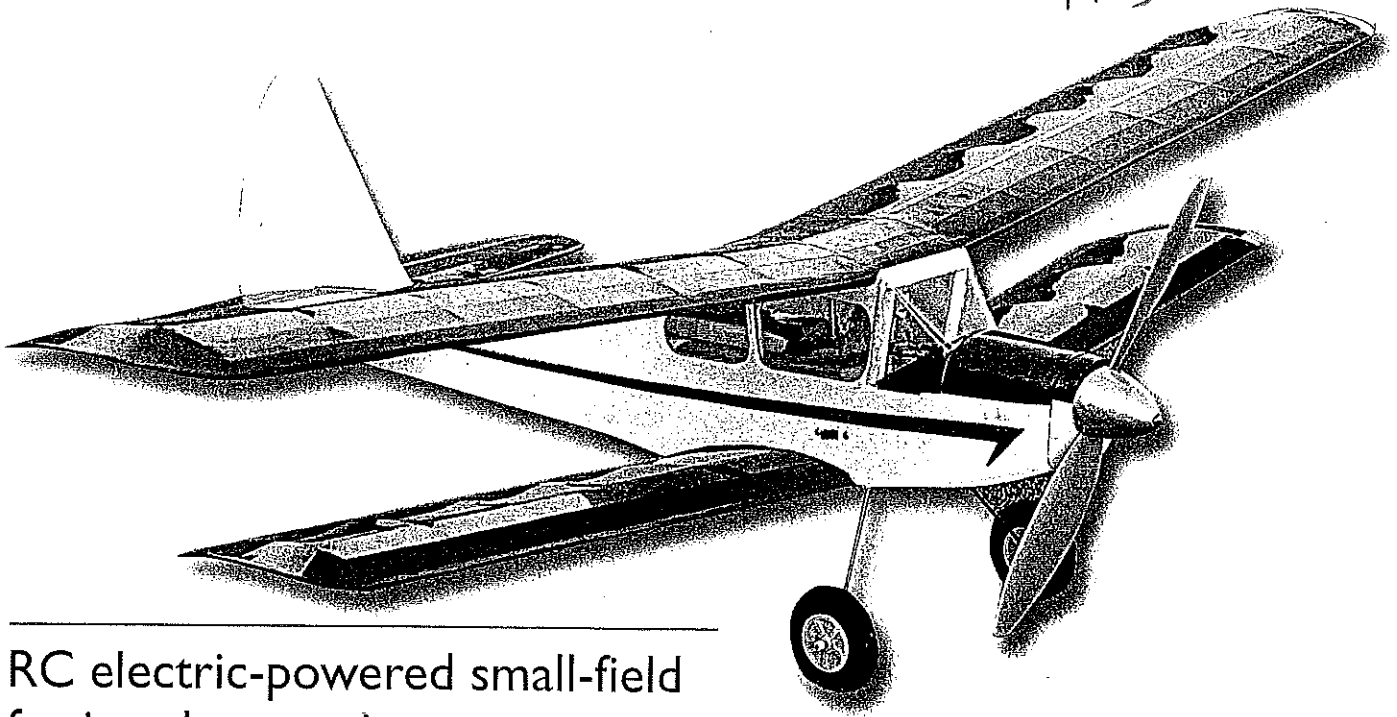


973



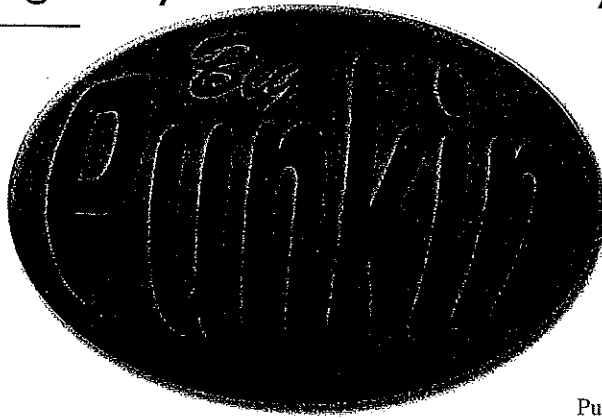
RC electric-powered small-field fun is only two wings away

by Dave Robelen

THE BIG PUNKIN goes way back in its ancestry. The first park flyer on record was designed by Ken Willard and published in *Model Airplane News* under the name Breezy. A biplane with a boxy fuselage and unequal wings, it caught my eye from the first. No big deal? The year was 1955!

Ken became one of my guiding lights through the years, and the Breezy layout surfaced several times in my building efforts. Several years ago I took advantage of the newly available micro equipment and built a 16-inch-wingspan biplane with that basic layout with electric power. By then the design had changed in many ways, so I renamed this one Punkin. It was published in *RC MicroFlight*.

As I continued to fly and enjoy larger electric-powered



models, I decided to revisit this design layout. This time I worked around the popular (and economical) Speed 400 motor group with a seven-cell battery pack. The resulting model—Big Punkin—has proven to be a joy to fly, with an exceptionally broad flight envelope.

If I am in the mood for slow and lazy, I can take the Big Punkin up to 300 feet or so and ride a thermal, power off, for 30 minutes or more.

When the urge strikes for some action, this model is capable of loops, rolls, spins, stall turns, and some tight, low-level flying.

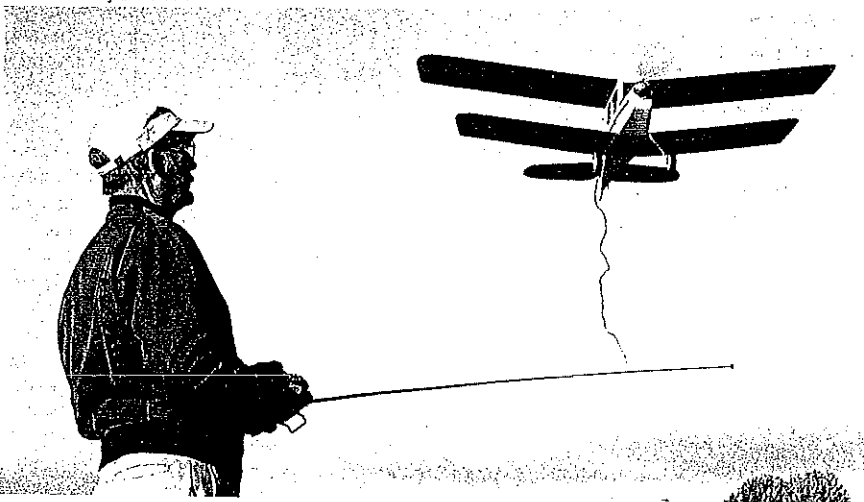
The takeoff roll in short grass is roughly 10 feet, and it's even shorter on pavement. A baseball-field-size open area is more than enough room in which to enjoy the Big Punkin.

In the interest of lightness, I used as little sheet balsa as was practical in the construction. Although light, the structure has proven to be ample for any flight load that the controls can produce, without strain. I am certain that it would break in a crash, but I design to fly and repair if that happens. The result is a lighter model that flies much better.

The fuselage on my Big Punkin is covered with MonoKote for strength, while the wings and stabilizer are covered with Solite for lightness.

I installed one of the JR micro flight packs for another small weight savings, and it has worked fine. There is plenty of thrust in those little servos for these controls. Considering how far downfield I have chased thermals with Big Punkin, I am grateful for the plentiful range that the little receiver provides.

Photos courtesy the author



The author files his design. The Big Punkin is a great slow flyer that will allow you to make low, slow, and close passes with confidence and safety.

The drive is a Graupner Speed 400 6-volt motor coupled to a Mini Olympus 2.33:1 gear drive, and that spins an APC Slowfly 10 x 4.7 propeller. The ESC is a Jeti 10A. I found all of these drive components at Hobby Lobby International, and they have been more than satisfactory.

Would you like to have a classy park flyer of your own with roots that go way back? Read on.

CONSTRUCTION

Careful wood selection can make a substantial difference in one of these models' weight. My Big Punkin finished out at 17 ounces, and there is no heavy balsa in it. Most of the wood averages 6-8 pounds per cubic foot in density.

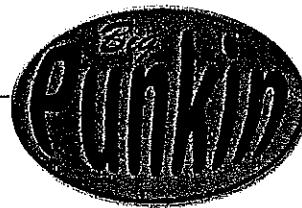
Although I have to drive a considerable distance to a hobby shop that stocks balsa, I enjoy going through the selection and choosing the best pieces for the various jobs. I prefer the stiff C-grain wood for the wing ribs, and I watch for nice, stiff material from which to cut the spars.

I purchase the wood in sheet form and slice off the strips as needed. If you do not have access to a good local wood supply, I have had success with Superior Balsa material, and Lone Star Balsa has a great reputation.

I am going to assume that this is not your first scratch-building project and that you will understand what tools to use and where.

Wing: Build the wings first; you will need them when you are working on the fuselage.

My method for cutting ribs is to trim out a pair of 1/16 plywood templates and make a "sandwich," with the balsa rib blanks in the



Type: RC sport

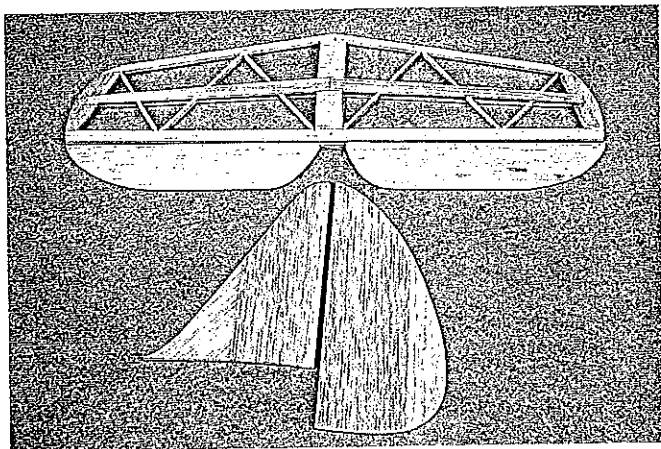
Wingspan: 37 inches

Power: Graupner Speed 400 6-volt motor
coupled to Mini Olympus 2.33:1 gear drive

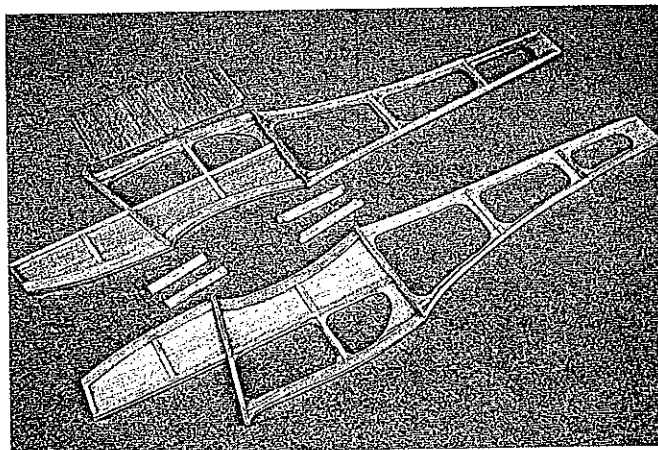
Flying weight: 18 ounces

Construction: Balsa and plywood

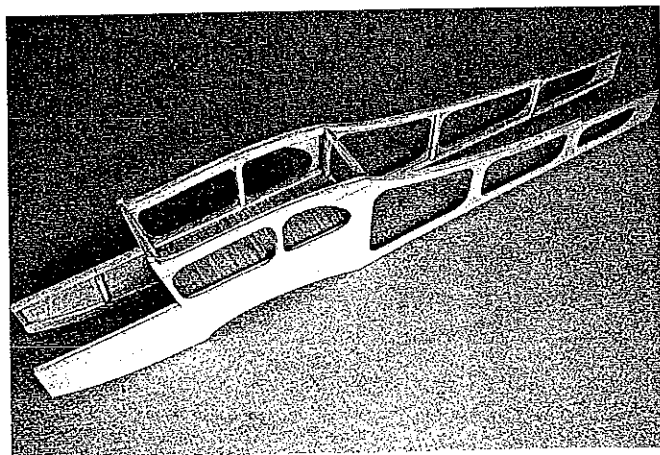
Covering/finish: Solite and MonoKote



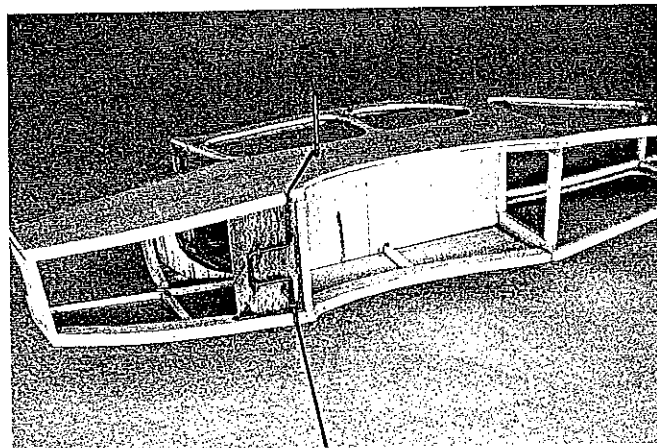
The stabilizer is a sturdy built-up unit, and the elevators and the rudder/fin assembly are made from balsa sheet.



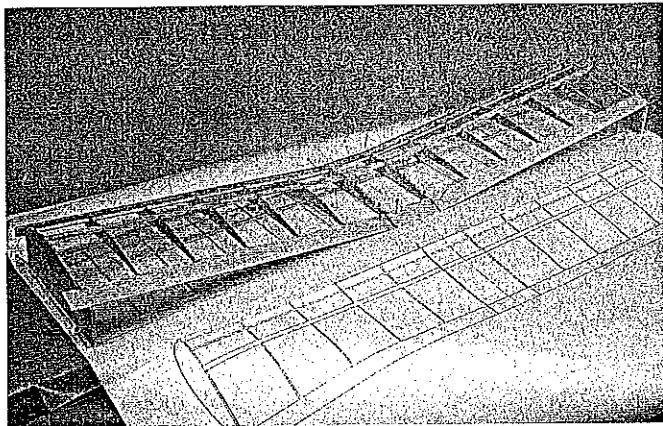
The 1/16 sheet-balsa fuselage sides are ready to be joined. Notice the reinforcements that have been glued to the sides.



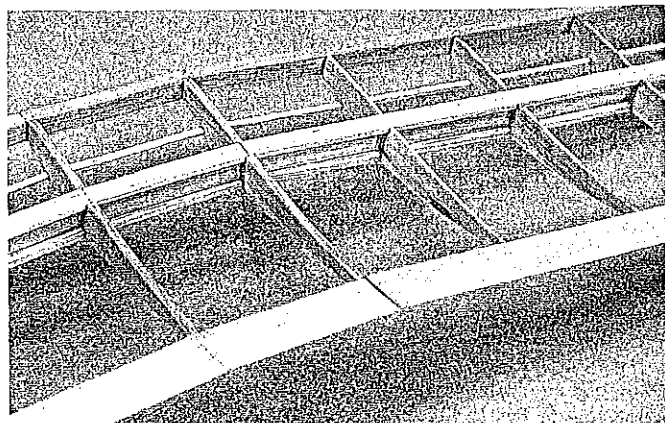
The fuselage sides have been joined with the two main formers. It's important to achieve accuracy at this point.



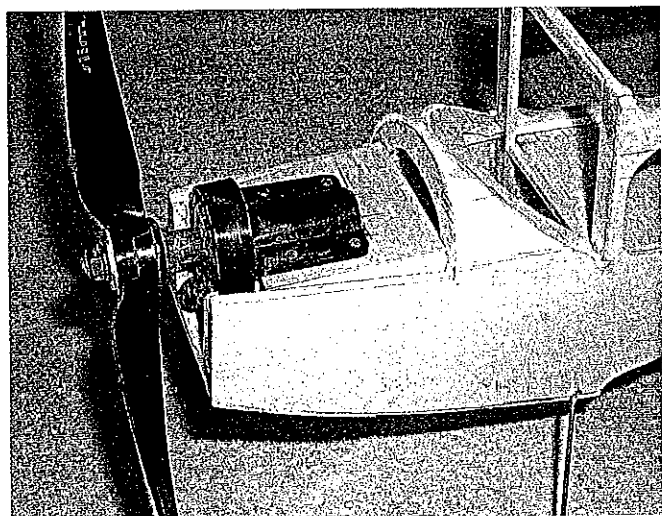
The remainder of the fuselage formers have been added, and the landing gear has been mounted to its floor.



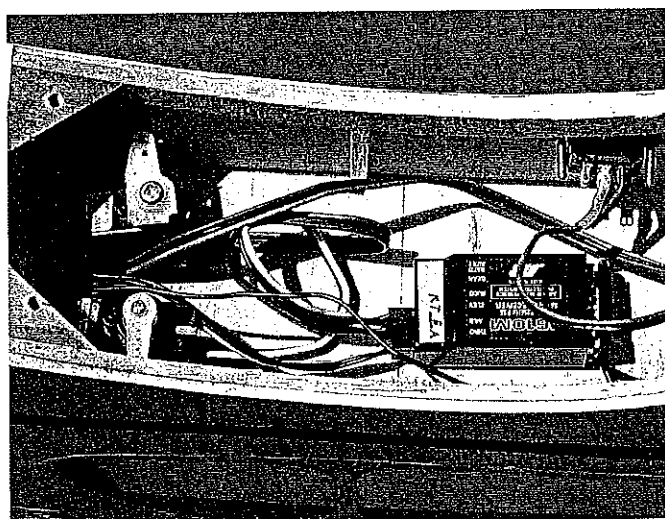
After the wing is assembled and the spars have been added, the dihedral joint cuts are made and the wing is fixtured while glue dries.



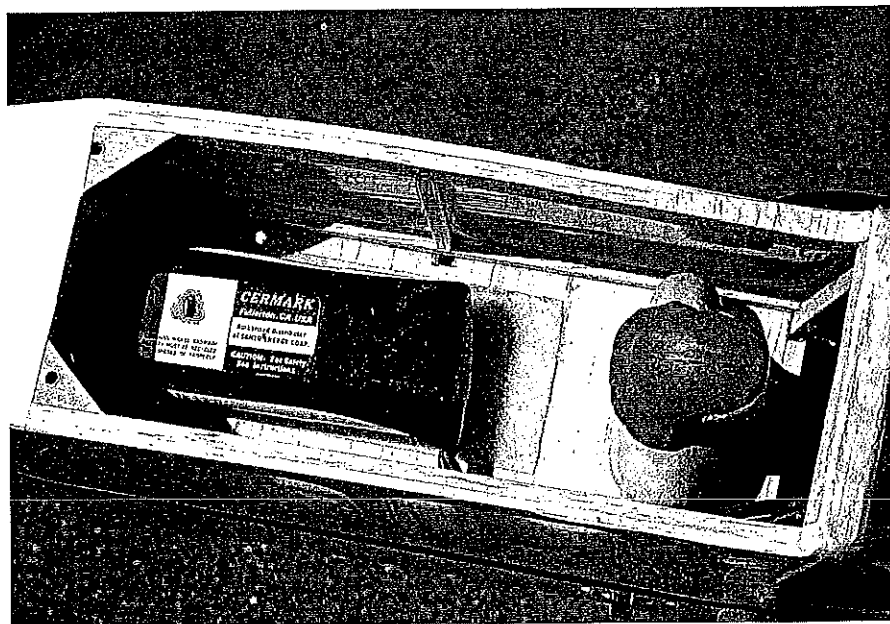
In this close-up photo you can see the spars and the shear webs in great detail. The construction is strong and light.



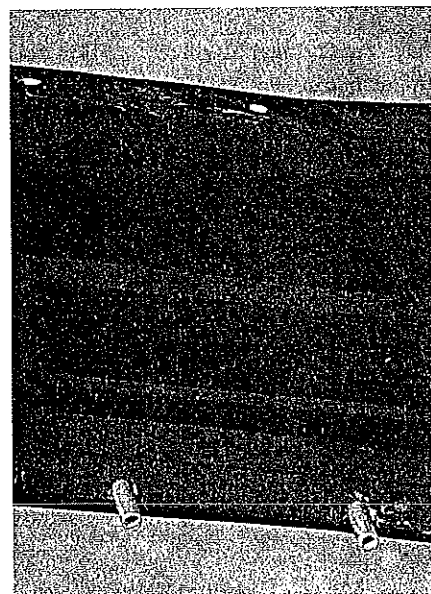
The Speed 400 motor is mounted to a $\frac{1}{8}$ inch plywood plate.



There is abundant room in the bottom section of the fuselage for the receiver and two JR micros.

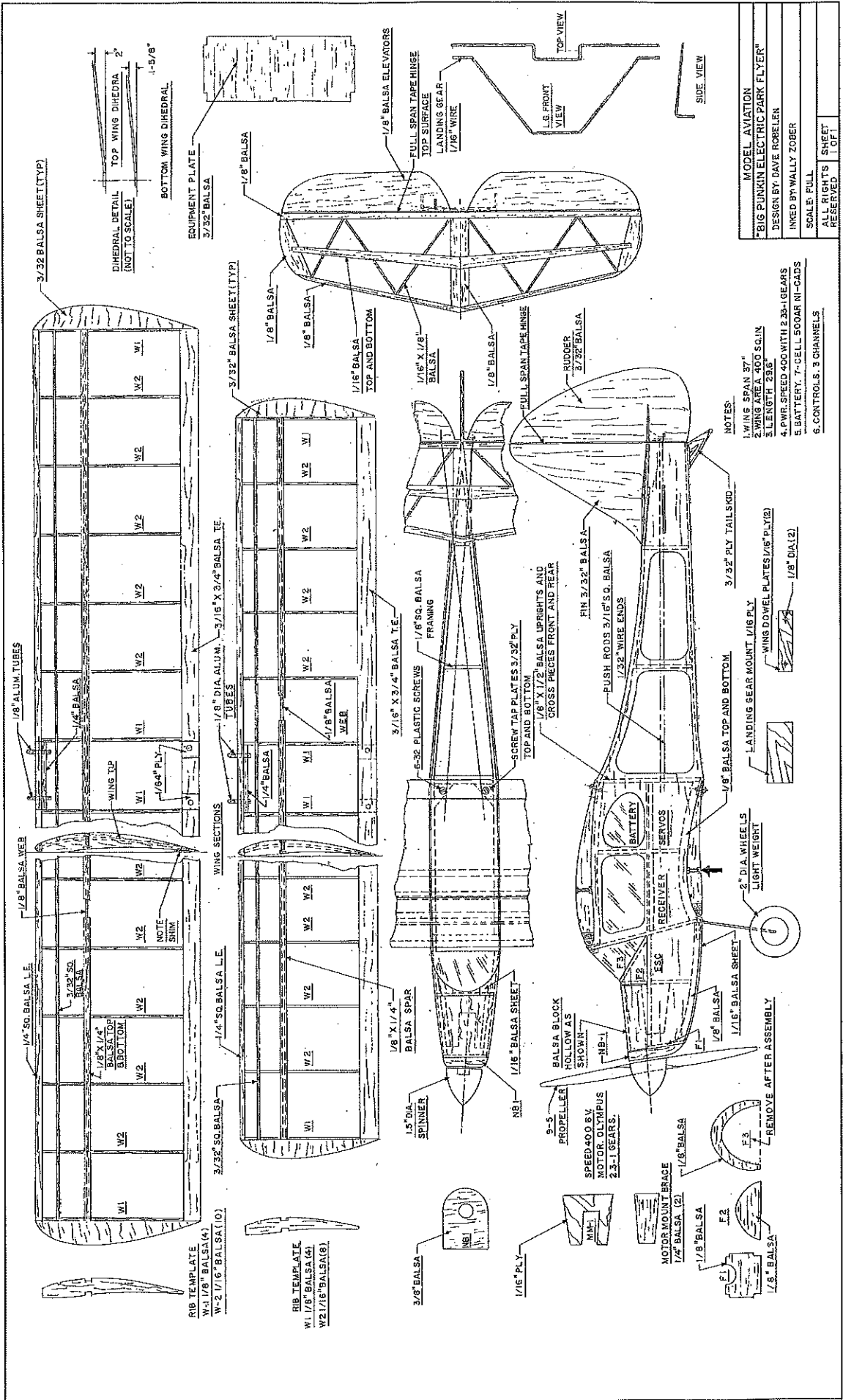


The battery resides in the top of the fuselage cabin section. A balsa floor separates the two sections.



Two $\frac{1}{8}$ -inch-diameter aluminum tubes are used at the front of the wing as forward hold-down pegs. The rear bolts in place.

We
E
A
\$8
With
Com
Win
Win
Eng
Rad
Win
Win
Eng
Rad
P
E



MODEL AVIATION "BIG PUNKIN ELECTRIC PARK FLYER" DESIGN BY DAVE ROBELLEN INRED BY WALLY ZOBER
SCALE: FULL
ALL RIGHTS RESERVED
SHEET 1 OF 1

- NOTES:
1. WING SPAN 37"
2. WING AREA 400 SQ IN.
3. LENGTH 23 1/2"
4. PWR. SPEED 400 WITH 2.3-1 GEARS
5. BATTERY 7-CELL 500AH NI-CADS
6. CONTROLS: 3 CHANNELS

middle and the plywood templates on either side. I have a couple of small C-clamps that are handy for holding all of this together.

While clamped, sand the balsa ribs to the finished shape and cut the notches. Strip out the spars and TEs, and trim the angle into the TEs.

Pin the TE strip to the board (notice the shims to tilt it), and then use the ribs as spacers to locate and pin the LE. Glue the ribs in place. When they're dry, cut through the LE and TE where shown, and trim the ends to match the dihedral. Using props to hold the panels at the correct angle for the dihedral, glue the outer panels to the center. Add the top spars.

When all of that is dry, lift it off the board and glue in the filler strips between the spars where shown. Now you can glue the bottom spar in place.

At this time, trim the LE to the proper cross-section and sand away any glue bumps, etc. You can add the tips now, along with the little plywood reinforcements for the hold-down screws. Do all of this again, and you have a nice pair of wings!

Fuselage: Begin the fuselage by splicing two sheets of 1/16 balsa to the width necessary for the fuselage sides. Cut the pieces to the outline shown on the plans, leaving the various openings solid for now.

Pinning the sides to a flat surface, glue all of the 1/8 balsa bracing in place where shown. Instead of bulkheads in the cabin, use strips of 1/8 x 3/8-inch balsa glued on edge in the front and back of the wings. With all of the bracing in place, cut the various openings in the sheet sides.

Join the sides at the cabin, using strips of 1/8 x 1/2-inch balsa as crosspieces. The tail may be pulled together now and glued; watch that you avoid building a banana! I had to cut partway through the bracing on the sides to pull the nose together and keep the sides straight. Add the rear cross bracing and the plywood parts for mounting the wings.

This is where those wings come in handy. Holding a wing in place, drill through the fuselage and wing for the front tubes and then the rear screws. Be sure to use the tap-size drill for the rear screws to avoid a mess later.

Open up the holes in the wings for clearance at the screw locations, and tap the plates in the fuselage 6-32 for the hold-down screws. I found my plastic screws in an assortment sold at RadioShack.

Landing Gear: I use soft copper wire to lace the 1/16-inch-diameter-wire landing gear to the plywood plate, and then I flow a bit of cyanoacrylate glue over the lacing. Mine holds fine.

Glue the assembly in the location shown, placing it high enough to clear the

bottom planking. Cover the front bottom with 1/16 balsa with the grain running across the fuselage. The top bulkheads and sheeting can go in next.

Cowl Block: I made the top cowl from a block of balsa and hollowed it, but bulkheads and sheet will work too. Fit the front block and sand the nose smooth.

I fashioned the motor mount from a plate of 1/16 plywood supported with a piece of 1/4 balsa on each side. This is a good time to fit the motor assembly and trim the necessary clearances in the front block. Set the motor aside for now, along with the fuselage.

Empennage: To get a stiff, light stabilizer, I assembled it from a 1/8 balsa core and added 1/16 sheet on the top and bottom as shown. When it was dry, I sanded the center sheeting to the wedge shape shown and rounded the front and tip edges. I left the TE square.

I cut the elevators from a sheet of 1/8 balsa. I installed the wire joiner before I cut the two apart. I also sanded the taper into the elevators while they were joined. I cut the center apart, sanded a sharp edge bevel on the front edge, and then set it aside. Cut the fin and rudder from 3/32 balsa sheet. You may have to do some splicing to get the width shown.

Covering: Chances are that you can do a neater job than I did, so my main suggestion is to carefully read and follow the instructions that come with the material of your choice. Avoid using MonoKote or other thick material on the wings and stabilizer that would add unnecessary weight and risk warps.

Make sure the covering is firmly attached to the rib bottoms to follow the undercamber. I found one of the little trim sealing irons handy for this. It let me bond the ribs without shrinking the covering away from them.

The windows on the fuselage sides are scraps of clear MonoKote ironed in place. The windshield came from one of those clear document protectors.

Final Assembly: I used full-span strips of clear packing tape (Scotch brand) to hinge the elevators and rudder. I left a gap of approximately 1/16 inch in the hinge line. This worked out extremely well. The hinges are free and smooth, and there is no leakage along the hinge line.

I mounted the wings to serve as a reference while I installed the tail. My system is to set the model flat on a countertop or other large, flat surface and level the wings. Then I trim the stabilizer cutout until it is level and glue it on with the hinge line squared to the fuselage.

Glue on the vertical tail next. Sight it carefully to avoid any tilting. I put a short piece of packing tape between the fuselage end and the rudder as a bottom

BATTERIES AMERICA
www.batteriesamerica.com
May 12, 2005 Special Online Only

PLATINUM POLYMER

2-Cell Lithium Polymer Packs - with JST-BEC red conn.
Other connectors are available - please see our website or call us for details.

#2LP300*	7.4v	300mAh	LI-POLY pk (13 gms/0.46oz)	\$20.95
#2LP400	7.4v	400mAh	LI-POLY pk (18 gms/0.64oz)	\$18.95
#2LP650	7.4v	650mAh	LI-POLY pk (28 gms/1.0z)	\$20.95
#2LP800*	7.4v	800mAh	LI-POLY pk (34 gms/1.2oz)	\$27.95
#2LP900	7.4v	900mAh	LI-POLY pk (38 gms/1.35oz)	\$23.95
#2LP1200	7.4v	1200mAh	LI-POLY pk (48 gms/1.7oz)	\$25.95
#2LP1500*	7.4v	1500mAh	LI-POLY pk (62 gms/2.2oz)	\$39.95
#2LP1700	7.4v	1700mAh	LI-POLY pk (68 gms/2.4 oz)	\$31.95
#2LP1900	7.4v	1900mAh	LI-POLY pk (76 gms/2.7oz)	\$34.95
#2LP2200	7.4v	2200mAh	LI-POLY pk (88 gms/3.1oz)	\$38.95

*300, 600, & 1500mAh are HIGHER-AMP packs (5C discharge)

QN-012BC charger QN-012DC charger VR6.4 / VR6.0

#QN-012BC Fast-Smart Charger (AC) for LI-POLY pk. \$19.95
#QN-012DC Fast-Smart 12VDC charger for LI-POLY pk. \$19.95
#VR6.4 Voltage Regulator -limits output to 5.4v max \$19.95
#VR6.0 Voltage Regulator -limits output to 6.0v max \$19.95

NEW Lithium Polymer cells - with E-Z solder tabs!

#P145	3.7v	145mAh	LI-POLY cell (4 gms / 0.13 oz)	\$ 6.95 ea
#P190*	3.7v	190mAh	LI-POLY cell (4.5 gms / 0.16 oz)	\$ 6.95 ea
#P300*	3.7v	300mAh	LI-POLY cell (6.5 gms / 0.23 oz)	\$ 7.95 ea
#P400	3.7v	400mAh	LI-POLY cell (8 gms / 0.32oz)	\$ 6.95 ea
#P650	3.7v	650mAh	LI-POLY cell (14 gms / 0.5 oz)	\$ 7.95 ea
#P800*	3.7v	800mAh	LI-POLY cell (17 gms / 0.6 oz)	\$10.95 ea
#P900	3.7v	900mAh	LI-POLY cell (19 gms/ 0.67oz)	\$ 9.95 ea
#P1200	3.7v	1200mAh	LI-POLY cell (24 gms/0.85oz)	\$10.95 ea
#P1500*	3.7v	1500mAh	LI-POLY cell (31 gms/1.1oz)	\$15.95 ea
#P1700	3.7v	1700mAh	LI-POLY cell (34 gms/1.2oz)	\$12.95 ea
#P1900	3.7v	1900mAh	LI-POLY cell (38 gms/1.35oz)	\$13.95 ea
#P2200	3.7v	2200mAh	LI-POLY cell (44 gms/1.66oz)	\$14.95 ea

*150, 300, 800, & 1500mAh are HIGH-RATE cells (5C discharge)

Motor packs, R/C packs, TX packs, & more!

New HiCell electric flight Ni-MH packs!
For park flyers, etc. Shapes: A=Flat; B=twin-stick; C=two rows; D=four sticks. JST conn.=add \$3.00. Deans Ultra conn.=add \$5.
Cell # size / mAh / \$ each 7.2v 8.4v 9.6v 10.8v 12.0v
AP-350 1/3AA, 350mAh \$2.50 \$23.95 \$26.95 \$29.95 \$32.95 \$35.95
AP-700 2/3AA, 700mAh \$2.50 \$23.95 \$26.95 \$29.95 \$32.95 \$35.95
AP-1000 2/3A, 1000mAh \$3.00 \$24.95 \$27.95 \$30.95 \$33.95 \$36.95

MOTOR PACKS w/ SANYO Ni-Cd cells (no connector):
Shapes (see above). Add deans ULTRA connector for \$5.00 extra
Cell # size / mAh / \$ each 7.2v 8.4v 9.6v 10.8v 12.0v
N-500AA (23A 500mA) \$2.50 \$20.00 \$24.00 \$28.00 \$32.00 \$36.00
KR600AA (23A 600mA) \$1.95 \$17.00 \$20.00 \$23.00 \$26.00 \$29.00

SANYO Receiver Packs w/ Connector! (Flat or Square)
Choose Futaba J, JR-HITEC-Z, or AIRTRONICS (old) plural

4.8 volt	700mAh	(Standard AA NiCd, w/conn.)	\$ 9.95 ea.
4.8 volt	1100mAh	(long-life AA NiCd, w/conn.)	\$13.95 ea.
4.8 volt	1700mAh	(KR-1700AU Ni-Cd, w/conn.)	\$16.95 ea.
4.8 volt	2100mAh	(ULTRA AA Ni-MH, w/conn.)	\$19.95 ea.

New & improved HEAVY 22-gauge Connectors!
Specify Futaba J (FM), JR-HITEC-Air, Z, or AIRTRONICS (old)
Male or Female (1 conn.): \$ 2.00 / 3' or 6' Extn: \$ 3.25
12' Extn: \$ 3.50 / 24' Extn: \$ 4.00 / 36' Extn: \$ 4.50
Y-connector: \$ 5.50 ea / Switch Harness: \$ 6.50 ea

SANYO TX Packs - Choose Square (S) or Flat (A). Add plug: \$3 extra

9.6 volt	700mAh	(Square or Flat, w/ leads)	\$16.95 ea.
9.6 volt	1100mAh	(Square or Flat, w/ leads)	\$22.95 ea.
9.6 volt	1650mAh	(Ni-MH Square or Flat, w/ leads)	\$29.95 ea.
9.6 volt	2100mAh	(Ni-MH Square or Flat, w/ leads)	\$35.95 ea.

SANYO 2300mAh AA Ni-MH cells - NEW! \$ 2.50 ea
Mail, Phone, Fax, or E-mail us. Pay w/ MC, VISA, DISC, AMEX

CALL OR WRITE FOR OUR FREE CATALOG

BATTERIES AMERICA 2211-D Parview Rd.
Middleton, WI 53562. To ORDER, call TOLL FREE:
1-800-308-4805
Phone inquiries: 608-831-3443 / Fax to us at: 608-831-1092
E-mail to us at: ehvost@chorus.net S&H \$7.00 min.

www.aero-works.net

NOW AVAILABLE STEARMAN PT-17 ARF



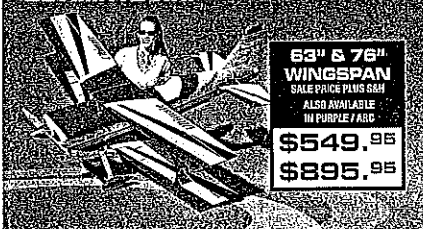
77" WINGSPAN
WING AREA 1750 SQ. IN.
WEIGHT 16 TO 18 LBS.
ENGINE 3.2 TO 4.2
\$595.95

29% & 36% KATANA ARF



84" & 106" WINGSPAN
SALE PRICE PLUS \$64
ALSO AVAILABLE
IN RED FABRIC
\$449.95
\$895.95

27% & 33% ULTIMATE ARF



63" & 76" WINGSPAN
SALE PRICE PLUS \$64
ALSO AVAILABLE
IN PURPLE FABRIC
\$549.95
\$895.95

40" EDGE 540T ARF



NEW 40" SIZE
56" WINGSPAN
PLUS \$64
\$179.95

80" PROFILE 540T ARF



80" WINGSPAN
WING AREA 1600 SQ. IN.
WEIGHT 11-12 LBS.
ENGINE 1.20-2.10
PLUS \$64
\$299.95

AEROWORKS NOW CARRIES

CA Models: Thunder Tiger
Chip Hyde Models: M.P.I.
Quiques Aircraft Co.: Pete Models
World Model: TBM Models

AND MANY MORE...

Aeroworks aircraft
have won first place
4 of the last 5
T.O.C.'s

AEROWORKS USES ONLY

HITEC

Confidence you deserve
Be sure to visit our NEW
website for all your
shopping needs.
www.aero-works.net

303.366.4205

401 LAREDO UNIT #D
AURORA, CO 80011
www.aero-works.net

**AERO
WORKS**
World Class Aircraft

hinge. Glue on the control horns.

I installed the motor unit next, and I used strips of the clear tape to attach the front nosepiece. The cowl block has a strip of tape on each side, with one side folded under to form a tab. This gave me a handy location for my battery connector, for charging, etc. I used hook-and-loop material to install the battery, with the grabby loops in the airplane.

Install the receiver and servos on the bottom of the equipment plate. Servo mounting tape worked fine for me. I made my pushrods from 3/16-inch square balsa sticks, with 1/32-inch-diameter-wire ends. Rather than have adjusters, I made the last wire/stick joint with the servo in neutral and the control aligned.

The wheels are the light foam type, held on with plastic push-on keepers. I cut the tail skid from 1/2 plywood and painted it to match the fuselage. Being the independent type, I made my spinner from balsa and covered it with fiberglass cloth and cyanoacrylate glue.

A commercial 1.5-inch-diameter spinner would do fine. I ended up settling on an APC 10 x 4.7 propeller for my Big Punkin, but you might want to try a few sizes to get the best match.

With all but the top wing assembled, put the battery in place and then mount the wing. Check the balance, and move the

battery as necessary to get the correct balance. Perform a good range check on the radio, and run up the motor to ensure that it does not interfere with the controls when the signal is weak.

Flying: Flying the Big Punkin is simple. I have never hand launched mine, but there is plenty of power if that is necessary. The ground handling on takeoffs is normal.

On grass, hold full up until the speed builds a bit, and then go to neutral. A small tug of up will lift it right off. On pavement, it is only necessary to steer with the rudder for a few feet until there is adequate airflow over the fin.

Climb up to 100 feet or so and feel out the low-speed handling. Mine will reach full up-elevator without dropping a wing if I leave the power low and do not make large movements with the rudder. Holding full up and pushing the rudder full over should result in a spin entry. The spins are pretty, and the recovery is immediate when you neutralize the controls.

From this point on, see how much fun you can have with your Big Punkin. Let me know how you make out, and I always enjoy pictures. Happy landings. **MA**

Dave Robelen
Route 4 Box 369
Farmville VA 23901
aplusfarm@hovac.com

Kites & Wind Art

Have fun anywhere the wind blows.
FREE 80 page Catalog with hundreds
of kites, flags, windsocks and spinners.
Fast, friendly service since 1980.

www.IntoTheWind.com

1408-MA Pearl St., Boulder, CO 80302 • (800) 541-0314



www.Graphtechrc.com

Composite Landing Gear and Tail Wheels

Lighter and more Durable than Aluminum

Dave Patrick * Hangar 9 * Sig * Lanier

Join the Electric Revolution today!

Electric powered flight has truly come of age. Our new 2 hour DVD "Electric Revolution" documents the latest trends in electric flight technologies including an in depth look at the new breed of Lithium Polymer batteries which is driving a renaissance in electric flight.

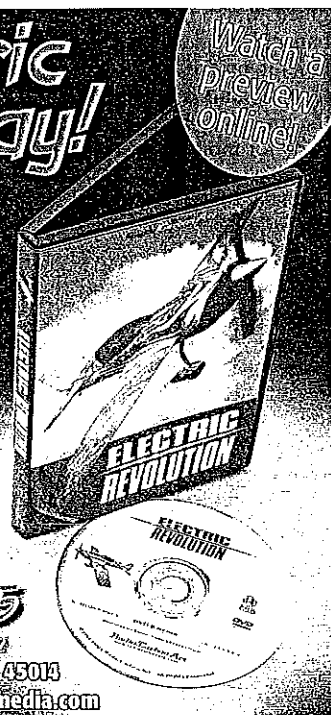
To see the latest technology, we take you to the 2004 Southeast Electric Flight Festival, one of the world's largest electric flight events featuring an amazing array of the latest electric 3-D, scale, ducted fans, and helicopters flown by the sport's top demonstration pilots.

Pro demo pilots Quique Somenzini, Mike McConville, Gary Wright, Jason Schulman, George Hicks, & helicopter ace Eric Larson, put their high powered craft through impressive 3-D aerobatic routines you have to see to believe. You will also see the new generation of foam 3-D shock flyers performing outrageous flight routines at low altitude and high speed.

\$22.95
(add \$5.00 shipping)

**AIRBORNE
MEDIA**

5655 David Place, Fairfield, OH 43013
888-829-4060 • www.airbornemedia.com



Watch a
Preview
online!