easy cure is to obtain a length of ordinary brass tubing whose inside diameter is the same as the diameter of the dowel. The tubing is then sharpened on one end with a file, or other means, to put several "saw teeth" on the cutting edge. The tubing is then chucked in an electric drill. Place the tubing over the dowel stub and slowly feed it along the dowel until the stub is removed. Proceed slowly so as to avoid over-heating the brass tubing. This method also works for removing broken self-tapping screws in plastic or wood motor mounts. This idea was submitted by W.I. Whitten of Birmingham, Alabama.



Brad Lang of West Orange, New Jersey, has often thought of different ways to suspend his aircraft in order to store them. Finally, he found an easy and inexpensive way while, at the same time, providing instant access to the models if you chose to go flying. His ideas consist of the items shown in the sketch. First, cut the curved tips of the pegboard hook off using the saw blade. Then saw the dowel to the desired length. Brad used dowels 1" in diameter and cut them into 8" lengths. Drill out the ends of the cut dowels so the wire hooks (which aren't hooks anymore) fit into them to form a snug fit. These can be Zapped to secure

FOR WHAT IT'S WORTH



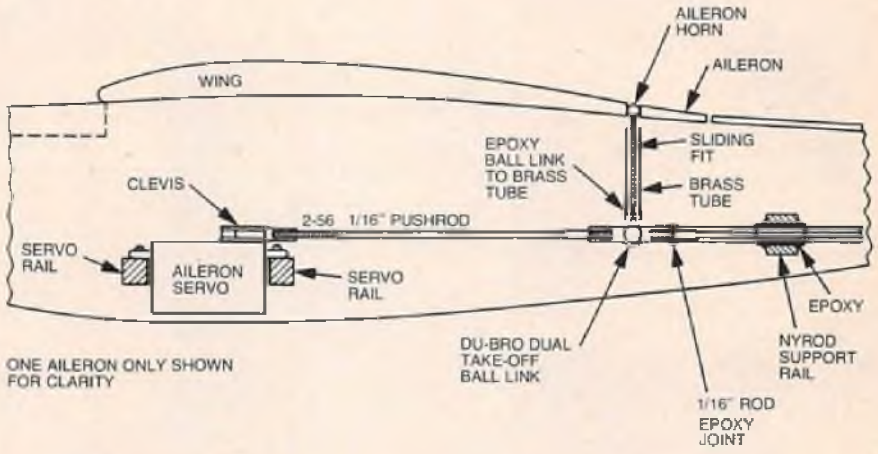


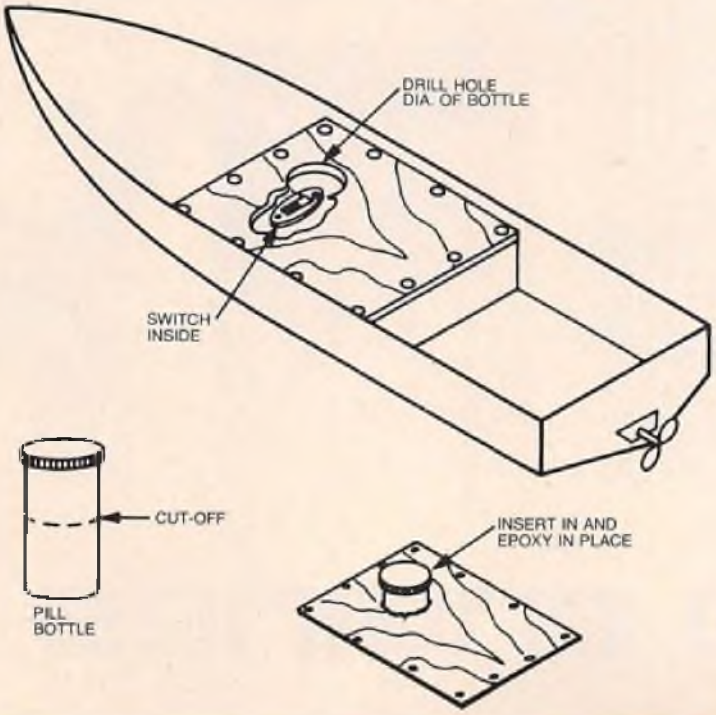
them firmly. The wood screws are screwed into the front of the dowels. Now you have sturdy "dowel hooks" which can be positioned on the pegboard in order to accommodate any aircraft fuselage or wing. The final sketch shows the finished product.

James Middleton of Medford, Massachusetts, suggested this hint for R/C boat enthusiasts. As with all boats, a waterproof radio box is needed and it takes about a dozen screws to hold the cover on, so, to avoid taking off all those screws, you can use a plastic medicine bottle and cut off the bottom half and drill a hole the diameter of the bottle in the radio cover, epoxy it in and mount the switch under the bottle top. Now all you need do is take off the pill bottle cover when you turn your receiver on and off.

When replacing damaged hinges that were pinned in with toothpicks, the problem is to remove the toothpick. A drill will usually slip off and make a mess. Dr. John R. Agnew of Fort Myers, Florida, suggests taking a 2" length of 3/32" O.D. brass tubing, sharpen one end on a grinding wheel, put it in the chuck of your drill, and drill the toothpick out cleanly. The toothpick captures the tubing so it can't skate around and tear the covering material.

Michael J. Korb of Clark, New Jersey, submitted the sketch of a quick release aileron assembly for R/C aircraft. This method eliminates the need for mounting your aileron servo in the wing.





H.A. Schremp of Clinton, New Jersey, suggested this quick accurate method for balancing propellers. Use either with the hand held or bench mounted prop balancers. The key ingredient is an aerosol can of clear shellac. Spray the lighter of the two blades with one or two fine coats, allow to dry for a few seconds, re-test, then repeat as necessary. A dozen proellers can be balanced in just a few minutes and the length and tip design of the propeller are not altered in any way. □

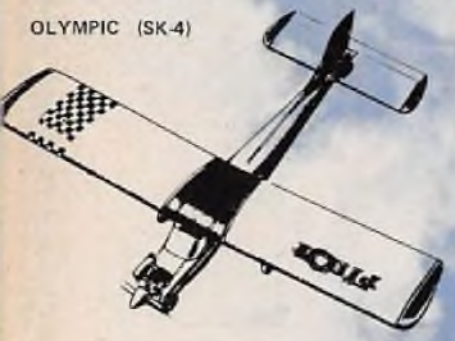
Send your hints & kinks to R/C Modeler Magazine, P.O. Box 487, Sierra Madre Ca. 91024. If used in this column, you will be awarded a 1 year subscription to RCM.

BOX FLY (SK-7)

JR. BOX FLY (SK-2)

SHELL FLY B (SK-3)

OLYMPIC (SK-4)



CARDINAL (SK-5)

CHEROKEE (SK-6)

GLASS HAWK (SK-7)

The kits we are illustrating in this advertisement run in different series depending upon the type of construction they feature.

BOX FLY SERIES

The BOX FLY SERIES feature plywood fuselage construction with foam wings covered with plastic. The JR. BOX FLY (SK-2); $24.95 - is a hand launched beginner's model. The STD. BOX FLY (SK-1); $34.95 - is an all around fun plane and trainer used with .20 and .30 size engine. The 40 BOX FLY ($45.95) - is a tricycle gear, low wing airplane which has a plywood-balsa fuselage.

DAS BOX FLY SERIES

The DAS BOX FLY series appeals to the slightly more sophisticated builder than the BOX FLY series in that the wings are built up and not out of foam. There are quite a number of models in this series. The 10MG (P-8); $24.95 - is a motor glider which uses a small .10 engine to get the model way up in the air, then acts as a glider. 15H ($22.95) - this is a small shoulder wing model designed for a .15 or .20 engine. It is a light low wing loading model which is slow on the controls and, therefore, an excellent trainer - it's a "floater". The 20S (P-6); $29.95 - and the 20L (P-5); $34.95 - are respectively a shoulder wing and low wing model. The "20" in the identification number is misleading because these models really fly better on a .30 or .40 size engine and have plenty of beef to take the larger engine. The 20W (P-7); $39.95 - is a bi-plane and definitely needs a .30 or .40 size engine.

VACUUM FUSELAGE AND FOAM WING SERIES

These PILOT kits have been traditionally sold by WORLD ENGINES and will be familiar to many of you. The SHELL FLY B (SK-3); $59.95 - is a tricycle landing gear low wing aerobatic airplane. the SKY-WAGON (P-9); $59.95 - is a .40 size tricycle gear trainer with ailerons. The OLYMPIC (SK-4); $42.95 - is a 3 channel, .20 size trainer. The CARDINAL (SK-5); $42.95-and CHEROKEE (SK-6); $42.95 - operate on .25 size engines and can accomodate, with some modification, 4 channel systems, however, they are basically 3 channel airplanes.

WORLD ENGINES KITS

The MULLIGAN (P-1); $47.95 - is an all plywood and balsa model with a nylon cowl. A sister to the MULLIGAN is the WORLD ENGINES CUB (P-2); $39.95 - and likewise the coming AERONCA CHAMP (P-3); $39.95 - fall into this kit series. The MISS WORLD (P-4); $49.95 - is a super easy to build trainer with built-in crutch, motor mount, servo tray, and landing gear retainer. Standing alone in the sequence is the fiberglass GLASS HAWK (SK-7); $49.95. This model features an all-fiberglass fuselage with wirecut foam wing and tail parts. An excellent fully aerobatic model.

WORLD ENGINES

INCORPORATED · 8960 ROSSASH AVE., CINCINNATI, OHIO · TELEPHONE (513) 793-5900 · INTERNATIONAL TELEX 214 557

WORLD'S BEST HOBBY DEALERS

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Franciscan Hobbies
1935 Ocean Ave.
San Francisco, CA. 91127

Hobby Warehouse
4128¼ South St.
Lakewood, CA. 90712

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120 W. Holt Blvd.
Ontario, CA. 91761

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8941 Reseda Blvd.
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Burbank, CA 91505

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Jacksonville, FL 32211

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4926 E. Broadway
Tampa, FL. 33605

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802 S. Edgewood
Jacksonville, FL 32205

Gasand Hobbies
805 Wood Rd.
Seffner, FL. 33584

The Hobby House
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Maitland, FL 32751

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1423 Tenth Ave.
Honolulu, Hawaii 96816

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M n'M Radiomodels
5544 W. 147th St.
Oak Forest, IL. 60452

Slot & Wing Ltd.
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Champaign, IL. 61820

Stanton Hobby Shop
4736 Milwaukee Ave.
Chicago, IL. 60630

West Side Hobby
2629 West Main St.
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Elkhart, IN 46514

Heuberger's Hobby Shop
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Bremen, IN. 46506

Hobbyland
343 Lincolnway West
South Bend, IN 46601

Jackson Enterprises
118 N. 3rd. St.
Lafayette, IN. 47905

Mutchler's Hobbies
217 E. 5th St.
New Albany, IN. 47150

Spencer's Craft & Hobby
2015 Ewing St. Rd.
Seymour, IN. 47274

KANSAS

Campbell Electric & Hobby
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Concordia, KA 66901

Tom's Hobby Shop
208 Poyntz
Manhattan, KA 66502

Modeler Hobby Shop
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Worcester, Ma. 01610

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Hobby World
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E. Detroit, MI. 48021

Joe's Hobby Center
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Joe's Hobby Center
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Rider's Hobby Shop
115 W. Liberty St.
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E. Lansing, MI. 48823

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MINNESOTA

Medical Center Cycle
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Miracle Mile Mall
Rochester, MN. 55901

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Lincoln, NB. 68508

WORLD ENGINES - GLASS HAWK 460

WORLD ENGINES - MR. MULLIGAN

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Kirtland, Ohio 44094

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Redmond, WA 98052

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London, Ontario, Canada

ITALY

Model Club Shop
Barcella 22, Mestri
Venice, Italy

showcase '78

All items appearing in Showcase '78 are press releases supplied by the manufacturer of the product and/or their advertising agency unless otherwise specified. The appearance of an item in Showcase '78 does not necessarily constitute an endorsement of that product by R/C Modeler Magazine.

NEW CATALOG FROM APTEX

The Aptex Corporation announces a new catalog for the bench and hand tools it manufactures. The catalog includes a double clip and single clip work holder for soldering, gluing and assembly work, as well as hand-held and base mounted magnifiers, ten different tweezers and a variety of knife blades and handles. These tools are designed for modelmakers, assemblers, jewelry makers and other craftsmen. They make all types of assembly work faster and easier. For a free catalog and price list, contact the Aptex Corporation, Box 59, Bethel, Connecticut 06801. Phone (203) 792-5705.

18-WHEELER

Pro-Cision Products streaks into the radio controlled field with unique new 18-Wheeler Truck/Trailer just in time for Nation's "hobby month" and Christmas sales. Joe Baer, Product Developer/Designer, shown in photo, explains the many functions of the 18-Wheeler to young "trucker" Mike Kelly. This 18-Wheeler has the support of the Allied Van Lines — who enthusiastically lent their name and design to the rig. Direct inquiries to: Pro-cision Products, P.O. Box 60643, Terminal Annex, Los Angeles, California 90060.

HARDWOOD MERCHANDISERS

Midwest Products Co. Inc., announces the addition of Black American Walnut and Genuine Swietenia Mahogany to their extensive Balsa and Basswood line. These woods feature the same "Micro-Cut" processing and are carefully selected from top quality hardwoods. Available in the most popular sizes 24" long. Also, a new merchandiser is offered for Basswood, Mahogany, or Walnut. It is free standing or can be wall mounted, requiring only 19" x 11" of counter space. Each unit comes pre-assembled with an assortment of wood. Available now. Midwest Products Co. Inc., 400 South Indiana Street, Hobart, Indiana 46342.

SOLDERING MANUAL FROM HEATH

Heath Company, world's largest manufacturer of electronic kits, announces the availability of another in their series of self-instructional products. This self-learning manual is intended to teach all that is required for an individual to solder like a professional. The manufacturer says that good soldering is a very important aspect of kit building and points out that the majority of kit malfunctions can be traced to soldering mistakes. Everything that is needed to learn soldering, except a soldering iron and small hand tools, is included. The manual uses effective programmed instruction techniques. Also included is a comprehensive final examination and a complete glossary of soldering terms. The accompanying practice kit gives real "hands-on" experience in soldering and unsoldering. Heath believes the new course could have value in industrial training programs, as well as instruction for the individual. For more information about the EI-3133 Soldering Manual, which is mail-order priced at $9.95, write for a free catalog to Heath Company, Dept. 350-380, Benton Harbor, Michigan 49022. Quantity discounts are available to qualified schools and businesses.

FRENCH PACIFIC LIVE STEAM LOCOMOTIVE

The sixth (6) in the series of #1 Gauge Live Steam Locomotives presented exclusively by Polk's International Distribution Center at 346 Bergen Ave., Jersey City, New Jersey, was unveiled at the Atlanta Hobby Show and enthusiastically received by the hobby shops in attendance. This giant 4-6-2 model is a work of engineering excellence with Aster Hobby of Japan (the makers) reaching the peak of fidelity to scale and operating performance on this model. The total range now has the JNR, British Schools Class, 0-4-0 Old Faithful, Virginia & Truckee Reno, The Shay and the French Pacific. Recent interest in live steam has sparked the sales and demand for this range of locos that are available in kit and ready-to-run form. The Shay loco has been the recipient of articles in most magazines in recent issues. The Shay loco is very beautiful in any gauge or size but, in #1 gauge it shows off its detail and elegance better than in any size. The French Pacific carries a suggested retail price of $1200.00

in kit and $1500.00 built up. The Shay is $1000.00 in kit and $1200.00 ready-to-run. Shown in the photo is Nancy Horne, operating head for the Atlanta Hobby Show having the Live Steam Loco details explained by Nat Polk. The French Pacific is at the bottom of the picture and the Shay loco is at the very top. The display showed the locos in operation and the visitors were delighted.

TATONE MUFFLER

Tatone Products Corporation, 1209 Geneva Ave., San Francisco, Calif. 94112, now has available a new muffler to fit .29, .35 and .40 rear exhaust engines. Tests have shown that this muffler will effectively reduce 10 to 12 decibels with little or no power loss. It blends a proportional volume expansion chamber with triple reflective tail cone baffles into one unit for quiet effective heat dissipation. The muffler is machine cast aluminum, weighs 2 ounces, and is easily attached to the engine with two screws. This muffler is now available at $11.95, catalog number 305-RX. Rear exhaust mufflers will soon be available for the .15, .19, .45 and .80 engines, prices to be announced.

HAWK

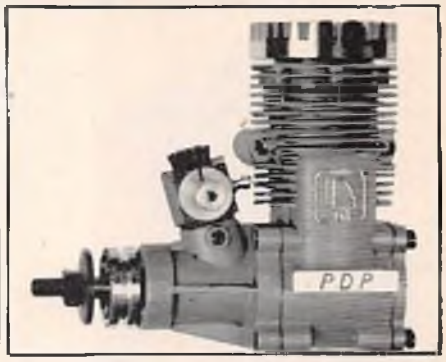
Midwest Products Company, 400 South Indiana St., Hobart, Indiana 46342, welcomes you back to the pleasures of radio control soaring with the Midwest Hawk. The Hawk is an almost ready to fly kit. All you need is iron-on covering material for the flying surfaces, primer and color paint for the fuselage, then install your gear. Only the toughest materials available are used to provide an airplane that is almost indestructible. Each Hawk is shipped in its own molded foam case that can be used when going to and from the flying field. Replacement parts are available. See your dealer today.

DU-BRO PROP DRIVE UNIT

Du-Bro Products Inc., 480 Bonner Road, Wauconda, Illinois 60084, announces their release of their Du-Bro Prop Drive unit. This smooth running, belt driven unit, opens up a whole new dimension in large R/C scale and sport models. Now you can build big and have a scale size working prop too! Specifically designed to accept .60 size engines, the Du-Bro prop drive unit will fit any engine with a 1/4" shaft and will easily power airplanes weighing up to 20 pounds. Now those big, old timers with extra large cowls aren't impossible anymore. Slow powerful flight is achieved with this unit, making those old time aircraft look and sound especially realistic. 20", 22" and 24" wood props are available from Grish Bros. Rpm's ranging from 600-5000, depending on engine and prop used. The ultimate power unit for Bud Nosen type airplanes. This unit comes completely assembled, ready for engine installation. Price is $100.00.

PARATROOPER KIT

The Desert Runway Hobby Shop, is now manufacturing a Paratrooper kit, complete with nylon parachute that is 3½ feet, made of nylon, with 2½ foot shroud lines, with reinforced seams. The parachutes are available separately. Prices may be obtained by writing the Desert Runway, 21028 Golden Triangle Road, Saugus, California 91350, or by sending check or money order in amount of $7.95, shipped prepaid in the United States. Add $2.50 for overseas.



HB ENGINES

HB Engines are here. Now enjoy all kinds of flying and forget about stalling. HB Engines are precision-made for power, performance and reliability even at the lowest idling speeds. Every HB Engine includes a Perry carburetor. Plus, several models offer Perry Directional Porting for increased power (up to 1500 rpm's more). Let HB precision, maneuverability and speed satisfy the Baron in you. For a complete catalogue, see your local dealer or write: HB Engines, Helmut Bernhardt Precision Movements Co., P.O. Box 6, New Canaan, CT 06840 (203) 966-8781. Dealership Inquiries invited.

POLYESTER GLASS RESIN

Polyester Glass Resin, just introduced by Fibre Glass-Evercoat Company, Inc., 6600 Cornell Road, Cincinnati, Ohio 45242, is a new resin for the hobby market. It can be applied in single coats or laminated. It dries hard, tack free, and very sandable in two hours. Polyester Glass Resin is available in pints and quarts with hardener and poly mixing cup — retails for $4.80 and $7.00.

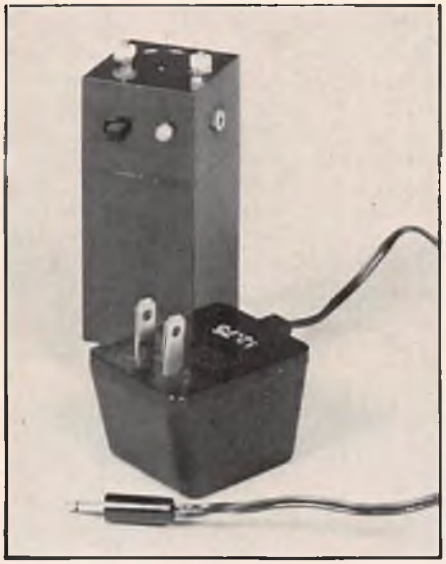
CORELESS MOTOR SERVO

Considered the most advanced servo available to R/C modelers, MRC's MR80 features high efficiency, long life and extremely fast response time. It is one of 8 MRC servos now on the market. Suggested retail $64.95. Explaining the benefits, Frank Ritota, manager of Model Rectifier Corporations's radio control department, explained that with a coreless motor, longer life results from less induction sparking; high efficiency because the iron loss is zero; and the fast response time (.5 sec. transit time, approximately) is a result of reducing inertia through the small mass of the rotor. The servo is excellent for aircraft as well as cars. Tight, fast and smooth, the expert and competition flier will appreciate the performance. As it is a ball bearing design, the output gear is supported so vibration normally associated with R/C race cars will not effect the servo. Other features of this advanced coreless servo, which measures 1¾" x 7/8" x 1⅜", include one of the thickest mounting lugs available; a choice of 5 different output arms with each servo allow the modeler a broad selection. They include one triangular, one medium disc, one large disc and two different arms. Signetics I.C. 544A gives the servo speed and power and minimal deadband. Servo centering is easily adjusted through a hole provided on the top of the case which contains the shaft of the centering pot. Servo weight 2.1 oz., torque 50.5 in./oz., idle current 5.8 ma. Other servos in the line include standard and reverse, ball bearing, mini servos, heavy duty retracts; and hi-torque units.

THE STING

Myers Airplane Products, 3911 E. Downey Ct., Simi Valley, California 93063, announces a new R/C plane in the line-up for '77. "The Sting" is an exciting .40 powered sports pattern ship. It gives you the economy of a .40 with the ability of a .60 and features an epoxy fi-

berglass fuselage at 11 oz., and foam wing cores with 1/64 ply skins. All parts are machine cut and sanded. The hardware package includes; a complete stearable nose gear assembly with mounting screws and blind nuts, main gear mounting plates and screws, torque rods, elevator and rudder horns and hinges. Also included are a set of detailed plans and instructions for quick assembly. The kit comes with fixed gear, but will accept retracts while at the same time supporting a pump motor. The wing span is 53" with a wing area of 560 square inches. It is 43" long and weighs in at 5½ pounds. "The Sting" is perfect for your first low winger. Only $89.95 at your local dealer.



MODEL 771 STARTER BATTERY

The Model 771 starter battery, just released by Flight Dynamics, Inc., features the Gates GellCell battery with an overnight charge cycle, up to 200 charge/discharge cycle life and 2.5 AH @ 2.2V for excellent starting in all weather. In addition, the unit features solid state logic circuitry to provide indication of glow-plug continuity as well as battery "on" condition. While designed specifically for the Cox 1/2A motors, the unit performs satisfactorily with the larger motors. As a safety feature, the "Test/Off" switch position limits the battery output to 10 ma @ .7V, reducing the possibility of causing a fire by accidental shorting in your flight box. Available from FDI, 4708 SE Johnson Creek Blvd., Portland, Oregon 97206.

NEW FREE HEATHKIT CATALOG

The latest Heathkit Catalog lists nearly 400 electronic products in kit form. Among new products featured in the catalog are: three new high-performance frequency counters, a "budget-priced" stereo FM-AM receiver, new learn-at-home electronic courses in Amateur Radio and Electronic Circuits. An updated selection of informative electronic books including many new titles on computers and microprocessors is also included. The catalog also describes nearly 400 electronic kits including automotive and marine accessories, amateur radio equipment, test instruments, home convenience items, stereo equipment and color TV's. The catalog is available free from Heath Company, Dept. 350-34, Benton Harbor, Michigan 49022.

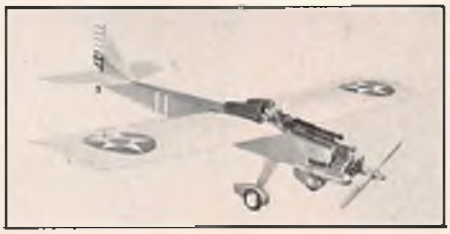
QUICKEE 18

The Quickee 18 is an almost-ready-to-float two channel boat designed for .049 to .10 aircraft engines. The kit is of all molded plastic with no further trimming or shaping needed. There are only five structural parts which means faster assembly. In fact, you can assemble the Quckee 18 in 18 minutes and you can build your second one even faster. No painting is necessary and it can be left gleaming white or, if you prefer, painted

with epoxy or polyurethane. All linkage hardware is included and nothing extra is needed to hook-up the servos. Even the first time modeler will have no problems with the step-by-step photo instructions included with the kit. The Quickee 18 is virtually unsinkable since the instructions detail a simple flotation chamber. It utilizes a tunnel hull for speed and stability and is shaped like a real racing hull; uses any two channel radio; and has a radio compartment that is 6½" long, 7¾" wide x 2¼" high. The simple air prop drive is perfect for the beginning modeler. Available from your local hobby shop or from Ram Models, 3631 North Kedvale Avenue, Chicago, Illinois 60641. Retail price is $24.95.

BUCKER BU 180 STUDENT

Three exact scale kits, by the designer of the famous Senior Telemaster, are now available from Hobby Lobby International, Route 3 Franklin Pike Circle, Brentwood, Tennessee 37027. Before World War II, airplanes had to be designed to carry two men aloft with engines that only developed between 50 and 100 horsepower. This low power necessitated aircraft designs that translate almost amazingly well to the R/C hobby. The Klemm L 25 d, Bucker Bu 181 Bestmann, and the Bucker Bu 180 Student are exact scale except for minor changes to the wing airfoil. All three have unusually large wing areas in relation to the engine size requirement. The wing spans may appear to be large enough for .60 size engines, but they all use high lift, low speed airfoils (as did the full scale originals) so they fly realistically on .20 to .40 size engines. These kits were designed by Karl-Heinz Denzin who designed the Senior Telemaster. Now you can have the same gentle sort of performance from airplanes that could win Scale for you at the Nationals. The Klaus Krick Bucker Bu 180 Student has a wingspan of 75.5" with a total wing area of 645.7 square inches and a fuselage length of 47.6". Gross weight is 5.3 pounds with a wing loading of 16.2 ounces per square foot. Recommended power is .23 to .40 cubic inches. The model was based on data found in a pre-war manual and to a much larger extent on an original aircraft beautifully restored by the aircraft collector Fritz Ulmer of Goppingen, and is absolutely true to scale in its outlines. This kit includes a well-detailed fiberglass fuselage with cowl and cockpit. The remainder of the kit is balsa construction. The wings plug into the fuselage like glider wings, and have special hardware to make aileron linkage hook-up. The hardware includes scale wheels, tailwheel, and detailed English building instructions are included. The price of the Student from Hobby Lobby is $99.95.



KREIDEL P-5 AND T-5

Kreidel Engineering, manufacturers of the superfast Quicker F-500 sport/pylon racer, has now introduced two new "Mock-Scale" variants of this popular design. Both P-5 and T-5, acrobat/sport and advanced trainer, respectively, feature half-span flaps affording super slow flight and great flexibility for the pilot. The T-5 offers tri-gear simplicity while the P-5 taildragger comes with a single Williams machine gun kit for "Mock-Scale" realism. Both come supplied with Williams pilots. Both give great sport and fun and an opportunity to impress your buddies with "flaps-down — slow fly-bys." After several get acquainted flights, Kreidel reports that pilots are thrilled and amazed at the slow flight performance offered. And with flaps up and a hot .40, the craft behaves like their rock-steady, super fast sister ship the Quicker F-500. The kits employ select materials and all 4 fuselage sides are machined to simplify dead true construction. The foam core, fully sheeted wing is very rugged. The T-5 and P-5 are basically the same as the top winner Quicker F-500 except each offers specialized flight and handling features. All fly with truly unusual precision and ease of control. Either kit is available for $45.95 plus $1.50 shipping from Kreidel Engineering, Box 1783, Whittier, California 90603.

G-GUN

A-West, P.O. Box N, Chula Vista, Calif. 92012, adds a curved-tip syringe to their line of applicators. The tip has a .025" orifice, and is tapered to allow cutting to any larger size required. The G-Gun is useful for applying lube compounds, glues or latex/plaster mold materials where desired, without waste or damage to nearby areas. Capacity of the high-pressure syringe is 1/2 fl. oz. A stamped envelope will bring descriptive literature on the complete line of applicators. Price of the G-Gun is $1.50 from A-West.

TRIMIT

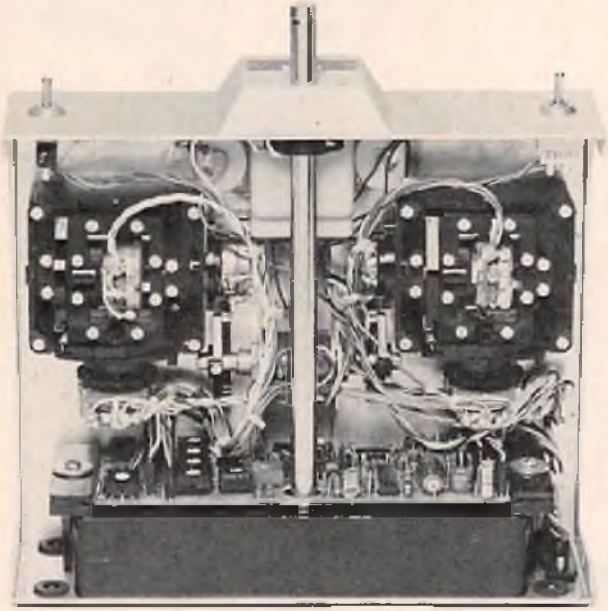
Coverite, 2779 Philmont Ave., Huntingdon Valley, Penn. 19006, introduces Trimit. This microblade cuts all iron-on coverings, silk, nylon, and tissue. It will outlast any razor type blade and has a T-square head that makes trimming easier; a curved blade protects tabletops and wood models. Its protective cover keeps blade clean and allows for carrying in pocket. Available now at retail outlets for $1.19.

BoLINK ACQUIRES MACH 12

BoLink Industries, P.O. Box 80653, Atlanta, Georgia 30366, has acquired all the tooling, inventory and assets of Mach 12 R/C Products of Seattle, Washington. Effective at once, all Mach 12 items will be available through BoLink Industries. Included in the purchase were four 1/12th scale bodies: Can Am Shadow, Midget, TI-22 (Can Am) and a wedge dragster. The acquisition also gives BoLink their own chassis. To be called the Mach 12 Racer, the car features machined one-piece aluminum wheels — 1½" wide rear and 1¼" wide front — strong, yet lightweight, all metal construction. It is truly a 1/12th scale radio control car kit that handles as good as it looks. Looks and handles like a championship 1/8th scale car. Designed and developed by R/C car enthusiasts for R/C car enthusiasts who want the very best. The entire kit will be available or parts separate. Look for an entire new electric car from BoLink in 1978. □

RADIO SPECS

KRAFT KP-7C
SERIES 77



KRAFT KP-7C
7 CHANNEL COMPETITION SERIES RADIO SYSTEM

MANUFACTURED BY
KRAFT SYSTEMS, INC.
450 W. CALIFORNIA AVENUE
VISTA, CALIFORNIA 92083

FEATURES

TRANSMITTER

- Number of Channels: 7
- Case Material: Textured vinyl covering aluminum case.
- Type Gimbals: Precision open gimbal sticks for greater control accuracy (direct drive from potentiometer) with adjustable stick length.
- Power Supply: 550 MAH heavy-duty, vibration resistant nickel-cadmium, fast charge batteries.
- Type Meter: Two electronically expanded meters read R.F. and transmitter voltage and also converts to read receiver voltage.
- Modes Available: Mode I, Mode II, and single stick version.
- Frequencies Available: All 72, 53, and 27 MHz.
- Weight: 2 lbs., 3 oz. (single stick: 2 lbs., 4 oz.).
- Size: 6" x 7.1" x 2" (single stick: 5.8" x 7.25" x 2").
- Unique Features: Frequency changing is simplicity itself with external plug-in R.F. modules which allows instant conversion to any of the 17 frequencies used for radio control and any new ones that may be allocated in the future. Antenna retracts into case. Trainer system is standard. Unique modular design multiplex linear ramp encoder. E.S.V. that checks both transmitter and receiver batteries under load.

RECEIVER

- Case Material: Lightweight, high impact, injection molded plastic (except KPR-7D which is anodized aluminum).
- Three Optional Receivers Available: KPR-7C, with plug-in R.F. section for instant conversion to any of the available R.F. frequencies. KPR-7L, a subminiature receiver. KPR-7D, advanced dual conversion receiver.
- Weight: KPR-7C; 2.12 oz. KPR-7L; 1.3 oz. KPR-7D; 2.1 oz.
- Size: KPR-7C; 2.92" x 1.82" x .8". KPR-7L; 1.94" x .96" x 1.08". KPR-7D; 3.12" x 1.63" x .79".
- Type Decoder: Pulse clipping, integration, and missing clock detector with reset; 8-bit C-MOS shift register for extremely low power consumption.
- Front End: KPR-7C and KPR-7L are double tuned. KPR-7D is tripled tuned.

SERVOS

- Four Optional Servos Available: KPS-11, both rotary and dual linear outputs. KPS-12, small size for miniature and moderate-duty applications. KPS-14 II, general purpose miniature servo. KPS-15 II, especially rugged design.
- Weight: KPS-11; 1.9 oz. KPS-12; 1.2 oz. KPS-14 II; 1.4 oz. KPS-15 II; 1.8 oz.
- Size: KPS-11; 2.02" x 1.55 x .89". KPS-12; 1.49" x 1.38" x .73". KPS-14 II; 1.69" x 1.49" x .75". KPS-15 II; 1.76" x 1.49" x .92".
- Type Amplifier: All servos use a special 3-wire bridge type output designed by Kraft that produces centering and tracking accuracy better than 1/2% with virtually zero drift with changes in voltage and temperature.
- Connectors: Servo plugs are securely held in place by a locking tab.
- Servo Options: Clockwise and counterclockwise rotation. KPS-12, KPS-14 II, and KPS-15 II available in 180° rotation at no extra charge. Optional special application KPS-15 H II, and KPS-16 high power servos also available.

SYSTEM

- Four Optional Receiver Battery Packs: Standard 550 MAH KB-4E; 450 MAH KB-4M and KB-4S miniature packs; and 225 MAH KB-4L subminiature pack.
- System Supplied With: Servo trays and mounting hardware; complete installation and operating instructions; full 1 year limited warranty.
- Shipping Container: Styrofoam box or individual component packaging.

A DIFFERENT TWIST

from page 93

line constantly rubbing the wire or rod guides over the hub. (I have seen grooves worn in music wire guides from this action.) It would seem obvious that one would want to raise the pulley apparatus to a foot or more above the ground and to keep the tow line centered on the hub and away from the guides to avoid useless drag and wear.

The second problem nagged at me the most; I had seen beautifully machined devices by Don Goughnour and others, but I wanted an answer closer to the simplicity and ready availability of the bicycle hub — then one day it flashed somewhere behind my eyes. Eureka! The answer was built-in to the bicycle hub itself, the flanges with the spoke holes. And, putting the obvious bicycle spokes in those holes followed naturally.

I tried several hubs and combinations of the spokes to test the application, two of the most successful are shown. The larger hub is machined aluminum and is the rear unit for a French racing bike chosen for its larger diameter to decrease the axle-bearing speed that I had noted in smaller diameter hubs. The larger diameter would also provide a deeper cone. Unit was disassembled and degreased, then reassembled and the bearings lubricated with a light machine oil. Replacement spokes were cut to length, inserted through one side of the hub flange and angled to the opposite side for the degree of cone desired. These loose spoke ends had to be secured to that opposite side. I chose to loop 12 gauge copper wire over each spoke end, linking each end to the next in line around the perimeter of the flange, however, small brass or copper washers over each end would do. Because of the tension exerted on the spokes at the center of the cone, I found

it was necessary to silver solder these joints; the lead solder connections that I first tried, pulled apart. The silver solder with the lowest melting point called "Easy" was used with Dixon silver solder flux; the soldering was done with a propane torch with a small tip.

The smaller hub proved to be the best overall answer. I used the left over ends from the longer spokes purchased for the other hub, but one could use any mild steel wire of that approximate diameter that will fit diagonally through the spoke holes. The beauty of the smaller unit is that the diagonal wires rest on the center of the original hub and very little tension is transmitted to the ends of the spokes or wires where they are secured to the flange — lead solder and small brass or copper washers will be adequate here.

The rest of the turn-around is self-evident from the photographs. I use a small guide of stainless steel wire to retain the line on the pulley when it is not under tension. Otherwise, during the towing operation, the line stays in the center of the pulley even on extremely angled cross-wind tows. The results of all this? Less drag, more responsive tows, and less wear and tear on the whole system.

Is it worth it? Maybe the answer lies in one's conceptual view of soaring. □

SAVE THOSE EGG CARTONS

from page 93/92

As it was, only the leading edge sheeting needed to be replaced. This incident really sold me on the "egg carton rib" idea.

Since it takes quite a few egg carton tops to make a wing, have your friends, relatives, neighbors and fellow employees save their egg cartons for you. They will think you have gone crazy when you tell them what you are going to use them for, but if you can save money while at the same time build a better airplane - - - who cares? □

IMPROVE YOUR BUILDING SKILLS

from page 91/87

then again, you just might become a believer.

Some people are naturally gifted with manipulative skills, while others are all thumbs. I started out in the "thumbs" category, but with five years experience and the help of these techniques, I have crossed over the dividing line. If you are a newcomer to R/C modeling, and are not yet secure in your building skills, give these techniques a try. We can all look forward to more mistakes, however as long as we don't make the same ones twice, there's light at the end of the tunnel.

My models will never hang in the Smithsonian Museum, but someday yours just might. □

HOW TO USE THIS AD

We've prepared this ad to be *used*, not merely read. The idea: it gives you the opportunity to let your friends and loved ones know what you would really like to have for Christmas—no more of those stupid ties and handkerchiefs. And, as you can see, the message at the bottom comes from us, not from you.

All you do is cut out the ad, check the X-mas balls near all of the products you want, fill in the message area with the appropriate names, and give the ad to that Christmas gift shopper you know.

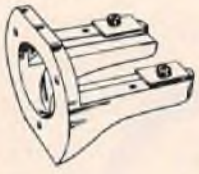
Try it—it's fun—and you might even get what you want for a change.

Sullivan PRODUCTS, INC.

535 DAVISVILLE ROAD • WILLOW GROVE, PA. 19090 • (215) 659-3900

LANDING GEARS

MOTOR MOUNTS



PROP-LOC SPINNERS & SPINNER-ETTES

CRAP TRAP FILTERS

GOLD-N-PUSH RODS

SUPER STAR OF STARTERS

Dear
With Christmas coming, I want to wish you the very best for the holidays. We have a very good mutual friend, who has tipped me off to some gifts he would love to receive this Christmas. The checked X-mas balls indicate our friend's favorites.
Thought you would like to know.
Matty Sullivan

PS—You'll find your nearby hobby shop very helpful with all Sullivan products. Suggest you send for our free catalog.

THE HOBBY MARKET

Be a winner!

Full Kits! LEGIONAIR

Handles like it's powered and floats with the best. Glass fuse; plywood, aluminum, balsa, tow hook, push rods, hinges, horns and instructions in kit.

Legionair 100, biggest standard class $57.99
Legionair 132, middle brother $63.99
Legionair 140, big winner in open $72.99

SHUTTLE

2 meter design with no carving or complex building. Complete kit with all hardware and instructions.

Shuttle 78 ..... $31.77
Shuttle 100 ..... $38.37
Shuttle 132 ..... $44.37

Southern R/C COMPENSATOR

New! Fiberglass fuse and foam kit

Build a real winner! Fuse features molded in alignment marks and canopy. Foam wing cores, plus all necessary sheeting and contact cement. All parts machine cut or sanded to shape.

Standard kit $73.00

LOOK
Mile High Models

HORNET

½A Hornet is a great value! Kit has precision cut quality balsa and ply with complete hardware right down to the .049 engine mount.

$12.77

SALE

Craft-Air ready-to-use FIELD SUPPORT BOX

$18.99

No paint, no glue needed!

Ready to use! Made of hi-density polyethelene, practically indestructible. Bright yellow, holds all your goodies and is easy-to-clean.

THE HOBBY

Jay Dave

Trainer & sport flyer

HOSS FLY MARK II

- 54" span
- .29 to .40 engine

Only $28.99

Precision cut, sanded foam cores; semi-planked wing; balsa leading edge and trailing edge stock, cap strips supplied; servo hole cut out.

Order Now!

Deluxe MITRE SANDER

$19.99

Bevel or square parts for precise assembly. Quick-build kit; all parts pre-cut, drilled.

SAVE DREMEL

#261 ... $30.77
#271 ... $35.77
#281 ... $38.99
#371 ... $42.99
#381 ... $44.99
#571 ... $44.99
#572 ... $60.99
#210 ... $15.99

D-Vise $17.66

Models 261, 271, 281, 371 and 381 with 34 accessories & case.

Hobby Market Quality Kits

Sporty Trainer
ME TOO
$21.99

- 520 squares
- 37" length
- .29-.40 engine

Sport plane for fun 'n learning. Stable, maneuverable. Kit includes foam wing. Krome Coat covering; formed landing gear, hardware package, good plans.

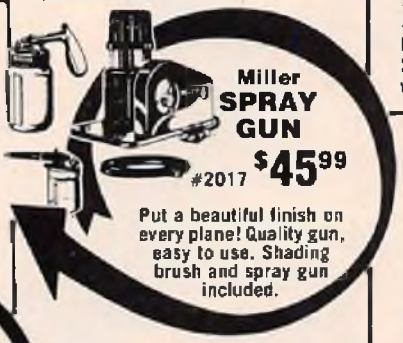
LR1 A QUARTER MIDGET

$46

- Epoxy glass fuse
- Balsa covered foam wing
- Wing tips installed

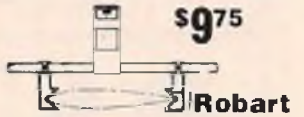
Fuse with firewall, molded cheek cowl. Canopy. Ailerons sanded. Balsa tail surfaces sanded and shaped. Landing gear, wheel pants in kit. 2½ - 2¾ pounds.

2nd at the '77 Nats!



Miller
SPRAY GUN
#2017 $45.99

Put a beautiful finish on every plane! Quality gun, easy to use. Shading brush and spray gun included.



$9.75

Robart
INCIDENCE METER

For setting proper thrust, wing and stabilizer incedence on a new model — or determining why your present model doesn't do right.

OPS .60 FR

Rear exhaust, complete with pipe

SALE $119.99

OLD TIMERS For RC or FF

M&P QUAKER

7-ft. $33.99
54-in. $21.99

M&P DALAIRE SPORTSTER $43.00

M.E.N. BUZZARD BOMBSHELL $34.99

PLAYBOY SENIOR $35.96

CONCEPT Models

Super Fli .40 powered stand-off scale

Travel Air, great classic of the 30's

Barnstormer, model of 1930 bi-plane

C. B. Associates

Plastic
SPINNERS
w/aluminum back plate
(adaptor nut needed*)

1¾" spinner $2.07
2" spinner $2.28
2¼" spinner $2.63
2½" spinner $2.77
2¾" spinner $3.33
3" spinner $3.47
3½" P-51 spinner $4.38
3½" P-40 spinner $4.38
*Adaptor nut (specify engine) ..... $ .40

A-iusto-jig Full House

Build accurate wings in half the time. Use adapters to convert to fuse-jig.

$37.99

Top Flite Heat Seal IRON

$13.88

HEAT GUN $18.99

C.B. Associates SCALE TAIL WHEEL

$5.95

Scaled to fit .60 powered biplanes. Spring leaves may be added or subtracted for heavier or lighter airplanes. Spring steering is positive up to about a 65° angle. Leaf springs are straight, you bend them to desired curvature.

AFI ½A STARTER

Start the small ones fast!

$10.66

12-volt high speed motor with ball bearing front end. Designed to fit prop nut or small spinner.

$23.99

AFI GEL CELL & CHARGER

Small and compact, safe and reliable. Gelled electrolyte is dischargeable in any position, no permanent cell reversal.

LADIES' DAY IS THURSDAY — we're here for questions & orders

Bridi QUICKEST 500

- 50¼" span
- .40 engine
- 4 channel

$23.99

Designed for the sport or pylon flyer. Kit has Bridi engine mount and special hardware. Machine cut parts. Build now!

ADHESIVES

Hot Stuff 14 grams	$ 1.99
Blue Hot Stuff	$ 2.99
Zap	$ 1.99
2-oz. Hot Stuff	$ 6.99
4-oz. Hot Stuff	$12.99
8-oz. Wilhold	$ 1.10
17-oz. Wilhold	$ 2.00
9-oz. Devcon 5-minute	$ 3.50
Hobbypoxy 4	$ 1.39
Hobbypoxy 2	$ 2.77
Hobbypoxy 1	$ .99
Sorghum	$ 1.69
Silicone Seal	$ 1.89
DuBro Model Cement	$ .47

ORDER NOW AND SAVE!

R/C ENGINES

Please check availability before ordering as some may be in short supply at this time of the year

Cox TD .049, no throttle	$12.99
Cox TD .051, no throttle	$12.99
K&B .19 R/C	$29.99
K&B .35 R/C	$21.00
K&B .40 FR/RC	$38.99
K&B .40 w/pump and carburetor	$53.70
K&B 6.5 FR w/muffler	$59.99
K&B .61 w/muffler	$49.99
K&B .61 w/pump and muffler	$64.88
Kraft .61 w/muffler	$73.00

MARKET

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Fort Worth, Texas 76101

Phone 817/731-0444 or 731-6388
P. O. Box 2172

Be kind to your engine- use

ZINGER PROPS

9x6, 7	doz. $10.36
10x6	doz. $10.99
11x6, 7, 7½, 8	doz. $12.99
11x7 wide blade	doz. $12.99

All maple, true pitch and balance. Airfoiled tips. Give you smooth power and less vibration.

SUPER MALIBU plus Astro .05

$44.99

Sure Flite SPITFIRE

$39.99

plus K&B .35 R/C

BARGAIN BOXES

Bridi

RCM 60 TRAINER plus Fox .45 Bush

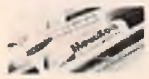
$74.99

Sig SKYBOLT plus Fox Eagle

$69.99

Craft-Air WINDRIFTER plus 3 rolls MonoKote

$42.99



LEGIONAIRE 100 plus 2 rolls opaque MonoKote

$69.99

Don't forget these building aids

Epoxy Brushes	$ .69
Prather Prop Balancer	$1.19
Spinner Balancer	$4.99
Bulk "T" Pins	$3.99
DuBro Hinge Outfit	$1.39
X-Acto Bulk Blades #11	$7.95
Balsarite	$1.88
Styromate	$4.55
Trim It	$ .89
K&B Resin	$4.99
K&B Glass Cloth	$2.25
DuBro large hinges (15), 6-pack	$7.77
Prather Prop Gauge	$21.00

From M&P

$16.99

HAPPY HARRY

45" span, for .09 to .15 engine, 2 or 3 channel radio. HH climbs with full power, maintains altitude at less than half throttle and gently drops down for landing at idle. Quality kit trainer.

OS .10 Schneurle w/muffler	$21.00
OS .20 R/C w/muffler	$24.99
OS .25 R/C w/muffler	$26.99
OS .25 FSR w/muffler	$39.99
OS .35 R/C w/muffler	$31.99
OS .40 R/C w/muffler	$45.00
OS .40 FSR w/muffler	$51.99
OS .60 Blackhead w/muffler	$55.00
OS .60 FSR w/muffler	$74.99
Supertigre X-15 R/C	$37.00
Supertigre .23 R/C	$30.00
Supertigre .35 R/C	$39.46
Supertigre .46 R/C	$39.15
Supertigre G-60 R/C	$65.00
Supertigre G-60 ABC R/C	$72.00
Webra .40 Blackhead	$59.99
Webra .40 Speed	$69.99
Webra .61 Blackhead	$74.00
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USE BANKAMERICARD or MASTER CHARGE

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Join the Quiet Revolution

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Astro-05	$ 30.00
Astro-10	$ 52.50
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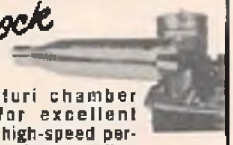

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PSL1 or PSL15 with 4 servos
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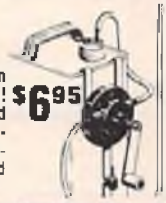

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Some items in limited quantity and advertised specials, subject to availability, will be honored until Jan. 10, 1978. All prices subject to change without notice.

THE HOBBY MARKET

STORAGE SHED SHOP

from page 86/85

"Gone Flying."

switch and we have instant communications. In case Jeri is out shopping or at the beauty parlor, she puts the house intercom on hold and I can hear the phone, it never rings more than three times before I am there.

I would be reluctant to suggest a storage shed workshop for 10° below zero and have wondered, even if it were insulated, would an electric heater keep it up to working temperatures in the milder part of the winter? To keep the Balsa Dust Factory cooler in the summer, I am planning to insulate with white Celotex spaced about 1" in from the walls. As you can see by my "air conditioner" out front, it still isn't insulated. At least the fan keeps the air circulating. The porch, for want of a better name, allows me to roll out the sander or the electric saw. This way the sawdust is outside and fertilizes the rocks.

The cement slab is covered with pieces of carpeting from the houe and I have found that it is easier to vacuum up the small scraps and dust from the rug than it was to sweep the slab with a broom.

Whether you use one of these steel storage sheds as a workshop outside

to page 112

A New Addition!

We have a new two-channel addition to our Sport Series line! Our KP-2AS is a high quality, low cost, discrete system. It includes a new miniature two-channel receiver, two KPS-14IIA or KPS-15IIA servos, switch harness, battery case, and transmitter. It is designed to use standard pencell type alkaline batteries but can be converted to rechargeable cells when the owner desires. (Batteries not included)

The transmitter features the popular single stick configuration. The stick is of our precision open gimbal type with the vertical axis movement convertible to a positionable ratchet operation if desired. We will soon have available both two stick control (KP-2A) and wheel control KP-2AW) versions of the two channel transmitter.

The KP-2AS is perfect for model boats, cars, and gliders. It is a great system for the novice and the sport modeler.

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STORAGE SHED SHOP

from page 110/85

your mobile home, condominum, or in you back yard, it should contribute to your enjoyment of the hobby. Besides, if you give up the hobby, you can use it to store your snowmobile, riding lawnmower, garden tractor and hang your fishing boat from the ceiling.

By the way, can anyone describe for me one of those things that the guys back East work in, I believe they are called basements or something like that? □

BABY DRAGONFLI

from page 78

. . . . built up sufficient flying speed. Our prototype performed beautiful on the first flight, requiring only a slight bit of down level flight. We started out with 1/2" aileron throw in either direction which proved to be a bit too much. This was cut to 1/4" either way, which seemed to be just right for nice rolls and also for good take-off and landing characteristics. The tracking in both upright and inverted flight was excellent. All of our flights were without fault (except for pilot error) and we didn't experience any of the normal "1/2A jitters" that are sometimes associated with a new small aircraft that is extremely fast.

We have to agree with the manufacturer on one last point. While the Dragonfli does not have any bad characteristics, we do not recommend it as a beginner's airplane. It is fast and maneuverable. It is best flown on 2 channels using ailerons and elevator. It can be flown on one of the Micro 4 channel systems, adding rudder and a throttle. We truly do not feel this would improve the flying ability of the aircraft and would only add to the wing loading because of the additional equipment. We know there are those of you who will want to add rudder and throttle to your model; this would make the take-off and landings more realistic. Having rudder control would make for much easier ground handling against the engine torque. □

REV-OLUTION II

from page 75/72

The blades are covered with the plastic material supplied. If you like, you may resin the inner 2" of the blades before covering. After covering, attach the flat blade holders using the six screws supplied. Square up the holder with the blades to assure good lead-lag setting. You may want to use a little epoxy on each holder to help hold them from shifting due to the wood shrinking away from them.

Now make up the fly-bar by screwing a paddle on the rod only to 1" depth. Next put on a 5/32 collar, but don't tighten. Next put on a brass washer. Now put the fly-bar through the rotor hub. Next comes another brass washer followed by the control arm; make sure that the arm points to the center of the head. Now screw the other paddle on the fly-bar. Make sure that they are level with each other and pointing in opposite directions. Now you can set this assembly on the main shaft to balance it.

Slide the collar and the control arm

to page 114

Hobby Shack SPEED BUILT

lamborghini countach LP400

RADIO CONTROL RACING CAR
.09 - .10 ENGINE 2 CHANNEL

- FORWARD — REVERSE AND ENGINE SPEED CONTROL WITH ONLY A TWO CHANNEL RADIO SYSTEM
- ONE PIECE ALL DIE CAST METAL CHASSIS
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- Total four wheel independent suspension
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- Wheels all die cast racing type with treaded racing tires

RETAIL
$109.95

COMPLETE KIT
LESS MOTOR
AND RADIO

$79.99

TECHNICAL DATA

Length: 14.4 inch	Forward gear ratio: 7.00 : 1
Width: 7.08 inch	Rear gear ratio: 18.7 : 1
Height: 3.54 inch	Radio: 2 channel
Wheel base: 8.14 inch	Engine: .09 — .10

SAITO

CERVIA Harbor Tugboat

Live Steam Power!

SPECIFICATIONS

Length: 600 mm	Beam: 160 mm
Height: 310 mm	Engine: OE1
Boiler: OB1	Radio: 1 channel

The CERVIA Harbor Tugboat is the perfect way for you to discover the enjoyment of Steam Power boating for the LOWEST COST! The boat kit is magnificent, and comes complete with all metal fittings and running gear which looks great both running on live steam or on display! The new engine is a single cylinder type which comes complete with boiler, alcohol burner and oiler. Instructions show steam installation and single channel radio for rudder control.

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OB1 BOILER & OE1 ENGINE
Retail $36.95 . . . . . SALE $27.99

FEATURES — Beautiful gel coated fiberglass hull ● Plywood wheel house and stand ● Screw prop ● Shaft ● Stern tube ● Anchor ● Funnel ● Lamp ● Bollard ● Winch ● Air scuttle ● Hand railing ● Shaft coupling ● Ventilator ● Life ring ● Towing hook ● Mast wire ● Rudder ● All fittings ●

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AMAZON SUPER-200

The Amazon Super-200 is a real fun airboat that is easy to complete, as it is Almost Ready To Go. It features a completed ABS plastic hull and deck. You build the motor pylon (materials included in the kit), install the radio system and engine and you are ready to go.

Length: 30 inches
Beam: 11.6 inches
Engine: .15 - .20
Radio: 2 channel

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Span: 39½ inches
Area: 450 sq.inches
Engine: .15 - .20 - .25
Radio: 2 or 2 channel

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REV-OLUTION II

from page 112/72

into the head. Now move the fly-bar from side to side until it will set level with hands off. Now tighten the collar and control arm on the bar, making sure that the control arm is level with the paddles.

After the head is balanced, you can now attach the rotor blades to the see-saw. This is an important step if a smooth flying helicopter is to be had. Just snug up the bolts holding the blades to the head. Using a square, or a straight-edge, line up one blade so that it is 90° to the fly-bar or straight along the side of the see-saw. Now tighten the bolts so the blade cannot move out of alignment. Re-check to see that the blade did not move during tightening. Now attach the other blade and snug up the bolts. Set the head on the main shaft and move the loose blade back and forth until the head sets level. This can be seen when the fly-bar is 90° to the main shaft. Now tighten the bolts. Re-check for movement during tightening. With the head still on the shaft, note if one blade is hanging lower than the other. If so, this denotes a heavy blade. I use 1" brads nailed in the end of the light blade to balance. Add brads until blades sit level. Be sure that the fly-bar control arm is not touching the see-saw during balancing. I used only one brad for accomplishing the balance on my machine. Remove the complete head and set aside until later. Now we'll work on the tail. Attach the bellcrank bracket to the bottom of the tail boom. At the same time, attach the tail skid under the heads of the bolts holding the bracket on the boom. Now put the pitch rod through the hole in the tail rotor shaft. Now put the bellcrank on the bracket with the pitch-wire through the outer hole in the bellcrank. Check to see that there is no binding when the bellcrank is moved.

Locate the tail rotor blade holders and attach to the bearings on the tail rotor hub. Press the two halves together and fasten securely with 2-56 x 3/8" bolts. Now attach a ball to the bottom of the blade holder with the ball to the inside toward the pitch wire. Now repeat the same steps on the other side of the hub.

Now prepare the tail rotor blades by cutting to the shape shown on the plans. Now resin and glass with 3/4 ounce glass cloth, the first 3/4 of an inch of each blade at the root. After this dries, sand and cover the blades with material supplied. Now attach the blades to the holders. Leave just loose enough to pivot if they strike something. The pitch head will be covered in the radio installation section.

Locate the plywood rear former and make the fuel tank cut as per the plans. Install on the frame with the fuel tank cap opening to the right when viewed from the rear. Glue two blocks in place to hold

to page 118

★★★

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Weight - 22 oz.
Two Channels
TD .049

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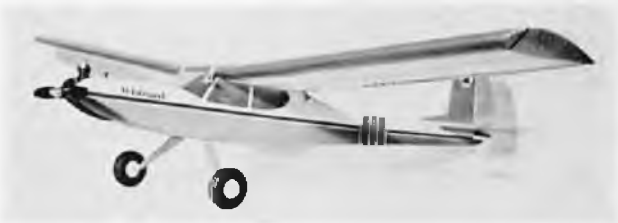

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REV-OLUTION II

from page 114/72

the cabin bottom to the former. Now trim the canopy and fit over the former. After you have it centered, tape into place. Slip the cabin bottom up under the canopy and against the main channel. Move the cabin back and forth until it fits snug into the canopy. Now mark the back of the cabin to the angle of the former. Remove and trim away excess fiberglass. To paint the class cabin, you must use a good primer and rub the wet paint into the many pin holes that are in the glass. I used two coats of grey auto primer with sanding between coats. I then used Perfect Paint to finish the cabin with Trim Tape for contrasting color lines.

After the cabin has dried, then put it back on the helicopter and hold in place with tape. Drill holes through the cabin into blocks and install screws to hold the cabin on. Now locate the bottom perm nuts and, using a small drill, drill through the perm nuts to mark the location for the bottom bolts. Now enlarge the holes to accept the bolts. Pull the canopy down snug to the cabin and drill small holes for the #4 sheet metal screws. Now remove the canopy and cabin and resin or paint the wood former to fuel proof it.

Now make up the tail rotor servo tray to fit your radio and install on the former. Cut the cyclic servo holes in the back of the former. Keep these holes close to the center so they will clear the seat back. Use the plans as a guide to hooking up your servos to the controls.

The instructions say to make hooks to hold the tank in place, but I found that Du-Bro Shark "J" bolts work very well for this.

Now you can go to the tail rotor and install the pitch head on the pitch rod. Put a 1/16" collar on the rod, followed by a small washer. Now put the pitch head on the rod, followed by a small washer and a 1/16" collar. Now before tighten-

to page 120

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REV-OLUTION II

from page 118/72

ing the collars, you must install the tail rotor pushrod. Use plans and photos as a guide. With the servo in neutral, adjust the clevis so that the bellcrank is square with the tailboom. Now adjust the collars on the pitch rod so that there is approximately 1° of positive pitch in the tail rotor blades. Do not squeeze the pitch head between the collars; just tight enough to keep the head from having any play in it.

You now have a helicopter that is almost ready to fly. You must first adjust the main rotor blades for approximately 2½° of positive pitch. Use the plans to make a pitch gauge and adjust each blade accordingly.

Install the muffler and fuel lines and you are now ready to proceed to the final adjustment. The final pre-flight adjustments are made with the engine running.

I do not recommend the procedure that is outlined in the plans for checking the blade tracking. The instructions call for the pilot to hold onto the tailboom and give power until the machine lifts off. This is a very dangerous procedure, as you can get your hands or arms into the rotor blades.

I suggest you put a board through the skids and weight the end with blocks to hold the helicopter to the ground. Now open the throttle and watch the blade tips for out of track condition. If one blade is high, then reduce the pitch in that blade slightly until it tracks with the other blade. This procedure of holding the helicopter down will also let you see if your radio will tolerate the noise that a helicopter is famous for.

After tracking is complete, then remove weights and gently give throttle until the machine starts to lift. If the throttle stick is less than 1/2, then you should reduce pitch in both blades, as your helicopter is coming up too soon. If over 1/2 stick, then increase the pitch.

Now watch the helicopter closely and see if it wants to go in any direction as it becomes light on the skids. If it wants to move in any direction, then cut the power and set it down. Adjust trims until the helicopter will come straight up with gentle power and, of course, with no wind. With a head wind, then you must hold a little forward to prevent the wind from pushing the copter backwards.

Well, that does it as far as the building goes. As you can see, the construction is simple and fast. I have not gone into the detail here that is in the instruction book, but have given you a good idea as to what to do. With this and the photos, you will be able to build the Rev-olution II in approximately 12 hours if you have ever built a helicopter before. If not, then you may need 16 hours of construction time.

Flying the Rev-olution is very quiet with the muffler supplied with the kit. The flapping rotor head makes for a very smooth and docile helicopter. The Veco .61 engine is very powerful for the 8lb. 6 oz. helicopter. This is by far the lightest .60 powered helicopter that I have seen. Climbs and descents are a snap with this much power.

I have my machine set up with lots of swash plate movement for quick control response. The manufacturer recommends 1/4" up and down for a total of 1/2" movement. I have approximately 3/8" up and down on mine, but do not

to page 122

Complete set of decals are also supplied for model shown above

- Wing span 49 in.
- Wing area 425 sq. in.
- Fuselage length 39 in.
- Weight 4¼ to 4¾ lbs.
- Wing loading at 4¼ lbs. = 23 oz./sq. ft.
- Engine .29 to .40 (Sport .35 to .40 recommended)

- Moulded scale exhaust manifolds
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- All balsa and plywood kit
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Sport, stand-off scale, P-51D MUSTANG

.29 to .40 power that builds like our ½A's

House of Balsa®

2814 East 56th Way
Long Beach, California 90805

Photo of actual model built from kit

REV-OLUTION II

from page 120/72

recommend this to the novice flyer. The only thing that I feel that is bad about this helicopter is when 360° tail rotor turns are done fast, the copter gets violent in the turns. When done slowly, the turns are smooth and stay level.

Well, that about does it for the Rev-olution II, so with the photos and captions, I feel anyone can build this helicopter. □

SMALL WONDER

from page 71

. . . . trainer for the intermediate flyer. If you are a beginner, get help from an experienced flyer to trim out the plane. With the plane trimmed, it will amaze you how easy it is to fly.

CORSAIR SKYLINER-40

from page 70

. . . . . side of the throttle linkage hole. This was done to prevent unnecessary clutter on one side of the servo layout. The dzus fasteners used for the wing hold-down installation were replaced with 1/4-20 nylon screws and hardwood blocks. The kit hinges were replaced by Robart hinges which was strictly our choice. Due to the color scheme used, we had to go to a different spinner than was included in the kit.

The overall quality of the kit is outstanding. It was packaged so that there was no possible way for it to be damaged in shipment. Everything fits perfectly, including the glass belly pan under the wing. There was nothing missing to complete the building other than glues, covering, paint and radio. Any substitutions made were simply the builder's preference.

The instructions, once they are studied, are very easy. There is a

16" x 22" sheet printed on both sides and in Japanese. This sheet is filled with step by step drawings. The English translation is referenced to the Japanese pictures by the number. Just study them carefully. We built ours before the English translation was completed and had no problems.

We used a new MRC 775-5 channel digital radio and it performed its job perfectly along with the Enya 40TV. The Enya started up with a couple of flips after prime, and was flown without any bench running. As each flight was made, the engine and air speed picked up. We were extremely pleased with the performance of the 40TV on our 5¾ lb. aircraft. Using one of the hotter engines, the performance should be all the better. All flight testing was performed using Goldberg fuel and a 10/6 Top Flite Prop.

Our first flights were made from a grass field. The roll was straight and holding slight down elevator for nose wheel steering. After a 10 yard roll, elevator was neutralized; another 10 yard roll and with slight up elevator, we were airborne. On an asphalt runway, the roll was much faster and a slight amount of right rudder had to be held until nose wheel lifted off. The total roll was 10 yards before lift off. The elevator movement was set for 3/8" travel each side of neutral; this proved to be sufficient. Having a split elevator with dual horns makes for a precise adjustment to either elevator. The ailerons were set with a differential of 3/8" up and 1/4" down. With the large rudder set at 7/8 either side of neutral, any maneuver can be accomplished depending on the pilot's skill. We checked the high and low speed stalls and found our aircraft always fell to the left. Before stalling, however, the pilot had ample warning of when it was going to happen. With low power or a dead engine, be sure to keep up the air speed.

We classify the Corsair Skyliner 40 as a strong high performance aircraft and very much worth the price. □

LOVE MACHINE

from page 39

What truly dresses this model up, appearance-wise, is the long streamlined canopy, which comes complete with a molded cockpit interior. The Love Machine may be built as a tail dragger or with a tricycle landing gear. The materials and instructions are provided for both configurations. We chose to build our test aircraft with the tricycle gear. We deviated from the manufacturer's instructions in two areas. The plans call for the fuel tank to be permanently built in. Being avowed disciples of "Murphy's Law", we elected to provide a means for removing the fuel tank. Those of you

who have been required to perform an "appendectomy" on one of your aircraft to rectify a fuel tank problem will appreciate what we are referring to. The method we used to make the tank removable was simply to cut an opening in the balsa fuselage former (immediately in front of the wing) which was first reinforced with an 1/8" plywood doubler. The tank compartment was reinforced with fiberglass cloth at the firewall and entirely coated with resin. The tank compartment was lined with foam to cushion the eight ounce Sullivan tank which slides into place from the radio compartment. We also chose to attach the wing with 1/4-20 nylon bolts, rather than using the conventional dowel and rubber band method. The "bolt-on" wing looks better and resulted in perfect alignment every time that it is attached; however, the possibility of incurring damage in the event of a hard landing is far greater with this method due to its rigidity. This should not be construed as a criticism of the manufacturer's suggested dowel and rubber band attachment method, which will work equally as well and is certainly more forgiving when subjected to a hard landing. Both the nylon bolt method of attaching the wing and the removable fuel tank changes are simply personal preferences.

The wings of our Love Machine were covered with blue MonoKote and the fuselage and tail surfaces were finished with K & B Super Poxy primer and yellow. Also included in the kit are two large pressure sensitive decal sheets which offer a variety of possible decorating schemes.

In flight, performance is very good. The Love Machine has no apparent airborne faults or nasty tendencies, and is an aircraft that should not disappoint any sport flyer. It is not a beginner's aircraft, yet any R/C'er with minimal 4 control function experience should have no difficulty. It is indeed a "fun" machine that

to page 126

Out Of The Skies Of History
Chance Vought F4U-1A
CORSAIR

Kit FS-36
Wing Span 36"

$29.95

36" Stand-Off Scale R/C Model

About The Airplane:

The prototype XF4U-1 was first flown on March 29, 1940. The Corsair was to become the most important Naval Attack Fighter of W.W. II, and remain in production for 13 years, yet its first service trials had ended in failure in its chosen role. It did not reach maturity as a great fighting machine easily. It gave notice that it was to be flown and tested at all times like a true racing stallion, and was an airplane for inexperienced pilots to reckon with. Because it was an advanced design—and had a new and untried high horsepower engine the Corsair required many perplexing and difficult flight tests and service changes before assuming the role of the Navy's first line fighter.

The Chance Vought Corsair had a service life spanning two wars, performing every conceivable mission possible for a military flying machine. The Corsair had a 15 year life span of battle victories unequaled in the annals of aviation history. Vought ceased production of the F4U-1 Model on Feb. 2, 1945 with the delivery of the 4,996th airplane. In air-to-air combat the Corsair had destroyed 2,140 enemy aircraft with the loss of 189.

The Corsair's distinctive whistling war cry, caused by the wing-root inlets for engine air, earned it the nickname "whistling death" among the Japanese.

The Corsair's most unique feature was the bent (gull) wing which was necessitated by the most powerful engine ever installed in a piston-engined fighter, coupled with one of the largest props in the world. Thus the inverted gull-wing permitted the short, sturdy landing gear required for carrier operations.

The first combat unit to receive the Corsair was VMF-124 and the first 12 machines arrived at Henderson Field on Guadalcanal on Feb. 12, 1943. On Feb. 13, VMF-124 demonstrated their superiority over the Wildcat by escorting PB4Y-1 Liberators all the way to Bougainville. The following day they saw combat for the first time, and the inexperienced Corsair pilots were badly mauled by some 50 Zeros. Two Corsairs, two Liberators, two P-40s and four P-38s were lost in this "Saint Valentine's Day Massacre", but the Corsairs soon gained superiority over the Japanese which was never lost. VMF-124 was subsequently credited with 68 kills against a loss of four aircraft and three pilots. Within six months, all Pacific-based Marine Fighter Squadrons had been re-equipped with the Corsair and the list of aces and the airplanes legend began to grow.

About The Kit:

Designed expressly for 2 channel R/C with plenty of room for just about any R/C up to 4 channel miniature units. Maintaining top quality and simple construction, (even the inverted gull wing), all Balsa and Plywood parts are accurately die-cut. Hardware Package including R/C Hardware, full-size step-by-step Plans and a flat finish Decal sheet for Major Gregory "Pappy" Boyington's Lulubelle as it appeared after the Oct. 17, 1943 raid on Kahili Airfield, Solomons. Recommended engine sizes for maximum performance .09 or .10. Minimal performance achieved with stock .049 or .051 Tee Dee. Diesel conversion of Tee Dee Engines is suggested.

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No checks. Only U.S. money orders or currency accepted.

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Address _____ City _____ State _____ Zip _____

LOVE MACHINE

from page 124/39

any R/C'er would do well to consider when selecting his or her next sport aircraft.

Although the Love Machine would surely fly with a .29 size engine, for ideal performance, we would recommend that it be powered by a .40 size engine.

If you are tired of the "all look alike" boxy fuselage, slab wing sport designs, the Love Machine merits your serious consideration. It's a 100% fun machine. □

1/2A RICKEY RAT

from page 30

If you're a newcomer to 1/2A pylon racing, a word to the wise - - - this is not a legal RCM 1/2A pylon racer. The wing is not constant chord or constant 7/8" thickness. The wing has a tapered leading and trailing edge and a wing thickness of 3/4", tapering to 3/8". If you fly in an area where the races are run by the RCM rules, you're out of luck, unless you change the wing or get them to change the rule. Good luck either way you go.

In conclusion, the 1/2A Rickey Rat is a rewarding kit to build and fly. It is scale-like in appearance and, with a good engine, will be a competitive 1/2A pylon racer. □

FLYING CIRCUS

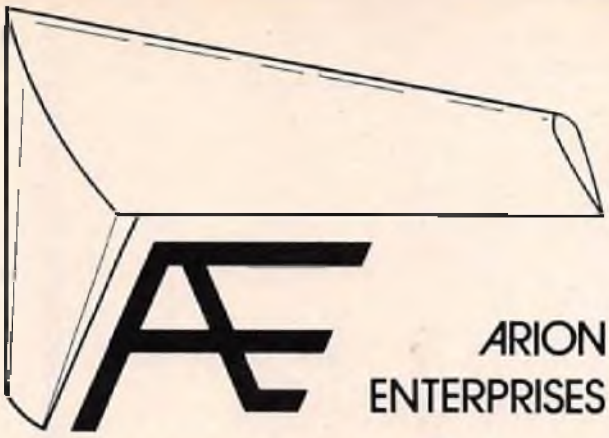
from page 68

were made during the flying about the Circus to be held during the next two days at St. Francis Seminary.

The events flown ranged from combat, to slow pylon with 8 ft. wing span airplanes, to scale, and toilet paper chasing. There are many other events that allow all guests (and that's what the flyers are treated like) to participate in some events.

The crowd started growing about 1:30 on Saturday and, by 4 p.m., there were approximately 10,000 people around the flying field. This was great, but on Sunday afternoon, the crowd was estimated at 25,000 throughout the day. Now that's a lot of potential modelers exposed to the finest in flying activities. The Spirit of American Show Team was a big hit with their Snoopy and Red Baron act with exploding buildings and lots of smoke. The Du-Bro Helicopter Team did some formation flying that really thrilled the crowd.

Well, I could rave on and on about the efforts of one club that is involved in public relations shows, but I'll stop here so each of you can assess your potential flying circus in your area. To use a well worn phrase, "Try it; you'll like it." □



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RADIO SPECTRUM

from page 66/64

one's problem. Anyway, here goes:

Dear Mr. Oddino,

Some of your readers may be owners of the Heathkit GD-19 receiver with the SCS decoder or the GD-57 3-channel receiver. These semi-obsolete receivers can be updated by exchanging the decoder for an 8-channel CMOS decoder developed by Ace for their Digital Commander. This decoder works perfectly with the Heath RF section and requires only one component change in the Ace decoder - - - replace the 27K resistor in the Q7 base circuit with 100K.

Ace sells a conversion kit containing the essential IC's, Cat. #12G10 at $7.95. The PC board is Cat. #28K19 at $2.50. This board requires radical surgery to fit the Heath case but it's easier than designing one from scratch. The Ace catalog also lists the remaining components to complete the decoder. Lanes-RC can also furnish all parts.

The advantages are lower current, more channels, and improved reliability, particularly over the SCS decoder. I have had no problems in a year of use, through summer and winter conditions.

Ed Gerhardt
Basking Ridge, N.J.

★ ★

Dear Mr. Oddino,

Because of the high cost of flight packs, I've been considering getting a Hobby Lobby 6.

I am a little puzzled about this set; maybe you can set me straight.

The set would be used in helicopters as well as planes.

(1) If I were to have an electronic failure in a normal servo – Kraft, etc., only that servo would be affected – but with the H.L. with everything in the receiver with the same type of failure, would it affect only that servo, or knock all of them out?

(2) In your own opinion, do you think this set would hold up well in helicopter use, considering the vibration and glitch problem they sometimes have; or would it be better kept in only planes? I'm using Kraft now, with no problem, but get tired of moving servos from my Huey Cobra to my planes.

Lon L. Mattison
Westlake, Oregon

The answer to question one is as follows: A failure in a servo amp that would knock out one servo in a normal system would also knock out just one servo in the Hobby Lobby. The same goes for a motor, gear box, feedback pot or connector problem. The last four problems could be corrected by simply replacing the servo which is inexpensive in the Hobby Lobby system. If the problem is in the servo amp, however, you must replace the entire receiver/servo amp package or wait until yours comes back from the factory.

The answer to question two: If vibration is a problem, and I guess it is in a helicopter, I would think the Hobby

to page 130

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1/2 x 3 (5 PK)	4.49
1/16 x 4 (10 PK)	4.80
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1/4 SQ. (30 PK)	3.60
1/4 x 3/8 (30 PK)	3.96
1/4 x 1/2 (30 PK)	4.32

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1/4 DIA. (10 PK)	1.00

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RADIO SPECTRUM

from page 128/64

Lobby would be better with the servo electronics in a package that can be isolated in foam from the vibration. Volume is also no problem in a helicopter so the Hobby Lobby might be a good way to go.

★ ★

Keep those letters coming! □

from page 63/62

large changes of cyclic control. This combination eliminates the over-control caused by using a Hiller system alone. That's where the pilot puts in a small correction to, say, stop and drift to the rear. Nothing happens that he can see, so he puts in a larger correction. Now the machine takes off forward like a long-tailed cat with its tail under a rocking chair, and a big rearward correction is needed NOW.

In short, Don, the Alouette 2 is an excellent beginners' choice and the easiest machine I've flown so far. The other four models I've owned have all been Hiller-only machines. The bell system on the Alouette 2 provides cyclic control even when rotor speed is so low that the machine has landed and most of its weight is resting on the skids. In fact, that's a good description of an Alouette 2 landing - - - no tendency to tip over at all; plus, it can grow with the

pilot's capability. There are many ways to increase control to get spectacular performance.

To give credit where it is due, Don, thanks for suggesting this machine to me and the bell control link change.

Regards,
Bob Jones
South Euclid, Ohio

•

Well, till next time — keep the stick forward! □

LITTLE MEDIATOR

from page 60/57

keep it light! For this reason alone, I would strongly suggest that you use one of the heat shrink, film type covering materials on the wing and tail surfaces. Whether you paint the fuselage or use film to cover it, it is, in my opinion, a toss-up. I simply prefer a painted fuselage, but will agree that the film covering is quicker and works equally well. If you go the all-film route, be sure that you seal the engine cowl area well with thinned epoxy or fuelproof paint.

Flying: Assuming that your Little Mediator has been built according to the plans and that everything is aligned properly, you shouldn't have any problems. It is docile and stable, yet will perform all the maneuvers that the high performance aileron-elevator ships are

to page 136

D & B MODEL AIRCRAFT

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Call (602) 747-3633 for immediate COD shipments.

LITTLE MEDIATOR

from page 131/57

capable of doing. If this is your first aileron equipped plane, I would suggest that you swallow a little pride and have an experienced flyer trim it out for you on the first flight. You'll be surprised at how rapidly you become efficient in flying your Little Mediator.

If you are an experienced flyer, the Little Mediator will be an ideal fun or small field type aircraft. I genuinely hope that you will derive much pleasure and enjoy flying your Little Mediator. ☐

FINISHING TOUCHES

from page 51/48

Application

The time you spent in preparation will pay off as you actually place decals on your model.

There are two rules at this stage of the game. First, move in one direction. Second, blot, never ever wipe.

Always apply your decals in one direction. Start at the top and work down or move from one side to the other, whichever you find easiest. This prevents wrinkles and tears. Judge the decal before you apply it, too. Stars and bars go on easiest working from side to side. Individual numbers and letters in a horizontal line should be applied top to bottom; in a vertical column apply them from side to side. This method prevents you from bumping into a neighboring decal.

Rule two is just some common sense. Wipers push decals out of place. The worst that blotters can do is lift the decal. The world's best blotters are sheet balsa. Sponges are great for wiping excess water from around the decal. Paper towels are linty, fragile, and best left in the kitchen.

Before you apply any decal, do read the instructions on the backing sheet. If the manufacturer says to soak ten seconds in lukewarm water, do it. He knows what he's talking about.

Also check the surface of the model and your hands. Take a tack rag to your model just before applying the decal. But be sure to follow the tacking with a quick wipe with a soft, dry cloth. Wash your hands, too. If you're the sweaty palms type, keep washing them at intervals throughout the decaling. The oils from your hands and fingers really do affect the decal.

Never squeegee a decal; you may tear it. Always blot.

For self-adhesive decals the rules are a little different. Again, read the instruc-

to page 138

Lanier Ready-to-Fly* Models

...every one designed and flown by the experts!

Four Easy Steps to R/C Flying
1. Glue pre-cut wing halves together.
2. Mount tail surfaces.
3. Attach control surfaces.
4. Install engine and equipment (not included).

NOTHING to cover or paint.

Span 50"
Area 700 sq. in.
Power .45-.60

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FEATURES PRE-CUT FUSELAGE TRIM & WING SUN-BURST

NOTHING To Build, Cover, Or Paint

REBEL BIPE

$99.50

LA 159

Jester II

designed by Len Purdy

Span: 53 in.
Area: 630 sq. in.
Wt. Complete: 6¼ lbs.
For .50-.61 engines
Flies with rudder, elevator, aileron and motor control.

KIT LA 124

FLIES COMPLETE AMA & FAI PATTERNS

Lanier INSTANT R/C WING KITS

All Lanier Wings are pre-covered and furnished with Tips & Gear blocks installed (where applicable) and correct Dihedral angle cut. Hinges are pre-installed in the wing with slots in the Ailerons. Aileron connecting fitting is also provided (where applicable).

65" Span 12% Symmetrical Standard Taper — 520 Sq. In.

Regular Low Wing Trike	LA 131	$22.95
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50" Span 10% Symmetrical Standard Taper 350 Sq. In.

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Len Sez

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Len

See next month's ad for other details & hints.

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$46.50

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Wt. complete: 3 lb. 8 oz.
For .23 or .35 engines

Flies with rudder, elevator and motor control.

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KIT LA 105

HARD SKIN WING AND STAB

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FINISHING TOUCHES

from page 136/48

tions. Do apply in one direction as this is very important for self-stick designs. One approach is to peel off just a tiny bit of the backing at the top or side of the decal you're going to place. Cut a sliver of this backing off with scissors or knife (about 1/4"). Bend up the portion of the decal from which the backing has been stripped. Now slide the decal into place. Once placed, rub down the unbacked portion with a soft light rag under your thumb.

Once you've done this you can lift the rest of the decal to peel off the remaining backing. The decal will be tacked in place by the thin exposed strip you first cut away.

On larger self-stick decals you can tape them in place before peeling the backing. To work this method, place your design in the proper location. Then secure each of four sides with a small strip of masking tape. Then, remove one piece of tape from the top or side you are going to start applying. The remaining three tapes will hold the decal in place.

Fold over the beginning 1/2" or more of the starting edge of the decal. Carefully peel the backing away from the color sheet. You should now have exposed a thin strip of decal all along one edge. Now carefully cut away the backing from the exposed edge with your craft knife.

With the three tapes still in place, rub down the section with the exposed adhesive. Then you can remove the remaining tapes and finish.

With either method, remember to peel backing as you apply. Keep firm tension on the decal, too. Your best bet is to lift the decal up to the point where you can peel off the backing in an even line just below or beside your starting line of application.

With more backing rolled back from the decal start your application. If the paper is **rolled** back, and if you're holding tension on the bottom of the sheet, the pressure of your rubbing should force the backing off the decal.

This method is virtually wrinkle free. Should any small bubbles appar they can be worked to the edge of the decal or pricked with a pin and rubbed out. These small bubbles are trapped air pockets.

Once the decals have been applied, let them sit overnight. If the manufacturer suggests heating the applications, use a hand-held hair dryer, or put your bird out in the sun. Never use an iron; it's too easy to scorch plastic and melt decals with just accidental contact.

A word about striping: When making corners with striping tape, 90° (more or less), be sure to miter the corners. Over-

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SERVOS, RECEIVERS, COMPLETE FLITE PAKS REGULAR OR MICRO, ASSEMBLED OR KITS

Litco flite paks or components can be purchased assembled or in kit form. Assembled units are pretuned and ready to use with transmitter specified below. All units use Deans connectors. Servos are supplied with extra female Deans connector to simplify installation.

Litco Systems has pioneered the concept of fully assembled flite paks custom matched to various transmitters. Our servos are electrically adapted to match the transmitter specified. There is no universal servo that operates properly with all transmitters since throws and pulse spacing vary with each make. Please order from table below.

PLEASE CIRCLE THE MAKE OF YOUR TRANSMITTER: **KRAFT EK ROYAL FUTABA WORLD MRC RS ORBIT HEATH ACE UNICOM CANNON**
(PRO LINE COMPLETE FLITE PAK ONLY) SANWA CIRRUS MICRODAVIONICS KRAFT KP4A

REGULAR COMPONENTS

MICRO COMPONENTS

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- Double sided PC boards
- Solid tantalum capacitors
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- High quality servo motors
- 4.0 lb. power, 0.5 sec transit
- 8 mA drain
- Fast, precise, high resolution
- Gold plated Deans connectors

REGULAR Size: 1.5x1.45x.73 Wt. 1.2 oz.
MICRO Size: 1.28x1.3x.6 Wt. 0.7 oz.

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- Double tuned front end
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- Gold plated Deans connectors
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- 5 channels, 8 available

FREQUENCY: 72.08, 72.16, 72.24, 72.32, 72.40, 72.96, 75.640

REGULAR	Size: 1.9x1.7x.8	Wt. 1.5 oz.
MICRO	Size: 1.75x1.14x1.0	Wt. 1.5 oz.
MODULAR RF	Size: 1.6x1.0x.55	Wt. 0.5 oz.
DEC.	Size: 1.5x1.0x.21	Wt. 0.5 oz.

BATTERY
REGULAR
- 500 mAH, vibration resistant
- Nylon D&R case
- Gold plated Deans connectors

Size: 2.2x1.25x1.25 Wt. 4 oz.
MICRO
- 225 mAH, vibration resistant
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- Noble high quality switch
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Our flite pak approach has been immensely popular and many modelers have purchased their 4th or 5th flite pak. If you have not yet tried our approach now is the best time to do it and save. Flite pak prices are the sum of component prices and all parts can be mixed.

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ADDRESS ZIP CODE

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	S1001	Rotary Dunham servo, assembled	543 IC	25.00	
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		Each additional channel for R2001B		1.50	
	B1000	Battery regular, assembled		13.00	
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	S5443K	Kit of S5443 servo	544 IC	25.00	
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from page 138/48

lap your tapes at the corner intersection but don't press it in place. Slice through the corner joint with your knife, cutting both pieces of tape. The top most tape will peel off easily. Peel the excess on the bottom tape away.

Now press the tapes in place pushing towards the cut. This method eliminates the bulge where the tape would ordinarily overlap and usually leaves an almost indistinguishable hairline joint.

Preservation

Whether or not your decals were made hot-fuel proof will affect our plans at this point.

If they are you've got no worries. A good coat of wax is all the protection they need, but you can go a step further.

I like to protect all decals with a clear coat of whatever. Some decals react violently to dope so be sure to read the decal instructions carefully for this warning. If you're not sure, test dope on one of the extra decals. I usually make a "test bed" with every model I finish. The test bed is nothing more than a large wide scrap of balsa finished as I finish the model. It's covered and painted as the model is, and sometimes before.

This test bed is a cheap way to check finishes and colors as well as the quality and resistance of decals. A few spare decals tested on the bed can save considerable aggravation with the model.

If the decals do not accept dope, a coating of clear epoxy or polyurethane varnish might do the trick as a sealer. The best bet is to coat the entire model, bonding the decals into the very last layer of the finish.

No matter what type of finish you've used, or how you seal the decals, be sure the edges of the decals are well sealed. Decals lift and peel at the edge so pay special attention to this area.

What Went Wrong?

Wrinkles: The main cause of wrinkling is improper application. A fold or wrinkle is next to impossible to cure. Sometimes a decal can be slit along the main line of the wrinkle or fold. It can then be lapped and smoothed. Most times it takes a new decal to solve this problem.

Peeling: A decal peels when it isn't bonded well to the surface. Poor surface preparation is sometimes the culprit here. At other times, and especially with water-activated decals, lack of adhesive is the cause. If water-activated decals are soaked too long or in water that's too warm, the glue comes off. If the decal is peeling, replace it.

Chipping: Again, this is an indication of either poor surface prep or lack of the bonding agent. Your protective coats of finishes can prevent chipping. Chips

usually start with a scratch or gouge in the surface of the decal. Most such chips can be touched up with paint or the reapplication of a same-size chip of decal. The patch will show though.

Bubbles: Bubbles are nothing to worry over. They're just air pockets trapped under the decal. Sometimes bubbles can be pushed to the edge of the decal with a rag and the constant pressure of your thumb. If they won't budge, prick the center of each bubble with a pin. Then rub from the outside towards the hole, pushing out the air.

Yellowing: Only light colors and finishes yellow. This was much more of a problem years back when sun and fuel did a number on finishes. Now yellowing is an indication that the decal hasn't been sealed properly, or that the finish is turning, as most inks and paints are color fast and sun-resistant. Yellowed decals that aren't defective in any other way can be fixed by sliding new decals right over them. Yellowing is also a process of age too, so for some of us our birds never live to yellow. □

L-39 ALBATROS

from page 43/40

tempt to fly your L-39 if it is tail heavy! If you have ever flown a tail heavy aircraft, no further warning is necessary here.

The elevator travel should be about 20°, up and down. Remember to avoid running your engine at prolonged high speed on the ground, as it is not receiving any cooling benefit from the prop blast but is totally reliant on forward movement air flow for cooling.

When my L-39 was completed and the first test flight was to be made, I was quite nervous as I had never built or flown a jet type aircraft before, least of all a pusher design.

I was primarily concerned with the relatively short wing-stabilizer moment arm and what its in-flight effects might be and also the possibility of the prop striking the ground on landings with the ship in a nose-up, flared position.

The maiden flight quickly eliminated these fears and produced a feeling of elation. The L-39 was both smooth and stable. Loops, rolls, and inverted flight were easily accomplished and on the second flight, FAI pattern maneuvers were performed. Naturally, the maneuvers are not as precise as those of a pattern ship, but for a Stand-Off Scale design, they are remarkably good.

I wish all L-39 Albatros builders many smooth take-offs and enjoyable flights. If there are any questions relative to building or flying your L-39 that I have not covered, please feel free to write to me: Pavel Bosak, Fucikova 278/IV, Klatovg 339 01, Czechoslovakia. □

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Wing Span: 36''
Wing Area: 485 sq. in.

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wing span 54"
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250R Converts 250 to 12 volts 1.56
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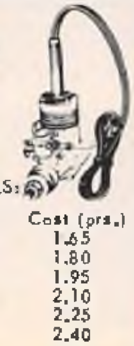

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8-HOUR SLOPE FLIGHT

from page 38/37

on and Mike brought a blanket to lie on. I sat on a park bench a good part of the time. We had two radios (the AM-FM type) and Terry kept track of the ball game (the Dodgers lost) while I listened to country music. Dick brought Gatorade to drink and we had snacks of bananas, sandwich materials and Double Stuff Oreos. We broke the monotony by talking to passers-by and by taking walks along the crest of the hill while watching our planes. We were grateful for the many large bushes which covered the slope.

About five hours into the flight, Mike Regan cried out that he'd lost his plane. He had tried to save on batteries and hadn't given his plane a command for sometime, so when he discovered that he'd been watching the wrong plane — his own plane was out of sight — he took off to search for it, but was unable to locate it.

The fog never lifted and, although it was 87° in Hollywood, it never reached 70° at our slope. After about two hours, I was cold even with a windbreaker and a sweater, and I was very thankful when Chris pulled a down jacket from his Jeep. No one expected it to be that cold. In spite of the overcast, we all managed to get sunburned faces even with conscientious applications of sunscreen.

When it was time for Terry to land, the lift was still strong. The one disadvantage to this slope is that the landing is very tricky. There is a narrow dirt strip along the edge of the slope and next to that a road. Some very expensive houses line the other side of the road. The idea is to land on the dirt strip and not to get caught in the turbulance that lies behind the edge of the slope. As a matter of fact, the author once put her foam Schweitzer through a plate glass window of one of those same houses in a much earlier phase of her career. The approved technique is to approach the edge of the hill at an altitude somewhat lower than the rim of the hill, allowing the plane to balloon up slightly over the crest and to slip it down gently on the dirt strip. We all cheered when Terry's Windrifter landed.

Dick landed shortly after Terry but I still had over an hour to go. By this time, I was very cold and shivering. The lift looked good and I had only a moment when I thought it might not last. While I was still flying, Dick went off to look for Mike's plane. He saw something that could have been a plane near a construction site, but wasn't able to get close enough for positive I.D.

I was really happy when Chris and Terry told me it was finally time to land and thrilled when I managed to bring the

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8-HOUR SLOPE FLIGHT

from page 144/37

Windrifter neatly down on the dirt strip.

Chris brought out a bottle of champagne and we celebrated. It seemed like a real accomplishment and all the better for sharing with good friends. Later that evening, Chris called to say that he and Terry had recovered Mike's Paragon which was undamaged except for a scratch on the nose. That was indeed good news which made our success complete. □

ROTORUTA

from page 35/33

lation. The actuator is bolted to a small platform in the aft compartment, which is angled slightly downhill to align the actuator to the torque rod. This torque rod is not located at the front end, but is attached directly to the actuator arm with a tight plastic sleeve. At the aft end, a small "L" shaped wire is soldered to the main torque rod to provide the rudder actuation.

(Although the Ace radio is shown on the plans, there's no reason why a single servo set couldn't be used. The only real revision would, of course, be to substitute a pushrod for the torque wire.)

Finishing: It hardly seemed worthwhile to warm up the iron to cover the model with plastic film, as it's all corners and bends, so the prototype was painted with Super Poxy all over, except the horizontal, which was clear doped, and the blades, which were lightly sprayed with silver.

FLYING

The model is, of course, hand launched, and the technique for hand launching is a little different from the usual model, i.e., you must not throw it! The first step in thelaunchprocess is to get the rotors spinning up to speed, and this is done by holding the model at right angles to the wind (if there's no wind, you have to run and make some). Then, when the rotors are really spinning well, bring the model attitude down to the horizontal quickly, and let it more or less fly out of your hand. The model might then sink a little before climbing out, but once flying speed is reached, it should climb away briskly. Maybe a small push will be required, but no throwing. The engine should be set for "all-out". Use the best prop and racing fuel to get a good climb performance and, in good trim, the model should reach at least 300-400 ft., then circle until the fuel runs out. At this stage, the model should glide back to earth in a fully controllable manner but, by changing the C.G. a little a completely vertical descent can be made.

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R/C MODELER MAGAZINE'S

MODEL OF THE MONTH CONTEST

The Model of the Month Award Program is designed to encourage the sport and novice competition flier to submit details of his most recent kit or scratch-built model to RCM in order to encourage general model craftsmanship and the overall promotion of R/C flying.

Each month R/C Modeler Magazine will award a 371 Variable Speed Moto-Tool as illustrated in the photograph. The second and third place winners each month will receive a one year subscription to R/C Modeler Magazine or, if they are a subscriber, an extension of their current subscription.

JANUARY WINNERS

2ND PLACE
Lee Shaver
Englewood, Florida

Dirty Birdy Fiberglass by Bridi Hobby. Span: 64", Area: 690 sq. in., Weight: 8½ lbs., Power: K & B .61, Radio: Kraft. Rhom Air retracts and Carl Goldberg Slim Jim spinner were used. The model was finished with Hobbypoxy and DJ's stripe on eagle.

1ST PLACE
Alex Meek
Australia

Scratch-built, Scale Handley Page Heyford (1935) from original plans. Span: 45.4", Weight: 5.3 lbs., Power: two O.S., Radio: Kraft. The model is covered with tissue paper and finished with K & B resin & Humbrol paints. All guns are hand-made and can be moved in a vertical direction. The bombs are rigged for dropping by a 5th servo.

3RD PLACE
Joseph Bukovchik
Vista, California

Scratch-built original design of Sport Bipe. Span: top 51" — bottom 45", Wing Area: 755 sq. in., Weight: 5 lbs., Power: O.S. Max .40FSR, Radio: Kraft. The model was finished with MonoKote and Aero-Gloss red dope. Characters mean "Dark Happiness", and the paint job is a copy of Japanese bi-planes from early 1930's.

RULES

A. Model Aircraft Origin
   1. Any kit — wood fiberglass, foam, or ARF kit is eligible. Any scratch-built aircraft built from magazine or original plans is also eligible.
B. Category
   1. All types of radio controlled airplane models.
      a. Scale
      b. Pattern
      c. Racing
      d. Fun-To-Fly
      e. Original Design
C. Entrants to submit:
   1. Color photo or slide, size 35 millimeter or larger.
   2. Black and white glossy photos (any size) of both sides, top, rear, front, and bottom views.
   3. Close-up photos may be submitted on detail work if desired.
   4. A short write-up giving dimensions, weight, power, radio, etc.
   5. A statement that:
      a. The submitter was the sole builder of the model.
      b. Parts and/or accessories used were part of the kit or available to all modelers at retail outlets.
      c. All non-available or special parts were built by the hands of the submitter.
D. Judging will be on:
   1. Workmanship
   2. Quality of finish
   3. Attention to detail
   4. Subject of model or difficulty of the project will count in judging.
E. Judging will be done by RCM Editors Don Dewey and Pat Crews.
F. Persons not eligible
   1. Members and employees of RCM or any other model airplane publication.
   2. Members and direct or indirect employees of Dremel Manufacturing Co.
   3. Members and employees of any manufacturer of hobby kits, hardware or supplies.
   4. Anyone engaged in the wholesale or retail distribution of hobby kits, hardware or supplies as a major source of income.
G. Models not eligible for submittal are:
   1. Models that have been submitted for judging of workmanship at any major AMA sanctioned contest and have placed 1st, 2nd, or 3rd in that judging. Flying points as a final standing do not apply.
   2. Models that have been built for display purposes only.
   3. Models that have been built for manufacturers demonstration purposes.
   4. Models that have won a similar award in another publication.
H. Entrants who have models that qualify under these conditions are eligible to enter. Included with the entry should be the entrant's AMA and FCC numbers, and also, the name of his club, if any.
I. Prize Information:
   1. A Dremel 371 Variable Speed Moto-Tool will be awarded to the monthly winner. An illustration and description of the kit will be included each month along with the winner's name, address, club, etc. The second and third place runners-up will be awarded a one year subscription to R/C Modeler Magazine.
   2. Dremel Manufacturing Co. of Racine, Wisconsin will be notified of the monthly winner immediately after a decision is reached by the judges so that the kit award can be received by the winner prior to the issue of that months RCM.
J. General:
   1. All contest entries must be addressed to RCM Model of the Month Award Program, R/C Modeler Magazine, P.O. Box 487, Sierra Madre, California 91024.
   2. All photographs and materials submitted by the contestant will become the property of R/C Modeler Magazine and none will be acknowledged or returned.

This contest will be null and void in any state or locality where specifically prohibited by law.

ROTORUTA

from page 146/33

If the model doesn't climb well, it's either a lack of power, or the wing hasn't enough incidence, so first, check the engine. Then, try a small shim between the wing and the fuselage, which should tilt the rotor backwards, or pack up the rear of the tailplane.

Try to avoid too much rudder control, as the model might go into a waltzing motion, which is quite safe, but looks a little funny.

That's about all for the flying bit; it's really quite a simple model to fly after the initial steps of getting a good launch have been mastered. □

POWER BOATING

from page 22/20

(3) Power-Pak: The power-pak must be 6 x 1, 2 a/h fast charge nickel cadmium cells, of any make. This, together with the motor will give a reasonable speed and duration, will keep costs down, and will mean that 15 minute periods between games is feasible.

(4) Radio: The radio should be any outfit providing two independent proportional channels. (There is no point in limiting it to two channel sets; this would keep out a lot of guys who have four or six channel outfits). Electronic speed controllers may be used (but would probably not be much of an advantage, especially since they can cut the voltage by up to one volt. A better bet would be a servo operated micro-switch; they are readily available to handle these low powers).

(5) Propeller: Only commercially available plastic propellers to be allowed.

(6) Power Train: Any kind of power train may be used, rigid shaft or flexible drive.

(7) Rudder: No limitations. (no one with any sense is going to stick it out behind the transom where it will get banged.)

(8) Pin: Not to extend more than 1"

beyond furthest forward point of bow.

PLAYING RULES

(1) The playing area to be any weed-free stretch of water of at least 55 yards in length. Two goals, one at each end, two yards wide and 50 yards apart.

(2) Each game to last 8-10 minutes (this will be determined by the duration of the power-paks). All games must start with the teams lined up in the water, alongside the bank, pointing outwards.

(3) Teams of three or four to have one balloon boat, teams of six to have two.

(4) There are no off-limits (obviously, no one is going to waste power going too far away).

(5) The balloon boat(s) must go through its own home goal before attempting a scoring run. If it does not, then any possible goals are not to be counted.

(6) After scoring, the balloon boats(s) must go back through its home goal before scoring again, but failure to do so will not discount the previous goal.

(7) Defense and attack boats may take whatever action they like, but may not attempt to attack the balloon boat(s) anywhere but at the transom. (This means that attack and defense boats will have to be not only solid, but stable. One argument for a one-class design here is that if one team has a faster balloon boat than the other, then it will be difficult for the slower attack boats to do so only from the stern. But this is not as bad as it sounds since it can be compensated for by boats attacking diagonally on the stern quarter.)

(8) Games to consist of two periods of 8-10 minutes each way, with a 15-20 minute charging period in-between.

(9) An umpire to be appointed to count the goals; his decision is to be final.

And there it is. This could turn out to be a cheap, economical and very amusing sort of competition. I don't know what the response will be, but I would suggest that if anyone has any ideas on the subject, they should write and let us know. Modifications, additions, deletions, anything goes, providing that it is in the interest of improving the game. (Knockers, please don't bother to write!).

In order to help things along, I will publish a design of a boat that is suitable for this sort of game, as soon as I can get it drawn up. (I already have a suitable hull, it's a question of getting it down on paper). If anyone else wants to send in what they think would be a suitable design that's fine. Just remember the criteria — fairly fast on the power available, quick-turning, stable and tough. The construction should be kept simple, and the weight down.

I won't go any further with the matter at this time, but rather wait and see what sort of response we get to the idea, so do write in and say what you think.

★

The letters keep coming in, and among them was one from my namesake, Gwyn Thomas, in Rhodesia, and since it seems that he is after my blood, I'd better deal with that one next. It accuses me of "untruthful reporting", because I said that in the World Multi Champs in South Africa last year, I was first away in all three races. According to Gwyn, who has it all on film, this is not so, I was only first away in two, because in the the A Class race it was his fourteen year-old son who hit the first buoy before anyone else was on the water.

Well, Gwyn, it could very well be that you are right — you should know, since you weren't running in the race, but acting as mechanic, so you had the time to look around. My comments were based on what I was told by others, since, being in the race, I certainly didn't take time out to check on this point. My sincere apologies to your son — whose name you didn't mention — for stealing his thunder. But as for untruthful — well, I would be more inclined to say mistaken, and show me the man who has never made a mistake in his life!

Gwyn goes on to dispute the fact that electric starters are faster than the good, old-fashioned boot-lace for getting an engine going. Here again, I am not going to argue; all I have to say is that anyone who can start a motor faster with a boot-lace certainly shouldn't go to the expense of buying a starter! Just remember, though, there are a lot of

people around who aren't so clever, and who find a starter a great help. (Gwyn's letter took all this time to arrive because although RCM is read out there, it takes three months to arrive. He adds that they, too, have their problems, such as hippos getting in the way when they are boating. And I thought I had problems with weeds!).

Another letter comes from Craig A. Hyatt of Greenwood, Indiana, who has a problem. It seems Craig has a pretty unusual set-up, or at least one that I, personally, have never come across before. He has put an Astro-Flight 20 motor and a Cox 3 channel radio in a Dumas "Thriftway Too", and he wants to know what propeller to use on the outfit. Craig, I wouldn't even know where to begin! Sorry, pal, but I just don't know all the answers, and as you added at the end of your letter, even the boys at Indy R/C couldn't tell you. I'll join the gang.

In fact, this is quite an interesting problem. The model in question is a hydro, and one of the important points with hydros, among others, is the power-to-weight ratio. If the boat is too heavy, then there is not going to be enough power to get it up onto the plane, and it is going to wallow around like a displacement hull — and a very inefficient one at that. Now I will go out on a limb, and suggest that

the power-weight-ratio in Craig's model is so bad that it is just never going to get up and go, no matter what prop he puts on it. I could well be wrong — I have been before! — and I hope so, for his sake. But I honestly believe that the weight of the batteries is going to prove too much for the motor to overcome. However, if anyone has any ideas on this one, do let us know, and we'll pass them on to Craig. Come to think of it, I have never come across an electric hydro, and I am just wondering if anyone else has ever tried it, and if so, what sort of results they have had. If there is anyone around who has, how about dropping us a line, tell us all about it, together with some photos if you have any? That way, we can add to the fund of common knowledge.

★

A couple of editions ago, we were talking about couplings for motors, and I asked if anyone had any information on the subject. Well, I just received a very nice letter from Herbert R. Arum of Stock Drive Products, 55 S. Denton Ave., New Hyde Park, New York 11040, together with some catalogues. As you can see from the photo, one of them deals with couplings, and although I haven't actually seen the goods, from the drawings

to page 154

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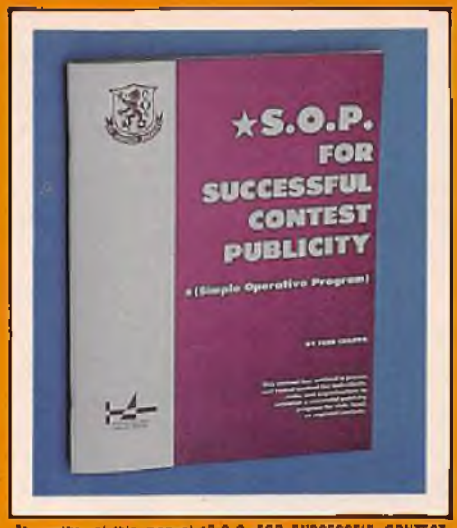

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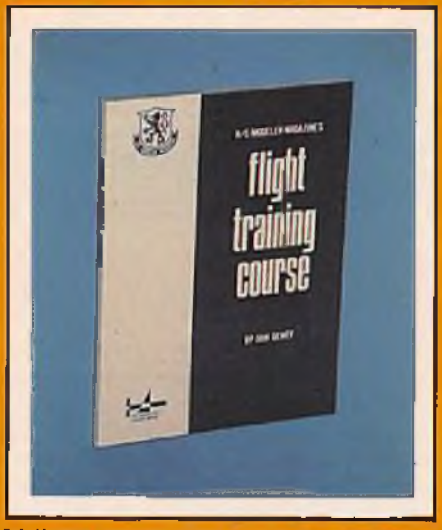

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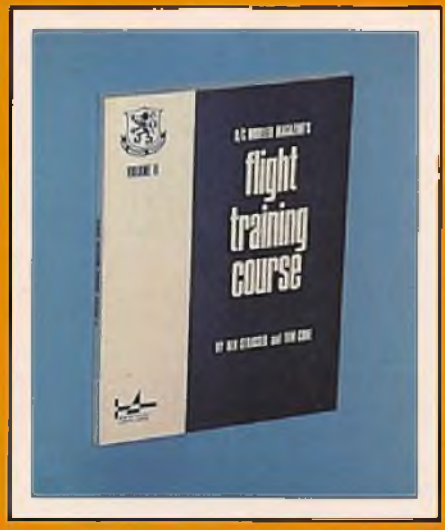

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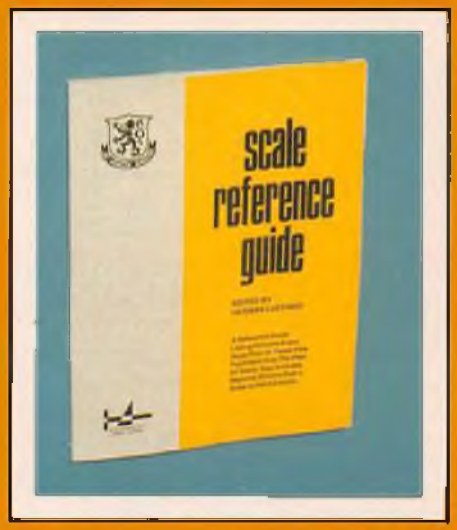

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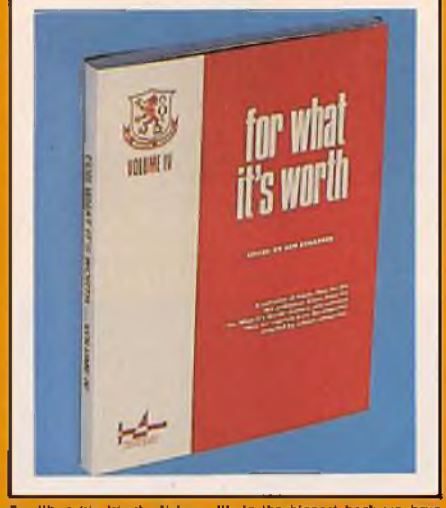

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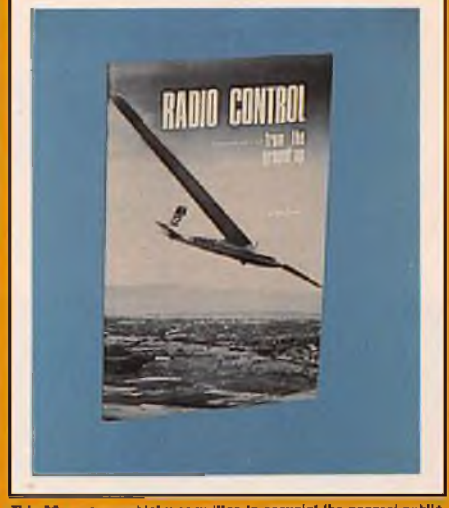

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POWER BOATING

from page 151/20

they look very much like the Continental Huco couplings. If anyone is interested, they should write for the catalogue. I notice that Stock Drive, while they produce a standard line of goods, are prepared to make up specials for particular jobs — something you don't find every day of the week. So if you have a problem, whether it is couplings, gears or toothed-belt drives, drop a line to Herb Arum, the Marketing Administrator, and he may well be able to help you. (I might add that their prices are pretty reasonable, too!)

Stock Drive Products catalogues – looks like there could be a lot of useful things for modelers in those pages!

And that's it for this month, I'm off to the drawing board to see if I can come up with a design for a balloon burster that meets all the requirements, including looking good. See you next time? □

ARMCHAIR ACE

from page 18

was learning to fly 'Reeds'. I had become quite good at taking-off and flying but I was lucky to land in the same county, let alone the same field!

"Well, several of the more experienced pilots came to my rescue. They instructed me to look over my shoulder as I did my landing approaches as if I were in the airplane. I was told to head the airplane directly at myself. They said that when I was about 30 to 40 feet out, I should turn the plane down the runway for a beautiful on-the-same-field landing.

"This is where the fun began. My first approach was beautiful and steady as a rock. I was really thrilled. Then PANIC! As the ship came closer, my brain ceased to transmit the proper signals to my fingers, which were about to leave permanent fingerprints in the transmitter case. At this point, everyone was giving me G.C.A. instructions but communications were so garbled that I did

to page 156

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The little elves at the Futaba workshop have been busy building up some very special packages. Now, just in time for the yuletide season, Futaba presents their limited edition Christmas Systems...the FP-4FN/17 and FP-6FN/17.

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ARMCHAIR ACE

from page 154/18

the only thing that seemed logical at this point - - - run like hell! There I was, the man in control, totally out of control. Picture this: running for all I was worth with transmitter in hand and a 6½ lb. Smog Hog, K & B idling, chasing me down the runway. At full throttle, this could have been a ***disaster****. But, since the engine was idling, I only received a rap in the rear end and a big dent in my pride! After an almost immediate recovery, the system was tried again, but without panic, and with great success.*

"This manner of learning to land works well and should be suggested by all instructors, with two extra words of advice, ***Don't Panic****!"*

John's idea works and I used it when I became disoriented during my first flights back in the 50's. It backfired one time, though. I was flying a pulse-rudder job with a highly directional 465 MHz radio. When I turned the transmitter away from the plane to look over my shoulder, that little bugger peeled off in a full-left-rudder spiral all the way to the ground. No signal reached the plane at all and it took just a second longer than the crash to realize what I had done.

to page 158

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ARMCHAIR ACE

from page 156/18

That won't happen with today's omni-directional antennas.

Sam Fluharty, President of Talbot County's TRAC had an experience similar to John's when he got his first Box Fly out with a high-winding Weber on the front. That bird was mean and things happened **fast**. On the first touch of down elevator, that high-powered little mother started in a 45° nearly vertical dive - - - straight for Sam. He knew he was going to get hit and danced around frantically, wondering which way to run until he figured that "up" would resolve his dilemma. It was funny until he later realized that he could have been killed. Probably would have been considered suicide . . .

Sam is an instructor with TRAC and one of the points he constantly emphasizes with his students is not to fly too close to the woods bordering their flying site. Every flight, you can hear Sam admonish the fledgling flyers to stay away from the woods. Well, Ol' Sam was flying Timmy Stagg's A-Ray one day when he put it right through the only opening in that dense expanse of trees. Panicking quitely to himself, Sam somehow steered Tim's plane behind the trees and back. Tim asked if Sam hadn't flown behind the trees which he tells everyone to avoid. "Just looked like it," Sam nervously replied. "Now you know, Tim, do as I say, not as I do. . ."

I pulled a boner on myself a while back when a friend and I collided on the field after a simultaneous landing and I lost. Rebuilding the fuselage of the 'Bird from stab to wing T.E., I checked alignment carefully as I went and you should know that I admonish every builder to check the decolage of a new (or rebuilt) airplane by "zeroing" the stab with a ruler to the kitchen table, then checking for proper angular difference by measuring from table to center of leading and trailing edges of wing. Guess who had to hold almost full up for level flight on the first flight of that rebuilt 'Bird?

Do as I say. . . □

SOARING

from page 17

Beach, California, and achieved a 24th spot. It is a Standard Class ship with 1080 square inches and uses rudder and elevator. It is called the "Santana" and promises to be a winning design in the future.

Second was Ed Kennedy of SULA, who uses a button on his transmitter to winch his sailplane. A cord is plugged into the winch where the foot pedal normally attaches and also plugs into a button box on the transmitter. When the

sailplane comes off the tow, he pulls the plug from the transmitter and walks to the landing circle to proceed with his flight. When the flight terminates, he goes back to the winch and picks up his extension cord.

Neal Taub with House of Balsa's, soon to be kitted, Santana.

Ed Kennedy of SULA, uses Xmeter mounted button to pulse the winch.

Reg Fleet, his Olympic II, his smile from New Zealand. He timed more flights than anybody at the NATS and LSF.

to page 161

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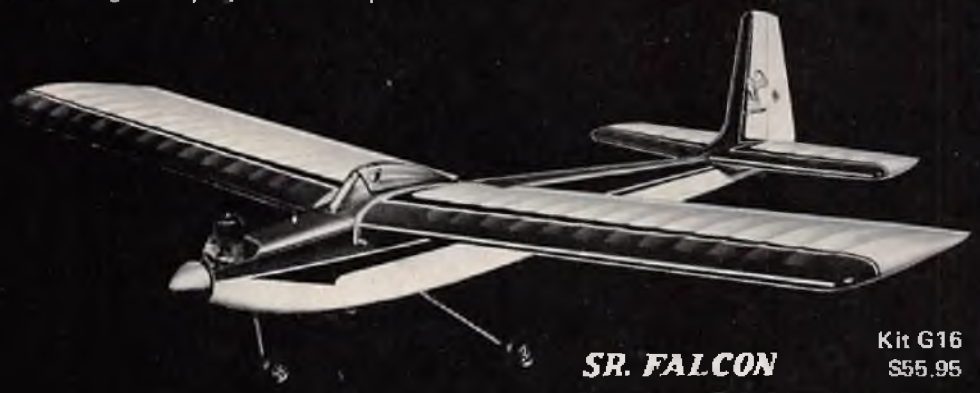

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SOARING

from page 159/17

Third was Reg Fleet from Auckland, New Zealand. Reg flew his modified Olympic II, constructed from RCM plans, to a very good Eighth Place. His radio was a New Zealand manufactured Teletrol. Reg and his wife were very interesting to talk to and discussed their travels to the NATS at Riverside and then on to the L.S.F. Tournament.

All of you sailplaners and your families and friends, have a very Merry Christmas and a Joyous Holiday. If a new radio or sailplane comes your way, check it out thoroughly before that first flight. Always practice safety.

Good Lift. □

SUNDAY FLIER

from page 16/15

Picture #2: The Albatross B-I in a flyby. Looks real, doesn't it? And here's an interesting aside: it was made from a Lou Proctor Antic biplane kit which Rich modified to achieve the Stand-Off Scale effect of the Albatross B-I.

Picture #3: My 1/2A Jenny, sitting in the center of the judging circle, made it tough on the judges because of its small size. How can you score it if you can't see it? But they did a good job, and I was very happy with the result.

Picture #4: Steve Atwater's DH-2 getting fired up for its first scale flight. It was very impressive in the air although they had some tense moments when the engine didn't rev-up like it should. Very nice model. One of the AMA Scale entrants.

to page 166

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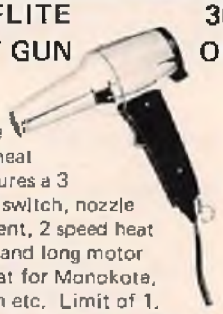

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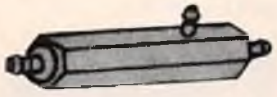

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from page 161/15

Picture #5: Joe Tschergi's Brandenburg flying boat. It also was entered in AMA Scale. Joe had some trouble getting it airborne. First he tried skidding it off the grass, with no success, then he used the scale handling dolly and, after a couple of minor modifications, managed to get it airborne. The flight was very impressive and, with the afternoon wind blowing as the model came upwind, it was very much scale in its speed and appearance. Joe also landed it very gingerly on the bottom of the hull, and kept it upright. A great performance. I was amazed to learn that the covering — which I thought was some kind of preprinted material, actually consisted of over 1500 hexagonal patches doped on top of a silkspan base. Joe has to keep it in the shade to keep the covering from fading. It's a truly beautiful model.

Picture #6: Biplanes were by far the most popular. This line-up of a Nieuport, a Camel, another Nieuport, and an Se-5 was typical of the field of entrants.

Picture #7: The world's largest R/C model? Eric Clapp, with the transmitter, seems to be guiding the parasol monoplane for a take-off. Not really. The "dummy" in the cockpit (as Monty Groves kept saying) really was no

dummy. It was Bruce Perch, son of Irving, flying the home-built sport plane designed and built in 1966 in Portland, Oregon, by Ray Wilsey. Bruce flies it at special events at the Hill Country Air Museum. It's a real crowd pleaser.

Picture #8: Bruce Perch in a low flyby.

Picture #9: Bruce listens to the applause of the crowd following his flight. The plane would make a great R/C job.

Picture #10: Dave Lovett, from Ukiah, entered this Blackburn monoplane in AMA Scale and finally wound up as the overall champion for all events. It's a good steady flier, scored fairly well in static points, and did a consistently good job in the mission, bomb drop, and combat events. An excellent choice for this type of meet where scale points are only part of the score, and total performance is what really counts.

Picture #11: Something out of the ordinary always shows up at model events, and the WW I Western Front Jamboree was no exception. This shot of a seven cylinder model engine is a case in point. It was designed, and is being built, by "Okay" Uzoma. It weighs 1.8 pounds, and the size can be seen as it is shown with a Top Flite 12/8 prop. "Okay" machined everything from bar stock and has it about 60% finished. He is an engineering student at San Jose State College and has limited funds. He has hopes of getting the engine in production, so if any of you readers would like to help him, write him at 2050 McKee Road, Apt. 114, San Jose, California 95116. I hope he makes a go of it. It's a beautiful piece of workmanship. Can't you just see one of them in the nose of a scale Fleet Husky biplane?

★

As it so happens, this month I took all of the photos myself. In some past issues I have furnished photos by other photographers and have neglected to give them credit. Let me correct that right now. Jim Georgeson, Jim Boswell, and Calvin Hills have all provided me, at one time or another, with some excellent shots; so has Whitey Pritchard and Monty Groves.

OK, fellas?

Gotta' keep peace in the family.

★

Hey Steve - - - Steve Crow. Where are you? Ever since I published a photo of your G.B. "Flying Barrel" displayed at the MACS Show, I've been getting requests for plans or information. How about getting in touch, so I can pass on the info?

★

Next month I'll tell you the "Saga of Jenny 2805". It's the story of a great man — and a fantastic coincidence.

I think you'll like it. □

ENGINE CLINIC

from page 12/10

came to rpm range and setting the needle. The OPS pipe differs in that following the expanding cone section, the rear portion remains a constant diame-

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ENGINE CLINIC

from page 168/10

ter with a flat back. This seems to considerably broaden the operating range of the pipe — at the expense of a few hundred rpm over a double coned pipe, but well worth it in operating performance. OPS offers both styles, but the constant diameter, rear section pipe using the SS designation, seems to be the better pipe for pattern and sport aircraft. Rossi also offers a line of pipes as does Duke, Fox and several individuals advetising in RCM. The E.D. Power Pipe from England is also still available.

Personally, I believe the "pipe" is the coming thing and you are going to be seeing more and more of them at the flying fields. Noise is becoming more and more of a problem and the tuned pipe also serves as a very efficient muffler. Rossi, Fox, OPS and Webra all offer piped versions or pipes for their engines. This coming Spring, K & B will be introducing their new Schnuerle .60 with, you guessed it, a tuned pipe.

I believe that about covers it. I am sure that I did not cover something that someone will want to know about, however, that will give me material for another column.

•

Dear Mr. Lee,

I have a couple of questions that I would appreciate some very short answers to. They concern the abilities of the Perry pump, and engine usage in very large models.

First off, the Perry pump. Will it operate satisfactorily on gasoline-based fuels? I read your article on the Robart pump and, quite frankly, you threw a monkey wrench into my plans with your information that the silicone diaphram in the Robart will not withstand gas-based fuels. The reason I need the gas-based fuels is that I am going to be running an ignition-coverted glow engine from a very large tank, and some type of pump from the large tank into a small header tank is essential to give me the reliable engine run I require.

The second question concerns very large models. I currently am flying a rather heavy Nosen Champ with an O.S. .80, and when everything is right, I have a lot of fun playing around at low altitudes. However, I have always been an advocate of having enough power available so that I don't have to extract the engine's ultimate capabilities. I have found that these conditions lead to much frustration and damaged engines. This Champ, however, does require everything that the engine can deliver and, quite often, more. I don't like abusing the engine like this.

So, the question is really twofold: Do you know of anyone who is supplying gear box kits to gear two .60's together

to page 172

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- Flies great with hot 1/2A engine.
- Includes world's finest control mixer for full house operation with 2 channel 2 surface configuration.
- Complete ready to fly weight only 14 oz. (less engine & radio)

Specs:
Span 28½"
Length 20" (not including engine)
Radio 2 channel or more.

- .40 powered pattern plane. 5 years ahead of its time.
- Comes built, sanded and ready to cover and/or paint.
- May be finished with conventional or tricycle landing gear.

Specs:
Wingspan 52¾"
Length 44½"
Engine .40 cu. in.
Radio 4 or more channels
Total weight Approx. 6½ lbs.

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- Designed for .19 size engines (have been flown with everything from .15 to .40).
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Specs:
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Area 480 sq. in.
Length 36"
Engine .19 - .40
Radio 4 or more channels

- Unique and Distinctively Different.
- For Sport and Fun Flyers.
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ENGINE CLINIC

from page 170/10

ala the old Cox .049 geared multi-cylindered engines? If not, do you have any experience with such a gear box which proves or disproves the practicality of such an item? My prime goal is to have an engine which will provide the power to swing about a 14/6 prop without straining its guts out. I think two .60's (mild ones) geared together should be able to do this. However, I have heard rumors that serious problems have cropped up when other people have tried to do this. Specifically, extreme wear from gear slap seems to be the most prevalent rumor.

If there are no suppliers for these gear boxes, I have all the machine shop capabilities of producing one, but I would like to hear of your experiences on their practicality. We, in this area, are very interested in this idea. We have a complete inventory of Nosen's kits here, with duplicates on several, and four of the Champs currently flying. Several of our monster-flyers are not too sharp on engine performance and fried engines are not unknown! These birds are really just too big and heavy for current engines and casual pilots.

I thank you very much for any help you can offer on these subjects.

Sincerely,
Lee Taylor
Roseville, California

Sorry to have thrown a wrench into your plans in regards to using a Robart Super Pumper, but I was not the designer of the unit. Would you rather not have known that gasoline would damage the pump diaphram and found out the hard way after having purchased one? Anyhow, your problems are over, as Robart now makes a special pump for gasoline use. The Perry pump can also be used with gasoline based fuels.

I do not know of any commercial source for a gear box to in turn join two engines together. Having geared two engines together myself, in years past, I found this method of joining to leave a bit to be desired. Gear wear was always a problem due to the impact shock of glow ignition imposing all of the shock load on two gear teeth, resulting in rapid wear of the drive gear.

Rather than gearing two engines together, I suggest you look into the Du-Bro reduction gear drive unit. This will give ample power for your Nosen Champ. However, one of the shortcomings of the unit which uses drive belts is rather short belt life.

Dear Mr. Lee:

I have two Super Tigre .35 Combat Special plain bearing engines left over from my control-line combat days which have been fitted with Super Tigre carbs for R/C service. One of these always seemed to run somewhat slower, but I didn't pay much attention; I used ball bearing engines in competition and the "slow" engine was fine for sport flying. Last summer, I converted a Strikemaster to a twin and used the two Tigres in it. When using a tachometer to synchronize the engines, I confirmed my gut feelings: One engine would turn a 10/6 Rev-Up prop at 10,800 rpm and the other would go to 12,000. With both engines turning 10,800, the twin Strikemaster was an impressive performer and I didn't worry about the difference in the engines.

Finally, my curiosity won out. Why did these "identical" engines perform so differently? Both were purchased at the same time and both have had the piston and liner replaced. A new crankcase was purchased for the slow engine because I had drilled out the spray bar hole in the original case and the tapered pin which retains the carb wouldn't fit. This new case now has at least five hours on it. I didn't notice any change in performance between the different

to page 176

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KP-7C

KPT-7CS

1976 Centennial 7 channel Kraft 2 Stick and 1 Stick Systems. List Price $515.43, and we are letting them go for only $359.95. Brand spanking new, famous Kraft guarantee, and your choice of frequency, and servo. Choose the KPS-15 workhorse or smaller KPS-14.

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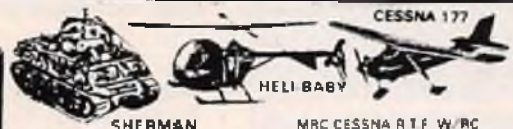

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from page 173/10

cases, although I don't have numbers to prove it.

I measured as well as I could on both engines. The engine friction could probably be measured with a viscometer available in the lab at work, but I never did get to that. It occurred to me that the clearance between the piston and head (deck clearance?) was the most significant difference. It was .016" on the slow engine and .006" on the fast one. In an attempt to confirm this theory, I put the engines on a test block and switched heads and gaskets. Fuel was 10% nitro and the same 10/6 Rev-Up prop was used on both engines – it didn't make any difference! The slow engine wouldn't go over 10,800; the fast one would still turn 12,000 with either head and the .005 gasket. Idle was smoother with the greater deck clearance, however.

So, now I'm curious enough to write. Do you have any ideas or suggestions as to why these engines run differently?

Sincerely yours,
Chuck Snyder
Coffeyville, Kansas

Due to space limitations, I did not run Chuck's sketches. All dimensions for both the slow and fast engines were within a few thousandths of each other except deck heights as mentioned by Chuck, but there was considerable variance in crankshaft timing; the slow engine having an opening timing of 23° ABDC and closing timing of 51° ATDC, the fast engine opening at 32° ABDC and closing at 49° ATDC.

Trying to pin down why two seemingly identical engines will have a large variance in rpm can get you talking to yourself. There are many variables involved. I have run into this many, many times, especially with the high rpm racing engines. To make things worse, you might have two engines that turn 20,000 and 20,500 respectively. Install a smaller prop and the slow engine might turn 24,000 and the fast only 23,000. I have gone the route as you have — changing cases, piston/sleeves, heads, etc., and proved nothing. One particular combination just proves to work better, however, a 1200 rpm spread at the 11,000-12,000 range is quite a bit. I can usually put six engines together and have them all run within 200-300 rpm of each other; this is if I bench run and give them the initial break-in. If I give the six engines to six individuals, I would see a 1000 rpm spread. I cannot say why the large spread in rpm between your two engines. Fit does not make a big difference and something must be hanging up in your slow engine; the crankshaft is binding, piston/sleeve not sealing well, etc.

You should have noticed some difference when switching heads — .006" is way too close and .016" getting a little excessive. This, in itself, should have shown up in some rpm change. With 10% nitro, you should be running about .010" clearance — .008" at the closest if the weather is dry. The largest variance in your engines is the crankshaft timing. The slow engine opening at 23° is pretty early for the rpm range that you are running the engine. Early opening, in turn, means less bypass duration. With a closing timing of 51°, you would not want to open any sooner than 30°-35°. The timing in the fast engine is more logical, especially with an exhaust timing of 135° as used by the S.T. .35. Extending the exhaust opening to 140° would benefit both engines. You might try switching crankshafts if the journal and rod pin diameters are the same, just to see if it is the crank timing that is making the difference, however, I suspect something else wrong in the slow engine.

Dear Mr. Lee,

I have a question about my O.S. Wankel. It runs fine and has plenty of power for my Sweet-Stik and it has been excellent on glow plugs, however, I now need a new plug but find all the local hobby shops and a few of the mail-order houses are all out of the O.S. Wankel plugs. I have heard two things I can do: (1) Use a standard (no idle bar) long plug such as the Hot Fire Ball as is and (2) file off the last two threads on the standard plug to make the plug look like a Wankel plug.

Could you please comment on these ideas, mainly with respect to damage to the engine. Since there is a great price difference between the standard plug (89¢) vs. a Wankel plug ($2.50), I assume many others would like to hear your comments also.

Thank you,
Alan T. Knight, Jr.
Woodbury, New Jersey

Alan, just about any long reach non-idle bar glow plug can be used in the O.S. Wankel, but I have yet to find one that will equal the performance. This is due to the fact that the Wankel plug is somewhat longer than standard long reach plugs and extends deeper into the glow plug cavity. Filing the threads off of a regular long reach plug will buy you nothing. The bottom threads have been turned off on the Walkel plug because the plug threads into a blind hole, i.e., the threads in the glow plug hole do not go all the way to the bottom due to the hole not being through.

It does seem to help if you gently pull the element out of the plug body very slightly. Use a pin with the tip bent over. This brings the element closer to the small hole at the bottom of the plug cavity.

to page 181

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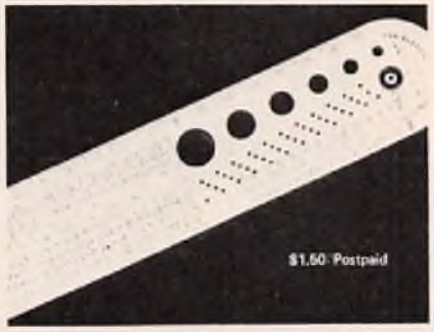

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ENGINE CLINIC

from page 177/10

Dear Mr. Lee;

I've got an O.S. Max .40H that's had 132 flights on it and recently it began to load up. After throttling back and then going to full throttle, the response is slow and it sputters and then finally seems to lean out. I've cleaned the carb, changed plugs and am using K & B 500 with 10/6 prop and Fox plug. Please help me if you can because everyone else I've talked to is baffled.

Sincerely,
Arlan Manning

Arlan, with 132 flights on your engine, the chances are pretty good that it is getting tired. As an engine wears, combustion pressure becomes less, resulting in less heat to keep the glow plug lit, compression ratio becomes less due to sagging of the piston (rod, wrist pinhole wear, etc.), and the timing is affected. If the engine has seen a few lean runs and digested some dirt, the process is speeded up.

You did not say if the idle was still okay or not. This is usually the first thing to go when the engine is over the hill. If the idle and top end are still good and the engine does not present any starting difficulties, then possibly you have the idle mixture set slightly too rich. Leaning the idle slightly will, in turn, lean the mid-range.□

CUNNINGHAM ON R/C

from page 7

commercial work, by all means, use a lifting tail section in the design; you will have a much better aircraft.

Again, as many of you know, I have been hooked on the big models for some time now, and a part of this fascination has come about from flying Antique aircraft. I wish that I had time to build all the aircraft that I would like to fly but, lacking that time, the next best thing to having all of these aircraft is at least watching others fly them. The best place to do this watching is at an Antique and Old Timer contest — Texas style, that is. The Second Annual Texas Pride Tournament sponsored by the Fort Worth Thunderbirds, SAM Chapter 29, and the Pearl Brewing Company, brewers of Texas Pride Beers, was just the place to catch a lot of action. 31 entrants flew their aircraft in four categories: Antique Add-em-up, Antique "Chicken", Old Timer Add-em-up, and Old Timer "Chicken". Tournament Director, Helmer Johnson, put on another of his fine, well-run contests, and it really wasn't his fault that, even though the day was 102 hot August degrees, the air at the T-bird field on the shores of Benbrook Lake was all falling into the lake. Pretty good lesson here.

to page 183

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from page 181/7

Almost no lift anywhere since all of the air around the lake was rushing into it. The only aircraft that could get good times were the Old Timer Playboys - - - these ships just stay no matter what the conditions. But the Antiques, such as my Powerhouse, Dallaire Sportster, and Quakers, couldn't quite cope with the sinking air. For successful contests with these type of aircraft, the classes must be separate.

Those of us who are flying this type of event here in the Texas area are going to be flying by our rules rather than by the normal SAM rules. We believe that these aircraft should be "radio controlled" aircraft, not radio assisted and that glo engines are the thing to fly. We believe that the pilot should have command of the airplane, and that its flying ability should be a combination of aircraft and pilot. The Add-em-up Event is the LSF task IIA in which the contestant has three flights to add up to 15 minutes with no one flight lasting over 7 minutes. Each flight has spot landing points of 100 added to it for hitting the 70' diameter spot. Next year we are thinking of making a mandatory touch-and-go as part of the flight before climb out for gliding altitude; also to shrinking the spot down to 50' or perhaps 30' diameter. Extra points for touch-and-go and landing tend to keep the event from becoming an engine race, since the engine must be able to idle to come around for a touch-and-go, as well as be able to yank the aircraft skyward for the soaring portion of the flight. Of course, pilot ability will come into play with a touch-and-go and a small spot landing for bonus points.

The Chicken Event is more like free-flight with a radio string as the aircraft is climbed normally, then the contestant has 30 seconds to set up his glide trim. When he hands his transmitter to the timer, the time starts for the glide. The time ends when he takes back the transmitter, but the aircraft must touch down on the flying field for any points in order to count, and a spot landing for extra 100 points makes you think twice about how long, at one point per second, to stretch the hands-off portion of the flight. If the wind is blowing, this can be a pretty short time but, in still air, times can be quite high.

Another feature of the Texas Pride Tournament was the fine trophies, down to fifth place in each event, plus two high point trophies all constructed with loving care from Texas Pride Beer cans. An EK radio was given away, not to the high point winner, but to one of the contestants from a drawing held among all of the contestants. You could be a last place finisher in the meet, yet still go

home with a new radio. A special award was made to Jane Johnson for being the Best Lady Pilot. Even though Jane was the only gal pilot entered in the Tournament, she still is the best. She flies sailplane events as well as Antique and Old Timer events right alongside of her husband, Helmer, and is beginning to collect an impressive display of trophies from contests around the state against men fliers.

If you have a chance next year, be sure to enter the Texas Pride Tournament — you'll have a good time.

Now, it's time to get after repairing the slightly crunched parts of Miss Texas. Glad I wrote an article a couple of months ago about repairing crashed aircraft, because one of the points was to wait at least a day before you start repair work. This is about the most valuable advice around. This week, Jan and I are leaving on our much overdue vacation, and hope to say Hi to some of the modelers in jolly old England. Until next month, Good Luck and Good Flying. □

FROM THE SHOP

from page 2

hundred and fifty foot tree! One can speculate about a lost model, but all one gets when it's on top of the tree is visiting rights.

We have a good friend who built a Prather Polecat to fly in a field by his summer cottage. Seems he was entertaining the neighbors with his flying prowess when this one hundred and fifty foot tree came up out of nowhere and plucked his model from the sky. Leaving the country for the weekend, our friend vowed vengence, and promised to return to rescue his model. Many plots can be hatched in five days, and so Plan I was born. On his return to his cottage the next weekend, our friend armed himself with a slingshot. Now fate decided to tease our friend. The winds during the week had blown his Polecat down to the very last branch capable of holding the model — at a height of some 75 feet. If David could deck Goliath with a slingshot, then our friend could hit his polecat out of the tree. Wrong! He hit two squirrels, one glass window, and the next door neighbor's nasty kid. The return trip to the city was sad that Sunday night. It was during that week that Plan II was conceived. If Willie Tell could hit an apple off his son's head with an arrow, then our friend could hit his Polecat out of the tree. Wrong! He hit himself in the lip. The trajectory of a missle fired straight up ends straight down. The wound is healing well now. Enough was enough. What started as a simple conflict has now escalated into full fledged war. Had not the tree been leaning towards our friend's cottage, that foe would have felt the sting of the cutters axe. Instead, reinforcements were called in, in the form of a tree surgeon. Twenty-five dollars later, the hostage was freed and a truce was called.

"All's well that ends well" the saying goes. That may be so for Shakespeare but

not for our friend, because there is an epilogue to this story. A model aircraft is built for flying and its place is in the sky, so after cleaning the electronic gear and engine, it was ready to be airborne again. It was a fine hand launch. Then it became a struggle to keep a suddenly tail heavy airplane flying, and then disaster as the water logged balsa disintegrated. The wing snapped in half as the glue joints gave up, and our friend's Polecat spiralled into the ground. All the pieces fit so neatly in a shopping bag!

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This next item concerns NASA Spin Tests utilizing R/C aircraft and is reprinted from the "American Bonanza Society Newsletter". Thanks to Dick Biro of Lakeside, Ohio, for bringing it to our attention.

BEECHCRAFT ENGINEERS CONDUCT NASA-SPONSORED SPIN TESTS WITH RADIO CONTROLLED AIRCRAFT MODELS

As part of a joint NASA-Beech Aircraft Corporation program, Beechcraft Research and Development engineers have completed a series of aircraft spin and spin recovery tests utilizing a radio controlled (R/C) scale model aircraft.

NASA, at the request of the manufacturers, is conducting extensive research into stall/spin characteristics of general aviation aircraft and data provided by the Beech tests is aimed at establishing the use of R/C model aircraft as a valid method of evaluating spins and spin recovery.

Under a NASA contract which provided for construction of the model, instrumentation, spin testing, and comparison of results with spin tunnel and full scale flight tests, Beech Aircraft first flew a precision 1/6 scale model of the Beechcraft U.S. Navy T-34C in July 1975.

"The T-34C was an ideal choice for the program," according to R.R. Tumlinson, Beech Aircraft's chief of aerodynamics. "Spin tunnel tests had already been conducted at Langley Research Center in Virginia and more than 1,200 spins had been flown on an actual T-34C prototype. The T-34C also has many common design characteristics with general aviation aircraft.

"With the results from previous tests in hand, we had the data base with which to compare our R/C model spin tests results."

The actual R/C model, with its instrument load, weighs 18 to 20 pounds, three times the weight of hobbyists' models of the same scale. The scale model T-34C is constructed of balsa wood, foam and fiberglass laminate, and had a 1.5 horsepower engine. It carries instrumentation on board for measurement of angle of attack and slideslip angle and for monitoring commands from the ground control transmitter.

Measurements taken during flight through wing boom-mounted flow vanes are transmitted to the ground where they are recorded along with corresponding ground control commands, on an oscillograph. A 16mm motion picture camera films each flight to provide detailed visual analysis of spin and recovery techniques.

"We believe that our tests furnished us with a number of positive results,"

Tumlinson said. "It has shown us that a particular airplane may spin in several attitudes but we need additional tests to cover all of the attitudes required for a complete correlation.

"Once that correlation is established, we think R/C models will furnish manufacturers with a useful and needed technique that can be used to determine spin and spin recovery characteristics early in an aircraft's development stage."

Beech will continue testing of R/C models under a follow-on contract from NASA as part of the agency's Stall/Spin Program for general aviation aircraft.

This new, rapidly developing technology is providing valuable experience and techniques which are now being applied to other Beechcraft projects and, in the end, stand to benefit all of general aviation.

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A letter from Roger Ballentine, who is stationed at Torrejon Air Base in Spain, is encouraging for RC'ers in that area.

Dear Don:

Just a few lines to request your assistance in passing on a little information concerning RC flying here in Spain. RCM is the only strictly RC magazine sold through our Stars & Stripes book store here on base. Since I know RCM is widely read by the military members, we here in Spain would appreciate it if you would pass on the following information: RC flying is alive and well in Spain. Even though, as I am writing this, we here at Torrejon AB, located just outside Madrid, are not a formally organized club, we are getting there. We have received approval from the Spanish Air Ministry to utilize all frequencies in the 27 and 72 MHz bands. Frequencies in the 53 MHz band as well as 26.995 MHz and 75.64 MHz are illegal for our use in Spain. In addition, we have also begun drafting our constitution and plans call for no membership dues at present. We are currently flying from the old Aero Club Field which certainly needs a lot of improvement, however, once we are organized and get our constitution approved by the air base officials, we can also hopefully gain their support in utilizing some of the equipment necessary to fix up our flying site.

If you would place the above information in RCM for the benefit of those RC'ers coming to Spain, and to let them know not to to put their equipment in storage, we here at Torrejon would certainly be grateful. Also, if anyone is anticipating coming to Spain, either for a visit or assignment, and would like more information or just plain old hospitality, feel free to write to me: Roger L. Ballentine, P.O. Box 121, APO NY 09283, or call me at Torrejon AB, extension 6136.

Thanks,
Roger Ballentine

•

See you next month and in the meantime — Good Flying. □

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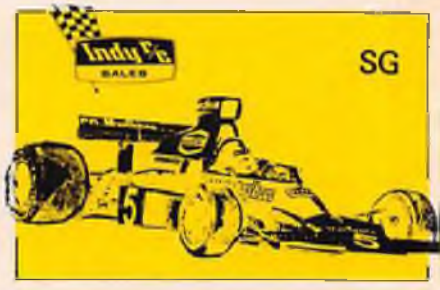
P-51	54.95	43.00
Kadet	33.95	27.00
Kommander	38.95	31.00
Kougar	42.95	34.00
Smith Mini plane	49.95	39.95
Zlin	54.95	43.99
Yak	73.50	59.00
Citabria	47.50	38.00
Liberty Sport	63.75	51.00
Ryan STA	73.00	59.00
Clipped Wing Cub	37.95	30.00
Sky Bolt	58.50	46.95
Piper J-3	37.95	30.00

The MK Spirit of St. Louis is an all balsa kit, requires a 45-60 cu. in. engine, has an 80" wing span. Plastic dummy engine cylinders included. This is also nice with an OS 4 cycle 60.

Corvette has come out with a new aluminum covering which is a natural for the "Spirit". Roll - List $9.95 - Indy $7.75. List on the "Spirit" - $90.00 - Indy $68.50.

MACH LINE RACER
Shown in photograph. 1/8" scale. Engine 15 to 29. Quality Japanese product. Price less engine. List $129.95. Indy $89.95

IZUMI RACE CAR
1/8" scale Porsche. Engine 15 to 29. Engine not included. A nice quality Japanese product. List $129.95. Indy $89.95.



SG FERRARI
1/8" scale R/C race car. Holder of many European records. With Supertigre engine. List $175.00 - Indy $129.00. Without engine - List $149.95. Indy $111.95. The decals that are included with this kit are really great and make the car authentic.

Pump - 2 oz. per revolution so you can partially fill tank if you desire. Extra heavy duty gear train for rugged service. Fast pumping not necessary as with most hand pumps. These manual hand pumps are always ready to go - no batteries to worry about. List - $12.50. Indy - $8.95.

Indy r/c

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Indiana Res. - 317-848-0766

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Indy r/c SALES

Indy r/c

RADIO CONTROL SYSTEMS

WORLD EXPERT MARK II

	List	Indy
Ch. D.S. (5 servos)	$464.95	$279.95
Ch. D.S. (4 servos)	$432.95	$260.00
Ch.D.S. (4 servos)	$399.95	$239.95

NEW EXPERT RADIOS

ch. 3 servos, nicads	$239.95	$169.95
ch. 2 servos, nicads	$179.95	$129.00
Ch. Glider,S.S., 3 servos, all nicads	$234.95	$169.95

FLIGHT PACKS

Ch. 5 servos	$264.95	$188.95
Ch. 4 servos	$259.95	$162.95
Ch. 4 servos	$249.95	$157.95

SERVOS

10 & S-11	$45.00	$36.00
etract	$52.00	$42.00

COX SANWA

Ch., 2 servos, all dry	$99.95	$73.00
ch. 4 servos, nicads	$299.95	$199.95
ch. 4 servos, nicads	$369.95	$245.00

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P-3C dual stick	$219.00	$175.95
P-5C dual stick	$375.43	$295.00
P-5CS single stick	$375.43	$295.00
P-7C dual stick	$515.43	$399.00
P-7CS single stick	$515.43	$399.00

NEW FROM KRAFT

P-4A dual stick, 4channel, 4 servos,		
nicads	$299.95	$214.00

SERVOS

PS-11,12,14 & 15	$44.95	$38.00
PS-15H & 16	$49.94	$41.00

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PRO LINE ELECTRONICS
(SPECIAL SALE)

PLN-3C 3 Ch. S.S. closed gimbal, all nicads" $250.95 $169.95
PL-5-D 5 ch. dual stick, open gimbal competition $559.35 $369.00
PL-5-DS 5 ch. single stick, open gimbal competition $559.35 $369.00
PL-7-D 7 ch. dual stick, open gimbal competition $597.50 $389.95
PL-7-DS 7 ch. single stick, open gimbal competition $597.50 $389.95
PL-5-II 5 ch. dual stick, semi-open gimbal Challenger II. 394.40 $269.95

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SMALL WONDER

MICHIGAN HOBBY HANGER

Quickie Bipe	34.95	22.50
Quickie	27.95	17.99
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Small Wonder	28.95	18.99

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MULLIGAN

GLASS HAWK

WORLD ENGINES
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20-L (low wing)	34.95	28.00
20-W (Biplane)	39.95	31.00
10-MG (motor glider)	24.95	19.95
20-S (shoulder wing)	29.95	23.95
15-H (high wing	22.95	18.50
ARF BOX FLY	34.95	28.00
Miss World	49.95	38.95
Mr. Mulligan	47.95	38.95
W.E. Cub	39.95	31.00
Lil John (H wing)	54.95	43.00
Lil John (L wing)	59.95	47.00

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	List	Indy
Willhold R/C 56	1.50	1.25
GMP Styro Stik	2.30	2.00
Hobby Poxy II	4.00	2.99
Hobby Poxy IV	2.00	1.75
Wilhold Aliphatic	1.80	1.50
GMP 5 mn. Epoxy	5.95	4.75
GMP ½ fast	5.50	3.75
Devcon 5 mn. lg.	2.60	1.85
Devcon 5 mn. sm.	1.35	1.00
Devcon 5 mn. 9oz.	5.80	3.99
Devcon slo cure	5.80	3.99
Hot stuff	3.50	2.75
Blue Line H.S.	4.95	3.50
Giant Zap	3.50	2.75
X-30 Adhesive	1.15	1.00
Ambroid 4 oz.	1.15	1.00
Ambroid ¾ oz.	.60	.50
Super Cement	55	.45
Blue Goo	2.95	2.59

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INDY SILK

1 yd. pkg.	3.25	2.75
2 yd. pkg.	6.50	5.00

COVERITE

Super 38 x 47	7.75	6.20
Silkspun	7.75	6.20
Permagloss	9.10	7.25
Day-glo permagloss orange, yellow, olive drab & aluminum	9.95	7.95
Camouflage 1% and 2" scale	9.95	7.25
Balsarite ½ pt	2.95	2.75

MONOKOTE

Opague	9.00	5.50
Transparents	9.00	6.50
Metallic	10.50	7.00
plain trim sheets	1.19	1.10
Checkerboard trim	1.59	1.50

SOLARFILM

Opaque	7.80	5.00
Transparent	9.00	6.50
Metallic	10.00	7.00

MIDWEST

MicroLon	1.95	1.75

BUTY – FLEX DOPE
22 colors

quarts, colors	4.95
quarts clear	3.95
Gallons clear	9.95
gallons Thinner	5.95

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AIRTRONICS

Std. launch pail	34.95	27.99
HD launch pail	36.95	28.00

CRAFT AIR

Del. Hi-Start	37.95	31.00
Std. Hi-Start	34.95	25.00
Para Pod	9.95	7.00

ASTRO-FLITE

HD Hi-Start (real heavy duty)	41.95	31.95
Astro-start	39.95	31.00

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CARS WITH RADIOS

MK-8B	177.50	142.00
Challenger	187.50	150.00
Alfa	226.95	181.00
Vette	215.95	172.00

CARS LESS RADIO

MK-8B	55.00	44.00
Challenger	65.00	52.00
Alfa	97.50	78.00
Vette	87.50	67.00

CARS LESS RADIO AND ENGINE

MK-8B	27.00	21.50
Challenger	32.00	25.50
Vette	50.00	40.00

JEROBEE – BODIES

MK-8B Body	7.95	6.50
Porsche	4.95	4.00
VW Bug Body	12.95	10.50
Vette Body	12.95	10.50

ACCESSORIES

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wing with decals	2.95
brake kit	1.95
remote tank kit	2.95
Aluminum flywheel	2.95
mount for Tee Dee	6.95
Bumper	2.49
Chassis Frame	3.95
Lexan Chassis frame	7.95
Starter Rebuild kit	1.60
Eng. rebuild kit	7.55
Rear Axle kit	1.49
Clutch shoes	98
drive shaft w/ret	.89

HUGHEY

	List	Indy
20 Rigger	100.00	85.00
40 Rigger	110.00	93.50
19 Hydro	77.00	67.00

SAIL BOATS

Blue Sonic 900	129.95	
Indy special	99.95	

STARTERS PUMPS

STARTERS

Std. Sullivan	31.95	23.99
Del. Sullivan	36.95	26.99
Sonic Tronic	38.50	27.00
Kavan	45.00	32.00
Astro-½A	15.00	12.00

FUEL PUMPS

Sonic Tronics MK II electric fuel pump	13.95	10.95

HAND PUMPS

Du-Bro	10.95	8.50
Six Shooter	10.95	8.50

HELICOPTERS

DUBRO	List	Indy
Shark 60	325.00	275.00
Tri-Star	229.95	189.00

ACCESSORIES

Conversion kit	75.00
Update Kit	34.95
Blade Set	15.00
Tri-Star Blades	12.00
Alum. paddles	10.00
Flybar	6.00

KAVAN

Bell Jet	320.00	275.00
Alouette II	160.00	139.95

ACCESSORIES

Instrument panel	12.00
T.R. blades	3.00
Reg. main blades	18.00
Expert main blades	19.95
Nylon tail cone	5.95
Comp. window set	20.00
window channel	2.95

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2 gear mains	85.00	57.75
3 gr. firewall	114.00	79.95
3 gr. belly	114.00	79.95
pressure gauge	13.50	
Freon	2.75	
1¾ oz. Oil	1.65	
line coupler	1.90	
quick disconnect	2.00	

GOLDBERG

2 Gear	14.95	10.50
3 gear	24.95	17.50

POWER PANELS
DAE

Dual range	24.95	18.00
Mini panel	15.95	11.00
SeriesIV	34.95	24.95
Std. panel	18.95	14.95

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Super Cycle	89.95	59.95

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Lil Lightning	48.95	38.95
Buschwacker	109.95	74.95

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I. 139.95

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L. 47.95
I. 33.56

Indy
20% OFF
HUGHEY RIGGER 40
L. 110.00
I. 88.00

Indy
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L. 97.95
I. 64.65

Indy
35% OFF
SONIC TRONICS ELECTRIC FUEL PUMP
L. 13.95
I. 9.07

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FRANCHISED INDY DEALERS

Hopefully you have seen many of our new products. We have many more exciting products coming in the next few months which will be available at our Franchised Dealers.

The Universal Servos have been a very big success and we are looking forward to adding to that line.

A Very Happy Holiday Season from all the Indy Franchised Dealers.

OS ENGINES / MUFFLERS

	List	Indy
OS 10 FSR std	21.	16.75
OS 10 FSR R/C	27.	21.75
OS 15 std.	28.	22.50
OS 15 R/C	34.	26.95
OS 20 std.	29.	22.75
OS 20 R/C	36.	28.75
OS 25 std.	32.	25.50
OS 25 R/C	39.	31.00
OS 25 FSR R/C	54.	43.00
OS 25 FSR std	45.	36.00
OS 30 std.	39.	31.00
OS 30 R/C	44.	35.00
OS 35 std.	40.	32.00
OS 35 R/C	45.	35.50
OS 40 std.	55.	43.50
OS 40 R/C	65.	50.95
OS 40 FSR R/C	75.	59.75
OS 60 R/C BLK. HD.	85.	66.00
OS 60 FSR R/C	110.	85.00

OS MARINE ENGINES

	LIST	INDY
OS 20 Marine	45.	36.00
OS 10 Sch. Marine	34.	26.95
OS 30 Marine	46.	35.75
OS 60 RSR Marine	130.	105.00
OS 65 RSR Marine	130.	105.00
OS 45 RSR Marine	98.	78.00

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OS 50 RSR	125.	98.50
OS 65 RSR	127.	99.95
OS 40 SR RV	75.	59.50

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OS 60 FS	199.95	139.95
OS 80 R/C	120.00	95.00
OS 60 FSR R/C W/Pump & Carb	140.	110.95
OS WANKEL	100.	78.00

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	List	Indy
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X-15 ABC R/C	62.	48.00
G-15 R/C	38.	31.00
ST 23 std.	35.	26.00
ST 23 R/C	43.	34.00
X-29 RV ABC	74.	58.00
ST 35 std.	50.	39.00
ST 35 R/C	56.	44.00
ST 46 R/C	56.	44.00
ST G21/35 std	50.	39.00
G60 FI PYP R/C	85.	67.00
G60 ABC PYP R/C	93.	74.00
G60 BH w/pump & carb	104.	83.00

NEW RELEASE SUPER TIGRE ENGINES WITH MUFFLERS

G21 FI R/C	99.	78.00
ST 60 FI BB R/C	70.00	55.00

SEE INDY ADV. Page 190 191

K&B (VECO) ENGINES

Veco 19 std.	40.	29.00
Veco 19 R/C	47.	33.00
K&B .35 pin bearing	30.	21.00
K&B 40 R/C Sers 75	62.	44.00
K&B 3.5 R/C w/muf.	67.	47.00
K&B 3.5 Inbrd mar.	69.	49.00
K&B 4.9 FR std	95.	66.00
K&B 5.8 FR std	95.	66.00
K&B 6.5 RS II	92.	64.00
K&B 3.5cc Outbrd.	99.	69.00
K&B 61 R/C w/muf.	85.	59.00

JIM GOAD SEZ:

You will be receiving this issue just before christmas.

I would like to take this opportunity to wish you all a very happy Holiday Season from the whole staff at Indy R/C Sales. We thank you four your patronage and are looking forward to serving you this coming year.

MERRY CHRISTMAS!!

Jim Goad

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Oakland, California 94609

O & D Hobbies
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Santee, California 92071
ph. 714-449-5656

Active Hobby
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Hanford, Calif. 93230
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Colorado Springs, Co. 80907

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Vincennes, Ind. 47591

Franks Hobby Shack
Highway 6
Hamlet, Ind. 46532
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Hartford City, Ind. 47348
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Elkhart, Ind. 46514
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Four Oaks, N.C. 27524

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Northgort Shopping Center
Fargo, N. Dakota 58102
Ph. 701-293-7121

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American Modeler
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Berea, Ohio 44017
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Dad's Toy Shop
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Wapakoneta, Ohio 45895
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Hobby Road Hobby Shop
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Columbus, OH 43229

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Toledo, Ohio 43609
Ph. 419-385-8739

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607 E. North St.
Prospect, OH 43342
Phone: 614-494-2110

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Lima, OH 45805
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Walterboro, S.C. 29488
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Creative Pastime Shop
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Conway, SC 29596

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Bike & Hike Shop
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Johnson City, Tn. 37601
ph. 615-928-8682

Myers Auto & Farm Parts
105 Elmore Road
Crossville, Tenn. 38555
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ElPaso, Texas 79901

Five Points Hobby Shop
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ElPaso, Texas 79903
ph. 915-565-3841

G.T. Enterprises
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Plainview, Texas 79072
ph. 806-889-3541

Hobby Towne
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Sherman, Texas 75090
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SEE INDY ADV. Page 104-105

INDY POWER PANEL

This flite panel is designed to panel mount onto your tool box. It acts as a terminal board to distribute current from a 12 volt battery. The Indy 12 volt gell cell is an excellent battery choice. The panel services your engine starter; fast field charger and glo plug. The ampmeter monitors the plug and charger. The glo plug current and the charge rate have variable control. The fast field charger is built into and supplied with this panel. List $34.95. Indy $23.50.

U.S.-1 SERVO U.S.-2

Indy U.S.-1 (Universal Servo) is built in Bob Dunham's dual rack output mechanics. The circuit is the new Signetics 544 amplifier. Width .76 in., length 1.52 in. and weight 1.52 oz. Mitsumi 16mm motor. List 27.95 - Indy 19.95.

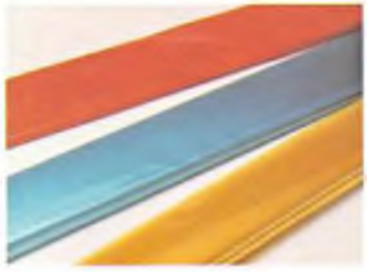
UNIVERSAL

Indy Universal Servo U.S.-2. This servo is built into OS servo mechanics. The 544 electronics are similar to the Indy U.S.-1 servo and the connector polarization is the same. This servo has long been popular with car and boat fans. Not a kit - assembled.
List 23.95 - Indy 16.95

Battery - lower right.
Panasonic pencell w/tab
4 pcs. ea. 1.80 - 7.20
8 pc. ea. 1.65 - 13.20
12 pc. ea. 1.55 - 18.60

INDY FUEL CADDY

Indy's Fuel/Pump and Caddy is powered by a Pitman 202 motor which uses four AA pen cell batteries. Fuel capacity approx. 3 qts. List 24.95. Indy 18.95.



INDY FILM MK. 2

Indy Film MK 2 is a new product.It features a new low temperature adhesive which is excellent for bonding on foam. The big news about Indy Film MK 2 is that we have made these colors with the K&B epoxy colors. The solid colors are white, yellow, green, orange, black, royal blue, and Navy blue. The metallics are aluminum, red, gree, and blue..The transparents are red, and yellow. Solid colors - $7.50/roll. Introductory 3.99/roll, 3/rolls for $9.99. Metallic film prices: List $8.50/roll, Introductory $4.88/roll. Transparents $8.50/roll Indy Special $4.88/roll.

GELL CELLS & NI-CADS

Pictured here is a new line of Indy gell cells and our charger. Our tapped 12 volt battery is a real break-through as it can be used also as a 6 volt battery and a 2 volt battery. This large 12 volt gell cell is excellent for engine starters. List $25.95. Indy $18.50.

Indy 2 volt battery pictured on right excellent for glow plugs. List $9.95. Indy $6.95.

Indy charger. Will charge 12 volt battery listed above. List $9.95. Indy $6.95.

Not shown - 2v charger. List 9.95 - Indy 6.95.

BLUE ANGEL

Engine: 40 R/C, fixed gear, wingspan 54.6". Kit includes hardware package, canopy and spinner. English instructions included. All balsa conventional construction. Designed by long time Japanese pattern champion, M. Kato. Wing - semi-symmetrical section.

List 49.95 - Indy 39.95.

CAPILLO .09

The Capillo .09 cu. in. is an Italian engine which takes a 7x3 or 7x4 prop. List: 14.95. Indy: 11.95.

We now have carbs for the Capillo engines. List: 3.50 - Indy: 2.98.

MILLS .075

All time sentimental favorite in small diesels. Excellent for small R/C. Complete with tank. Featured originally in Ocholt's Live Wire Champ. List - $19.95. Indy - $15.95.

MILLS 1.3

We announced delivery by Sept. 1st. on this engine in last month's advertising. This delivery is moved back to Nov. 15th.

This engine is a nice sport R/C engine - being a diesel it requires no glo plug or battery. Fuel is not hot. List: 28.95. Indy: 19.95.

COMO R/C 40
w/Muffler

About the engine - the bore stroke ratio is over square in a speed configuration. The engine features boost ports and the piston is a cast aluminum of low expansion alloy - single ring. Conrod is bar stock with oil groove. High alloy steel crankshaft supplied in twin ball bearings. Note the cool touch on your dish-shaped head styling. Engine is standard with Perry carburetor and is available with a Tigre carburetor at slightly extra cost. Our introductory price is listed after the list price.

W/ST Carb. L-69.95 - I-43.50

10620 N. COLLEGE AVE., INDIANAPOLIS, IN. 46280

$1.00 handling on all orders. Prepaid domestic orders postpaid; foreign orders allow $10.00.
Orders - check, M.O. or C.O.D. Also, BankAmericard or Master Charge (bank number) 4% IND. RES. TAX.

8 powerful, fast and little reasons for buying MRC radios.

1. MR30—High torque for cars and boats. Gathers power from husky 20mm motor. Low current drain. Extra thick case for maximum protection.

2. MR80—A breakthrough in design. Coreless motor provides faster response, more torque, longer life. Ball bearing supported output gear plus low mass armature for lightning speed, heavy duty torque. In our opinion the best you can buy.

3. MR60—The mini that fits where others won't go. Fast, tight and light, yet it will handle .60 pattern craft with ease.

4. MR40—Handles broadest range of applications. Fast, tight. Has thickest mounting lugs of any servo we know. Stands up to tough applications without compromising performance.

5. MR10—Fast response, tight gears, no play on output wheel. All these features yet it's the lowest price of any we offer.

6. MR50-180°—If you have space and want slower retract transit speed and extra power this one is for you.

7. MR70—For profes-sional modelers. Ball bearing supported output gear absorbs shocks, provides smooth operation throughout its motion.

8. MR30-180°—Our basic retract for a wide variety of electro-mechanical operations. Strong 20mm motor handles almost any application.

MRC's wide selection of servos makes your radio instantly versatile and more valuable. It makes available just the right control to let you expand your R/C involvement. Select size, torque or speed that allows you to experiment with gliders, boats, helicopters or cars. Choose the servos precisely matched to the rigors of pattern, pylon or heavy scale craft. You name the application, there's an MRC servo that assures maximum performance and control from your radio. It's our systems approach to R/C, and one more reason to buy a quality engineered MRC radio.

Send $1.00 for our 44 page, color R/C products catalogue, complete with photos, reviews and technical information.

	Type	Torque	Idle Current	Size L x W x H	Weight	Case Material	Approx. Transit Time
MR 10	Wide Application	35 in./oz.	6.4 MA	1¾ x ⅞ x 1⅜	1.7 oz.	Nylon	.6 sec.
MR 30 STD.	Hi Torque	48 in./oz.	10 MA	1¾ x ⅞ x 1⅜	1.7 oz.	Glass Nylon	.7 sec.
MR 30 Reverse	Hi Torque	48 in./oz.	10 MA	1¾ x ⅞ x 1⅜	1.7 oz.	Glass Nylon	.7 sec.
MR 30 180°	Retract	54 in./oz.	10 MA	1¾ x ⅞ x 1⅜	1.7 oz.	Glass Nylon	
MR 40 STD.	Standard	36 in./oz.	10 MA	1¾ x ⅞ x 1⅜	1.7 oz.	Glass Nylon	.6 sec.
MR 40 Reverse	Standard	36 in./oz.	10 MA	1¾ x ⅞ x 1⅜	1.7 oz.	Glass Nylon	.6 sec.
MR 50 180°	Retract Hvy. Dty.	58 in./oz.	10 MA	2 x ⅞ x 1½	2.13 oz.	Glass Nylon	
MR 60 STD.	Mini	32 in./oz.	7.9 MA	1½ x ¾ x 1½	1.4 oz.	Glass Nylon	.6 sec.
MR 60 Reverse	Mini	32 in./oz.	7.9 MA	1½ x ¾ x 1½	1.4 oz.	Glass Nylon	.6 sec.
MR 70 STD.	Ball Brg.	36 in./oz.	5 MA	1¾ x ⅞ x 1⅜	1.8 oz.	Glass Nylon	.6 sec.
MR 70 Reverse	Ball Brg.	36 in./oz.	5 MA	1¾ x ⅞ x 1⅜	1.8 oz.	Glass Nylon	.6 sec.
MR 80 STD.	Ball Brg. Coreless Motor	50.5 in./oz.	5.8 MA	1¾ x ⅞ x 1⅜	2.1 oz.	Glass Nylon	.5 sec.

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