1980 – 82 *PAY'N PAK*, 1/12th Scale, Limited Sport Hydro
"P" Sport Hydro

Introduction:
The 1980 turbine "Pay'N Pak" is a good subject for a model race boat. It has a low profile, mild pickle-fork setback, long after-plane, aerodynamic lift shifted aft for stability and it looks cool.

The original was very fast, being the first turbine powered unlimited hydroplane to win a race. It was also a hard-luck boat. It competed for only a few years, and is known for a spectacular airborne flip due to a wing failure on the Columbia River in 1980. The hull continued on, winning more races as Miss Tosi Asti and Miss 711 until 1987.

This model is made of 3/32" balsa laminated with 1/64" birch plywood on the outside, making it strong and light. It can be equipped with a straight, wire or cable driveline. The batteries and motor are mounted as low as possible for good balance in the turns. The tunnel shape keeps the nose from lifting at high speed, in rough water or gusty wind.

Preparation:
You will need 5 – 3/32" X 6" X 36" balsa sheets, a 1/64" X 12" X 36" sheet of birch plywood and a few other odds and ends (see the material list). Cut the parts exactly to the templates and copy the assembly markings to them. Laminate the outside sheeting (right and left of each) with 1/64" birch plywood using 3M-77 contact cement before assembly. Make a 1" X 7.5" X 28" building board, mark the "floor plan" then cover with wax paper.

Tunnel:
With a small drop of CyanoAcrylate (CA), through holes in the wax paper, tack-glue the temporary tunnel formers (with spacers) and sump strip. Glue the sump standoffs and tunnel strips to the sump strip, but just tack glue to the former. Glue the leading edge blocks in place. Note, the sump strip is laminated with 1/64" ply (can be done after assembly), but the tunnel sheets do not need this.

Frame:
Glue ¼" triangular balsa stock and bulkheads A & B to the left and right stringers. Glue the doubler to the transom. On the building board, assemble and tack glue the stringers, bulkhead D and the transom over the tunnel assembly. Check the alignment then glue the rest of the bulkheads. Bevel the base of the rear non-trip panels and glue in place. Glue ¼" balsa deck strips to the tops of the bulkheads. Final glue all joints. Slip a long thin knife blade under the bottom to break the tack glue spots loose.

Dampen, heat and bend the sponson bottom sheets over a hot iron to match the curve of the bulkheads, then glue in place. Add the sponson sides the same way. Glue ply doublers to the right side of bulkhead-D for the turn fin mount. Check the open framework for a smooth profile and sand if needed.

The hull can warp while sheeting the bottom. Before the deck is installed, lay the hull on a level surface. See if the transom is flat with both sponsons on the surface. If not, block the transom up level, then glue the deck while the hull is tack glued to the building board. If there is still a warp, again block the transom level and secure the hull to the board while gluing the center front and rear deck sections in place. After these are on, the hull cannot be twisted to correct for warps.

Deck:

Keep the boat on the building board to minimize warps. Put wing skin contact cement on the top edges of the open structure. Add contact cement to the inside of the deck. Let this set up for 10 – 20 minutes. Align the deck to the inside edge of the pickle-fork and carefully touch the deck down at bulkhead-D. Lay the deck down along the center of the deck strip to the transom. Then pull it down to meet the rest of the open structure. Add CA to seal the outside seams. Trim the deck edges flush with the side panels.

Remove the tunnel formers. As an option, plane or sand a ¼" X 45° non-trip bevel on the inside of the sponsons. Bevel the sides of the sump as shown. Add the front deck extension supports and the deck and nose supports. Laminate and glue the center deck sections in place (the rear section may wait until after the radio antenna is installed). Add the ¼" square balsa hatch frames. Cut the centers out of bulkheads C, D and E. The basic hull is done; it should weigh between ¾ to 1 lb.

Removable Cowl and Hatch Cover:

Assemble the cowl nose base, cockpit sides and frames in position over the hull. Bend the sides to fit the frames and glue together, but not to the hull. Glue the cowl top in place. Trim and fit 2" or 3" long 1/8" balsa hatch sheets in place between the cowling sides and the main deck and glue in place (not to the deck). Sand this to match the deck profile. Add cockpit top then plane or sand the rear profile to the shape shown. Glue the cockpit front in place. Add the inside scoop walls and sand the front profile to shape. Add the cockpit nose then small filler pieces to the openings on the sides. Trim the rear cap to fit inside the motor hood opening and glue.

Cut the turbine exhaust from 1¾" cardboard rocket tube and trim a tapered balsa adapter to fit the rear of the motor hood. Also shown is a flat layout for forming .015" aluminum sheet. Glue this in place after painting.

Laminate the wing and fins from 3 pieces of 1/16" balsa with the outside grain running lengthwise. Sand to a symmetrical airfoil shape. Glue these together and paint before final assembly. Just tack-glue these in place so they will not tear out the deck if they get knocked off in the heat of battle.

Driveline:

Two drive systems are shown that work well in this hull. The straight drive shaft is simple and very durable. For this, cut a ¼" brass stuffing tube, drill a hole for lube fitting

and solder a 1/8” piece of tube over this. Use 1” long 7/32” brass tube for the motor and propeller end bushing.

The shaft is 3/16” dia. X 9” long with 10-32 threads. You can buy one or make one from .1875” drill rod. Grind flats on each end for the setscrews. Assemble the drive dog, propeller and *Dumas* 3/16” dog-bone type U-joint. The motor end of this needs to be drilled to 5mm (.197”) for a Speed-700 motor.

The propeller trailing edge centerline should be 1.75” behind the transom and .75” below the bottom. The drive angle should be 4° for a flex drive, to 7° maximum for a straight shaft. Mount the strut .50” to the right of the centerline. Make an opening in the bottom sheet (.50” to the right) for the stuffing tube. Line this up with the motor and apply CA.

With a straight shaft, it is important to mount the motor as low as possible. I put it below the floor level by using a belly pan. This will allow a propeller angle of attack as low as 6.5°. A flex drive allows the motor to be mounted above the floor.

For the low mount, make a motor bracket from .06” aluminum and belly pan and end cap from .015” brass. Bend the belly pan so it fits the motor case. Solder the end cap then glue this to the bracket. Bolt the motor in the mount and drop it in a cutout in the tunnel so it lines up with the driveline. The pan will extend 3/8” below the bottom. With the motor, U-joint and driveline in position, add CA to the seams. If using LiPo lithium cells, you must move the motor forward about 3” to balance the boat with the reduced battery weight.

Finishing:

Spray sanding sealer on the bare wood, and sand with 200 grit. Repeat as needed until everything is smooth. Spray a coat or two of glossy white then wet sand with 400 grit. Add highlights, trim tape and the graphics. Finally, spray clear over everything. Wet sand with 400, then 600 grit. Rub this out with automotive polishing compound and wax.

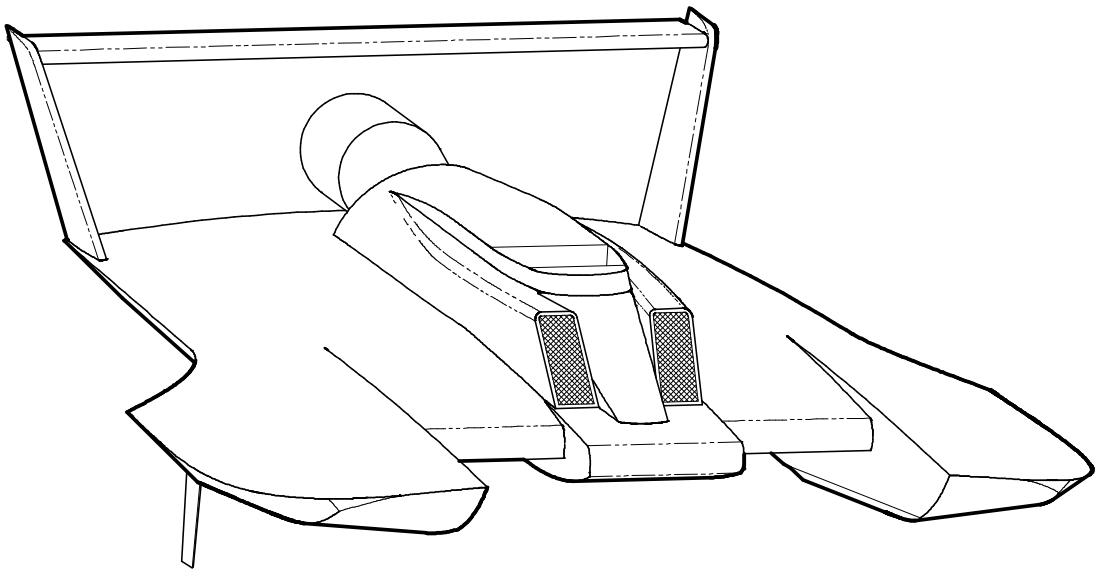
Running:

This boat is a lot of fun to drive. Give it full power for a second from a standstill to get it on plane. From there you can cruise around at ¼ throttle. When you are ready, pull the trigger hard. The boat will accelerate in a straight line very quickly to full speed. It has a nice smooth “float” to the ride once it airs out. Turns are best taken by momentarily backing off the power, add rudder and get back on the throttle. Once you get use to it, most turns can be taken at full power. Just hang on and watch the spray.

Specifications:

1980 – 1982 turbine Pay'N Pak unlimited hydroplane

Type:	Electric, 1/12th scale, 12 cell, Limited Sport Hydro (LSH) or, 12 cell P, or 15-V LiPo Sport Hydro
Dimensions:	Length: 28.5", Width: 14.25", Weight: 4¾ LB. (ready to run)
Hull Material:	Balsa & birch ply
Hardware:	Custom aluminum & brass, LSH / P sport size
Motor:	Speed-700 or 8 or 9XL (1750-2250 KV brushless)
Battery:	12 cell or 2 – 6 cell sub-C packs, or 15-V LiPo
Propeller:	Octura X642, to X645
Performance:	3 – 4 min. run time, 30 – 35 MPH (Speed-700) to 40 – 50 (9XL-brushless)
EST cost:	$350 – $700



Materials used:

5) 3/32” X 6” X 36” firm balsa – hull framework
1) 1/64” X 12” X 36” birch plywood – deck, side and sponson lamination
1) 1/16” X 6” X 12” birch plywood – transom and doublers
1) 1/4” X 48” square firm balsa – deck strips
1) 1/16” X 6” X 36” firm balsa – wing and fins
1) 1/4” triangular 24” firm balsa – sponson brace
Assorted 1/8” balsa and 1/32” ply scraps – cowl and hatch cover
1) 3/16” X 9” drive shaft (or 1/16” wire or 1/8” flex drive)
1) 1/8”, 7/32, 1/4, & 9/32” O.D. X 12” K&S brass tube – drive and water tubes
1) *Dumas* 3/16” double U-joint
1) *Octura* 3/16” thrust washer set
1) *Octura* 3/16” prop drive dog
1) *Octura* X642 – X645 propeller
1) Speed-700 stock motor – or – 8 or 9XL brushless
1) SC-8 speed control – or – 125 amp brushless
1ea) LSH – P sport Strut, Rudder and Turn Fin
12 cell battery pack, or 2 6-cell packs, or 15-V LiPo

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