KING AIR B200

The latest version of an enduring design

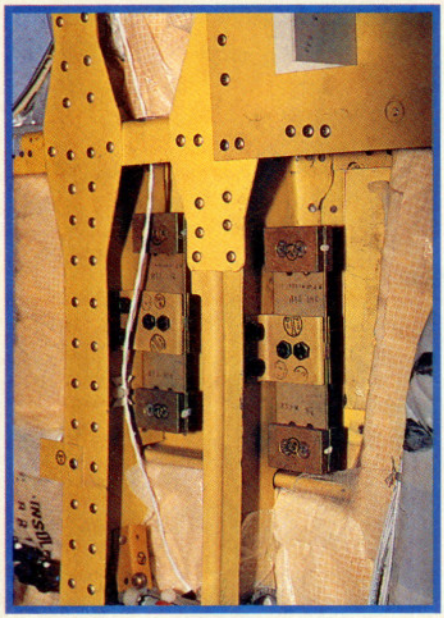
BY THOMAS A. HORNE

IT'S always been tough buying a new turboprop twin. These days, it's even tougher. Pilots, passengers, and financial types must all feel exceptionally good about the decision to sit down to a multimillion-dollar deal. The airplane has to suit the typical short-range missions, yet be flexible enough to take on the occasional long legs without sacrificing load-hauling capability. It has to be fast but not come off as a quirky, fire-breathing hot rod. It must be relatively economical to operate and hold its value over the long run. It must have docile manners—docile enough to make pilots look good and passengers feel secure. And for a businesslike image, the airplane must come across as a blend of the functional and conservative, yet retain a dignified stylishness. ■ For many, the Beech Super King Air B200 fits the bill. It's benefited from constant refinements over the 200-series' 20-year production run,

PHOTOGRAPHY BY MIKE FIZER

and it's one of the most popular turboprop twins ever built. The latest models have four-blade propellers and an ingenious set of interior sound dampeners and other soundproofing improvements, making them the quietest of the B200s.

It's easy to understand why pilots like this airplane. It's completely conventional in its handling qualities, and anyone who is familiar with Beech's Bonanzas or Barons would probably feel right at home after an hour of flying a B200. There's no substitute for a formal training program when it comes to airplanes of this size and power, but the truth is that with a quick read of the pilot's operating handbook and a little coaching from an experienced hand, just about any reasonably competent pilot could handle a B200—the first time out. That's a strong testimony to Beech's attention to human-factors engineering, as well as a strong selling point for those many customers stepping up from other, smaller airplanes.



Sound dampeners (above) make the B200's cabin even quieter. Access to the baggage area is easy, thanks to an improved airstair design.

Systems-wise, the B200 is a study in simple complexity. The fuel system, for example, consists of six fuel cells per wing, plus a nacelle tank. Fuel must be transferred to the nacelle tanks before being fed to the engines. Sound complicated? It's not. Fuel is transferred by gravity feed or, in the case of an auxiliary tank, motive flow valves energized by fuel pressure created by the engine-driven fuel pumps. In case a motive flow valve fails, a manual override is available. There are two engine-driven pumps and, in the unlikely case that both happen to fail, a standby boost pump. Naturally, crossfeed flow is available in the event of an engine failure.

Operationally, this all boils down to very little hands-on pilot work load. The only time the pilot usually needs to fool with the fuel control panel is during the prestart check. If the engine-driven pumps fail, turn on the standby pump (an annunciator light tells when fuel pressure is falling). If a motive flow valve quits (again, an annunciator illuminates), flip the Aux Transfer switch to the Override position. Want crossfeed? Flip the Crossfeed Flow switch in the desired direction.

The electrical system is equally simple. Power comes from each engine's 250-ampere-hour starter-generators and a battery. The important thing here is to make sure that both current limiters (isolation and protection devices that connect the generators to their respective buses) are functional before takeoff. Because the B200 uses dual-fed buses, failure of a current limiter might deprive some of the ship's equipment of electricity in the event of an engine failure.

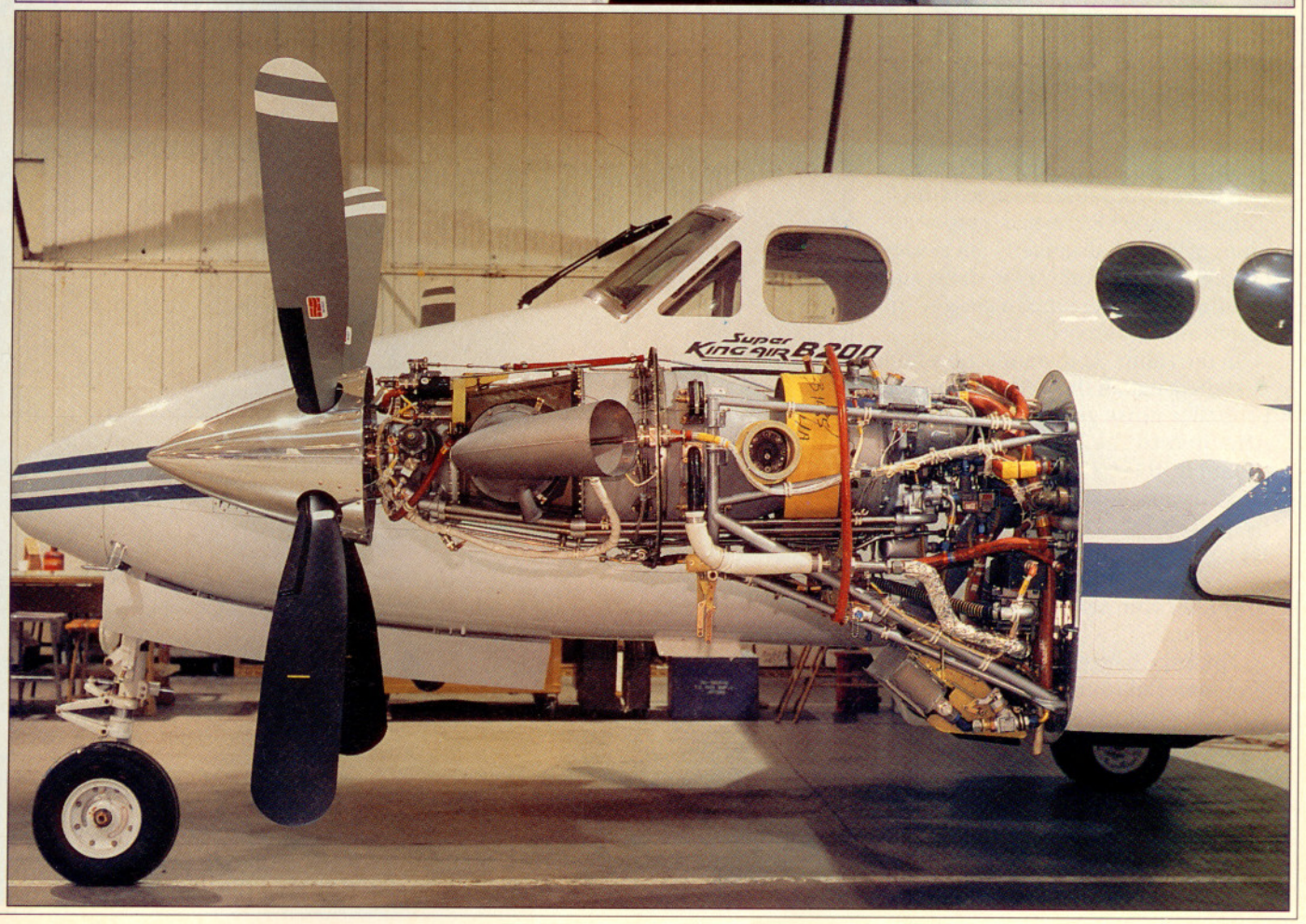
A redesign of the current limiters in the new B200s permits simpler cross-starts. It used to be that you had to turn off the generator of the operating engine before making the second start. Now, you can leave the operating engine's generator online without fear of drawing too much damaging current; the limiters hold down the load automatically.

The runup checks show off other systems goodies: autofeather and a rudder bias system that kicks in additional rudder pressure to help maintain directional control in an engine-out situation. It's all standard, and so is an engine fire detection system (a fire extinguishing system is optional).

According to Beech, the typical B200 owner most often flies trips of between 275 and 350 nautical miles, and three passengers is a normal load. To sample what such a trip entails, the folks at Beech let us fly one of their newest demonstrators from Beech's factory field in Wichita, Kansas, to Dallas' Addison Airport, a trip of some 300 nm.

N1559W is pretty much a standard-equipped airplane, with a list price of $3,754,951. Its few options included a Collins MFD-85B multifunction display, which can superimpose check lists and various navigation displays on the ship's color weather radar screen; heated brakes; dual encoding altimeters and transponders; and a Wulfsberg Flitefone VI. The heated brakes use engine bleed air to keep slush or snow from freezing on the brake assembly and so prevent tire blowouts during landings in cold conditions.

Along with color radar, an EFIS (electronic flight information system) consisting of an EADI and EHSI on the pilot's side is standard, as well as dual RMIs, DMEs, and a Collins autopilot/flight director. In what may be a precursor of things to come, a Loral/


Super
King Air B200

Fairchild cockpit voice recorder is also standard.

We took on 3,400 pounds of fuel (about 245 pounds shy of the maximum 544-gallon fuel capacity), then boarded five people. That put us at a gross weight of 12,409 pounds—less than a hundred pounds under the B200's 12,500 maximum gross takeoff weight.

In spite of the load, we accelerated at a goodly rate, getting a firm push as the torquemeters reached their 2,230-foot-pound redlines. Soon, we were at the 95-knot rotation speed, and the runway became a thing of the past. The book said our ground run should have been 1,800 feet (distance over the FAA's 50-foot obstacle was 2,500 feet), and that seemed about right. At the V_Y of 125 KIAS, our initial rate of climb settled at a hair under 2,300 feet per minute.

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Enroute, there was time to sample the new B200's main improvement—noise attenuation. Beech engineers assaulted this goal by first switching to four-blade propellers with a 94-inch diameter; earlier B200s had three-blade props of 98-inch diameter. Four blades operate more smoothly than three, and smaller diameters mean slower tip speeds and less propeller noise.

In the cabin, 32 dynamic vibration absorbers match the frequency of the propeller noise generated at cruise. Attached to the bulkheads during assembly, these 1 × 4-inch rectangular slabs are tuned to resonate at 113 hertz. This helps cancel out the fuselage resonance and low frequency noises that prevail at the B200's cruise propeller rpm settings of 1,700 and 1,800 rpm.

Thicker, "bagged" acoustic insulation material rounds out the soundproofing upgrades. The bags completely surround the inside surfaces of the cockpit and cabin, from the floorboards up. Earlier B200s used thinner insulation.

How does it work? Let's put it this way: Prior to takeoff, there was some


PRESS TO TEST
PRESS TO RESET
PRESS TO RESET
KNOTS
ALT
VERTICAL SPEED
RADALT
FEATHER
FUEL CUT OFF
PITCH TRIM UP
CAUTION
REVERSE
FLAP
RUDDER TRIM
OXYGEN

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discussion over whether or not we wanted to use headsets. As it turned out, they weren't needed. Conversation could be held in normal tones, both in the cockpit and in the cabin. Apparently, the system not only works, it works well. Currently manufactured C90B King Airs share the same methods of sound insulation and noise attenuation.

After the inevitable vectoring, we settled down to cruise at Flight Level 290. It was -33 degrees Celsius outside, giving us nearly standard conditions for that altitude. At maximum cruise power, true airspeed worked out to be 284 KTAS, and the fuel burn was 250 pounds per side, for a total of about 75 gallons per hour. All the numbers were within a few digits of published book values.

Steep descents can become even steeper if the flaps and gear are extended, of course, and the new B200 helps in this department by having a higher V_{FE} and V_{LE} than its predecessors—200 and 181 KIAS, respectively. A newly designed gear warning horn silencing switch has been located on the left power lever. In descent at reduced power, you can shut off the horn without diverting your attention to the sub-panel, which is where earlier B200s had their silencing buttons.

Landings require no special skill, in spite of the airplane's rather large size. On downwind—or up to the final approach fix—arm the autofeather, turn off the propeller synchrophaser, select approach flaps, reduce torques to about 1,000 foot-pounds per side, and slow to about 150 KIAS. Abeam the numbers—or at the final approach fix—turn off the yaw damper, select gear down, pull the power levers back to about 600 foot-pounds, and watch the airspeed bleed off to about 125 KIAS (blueline is 121 KIAS) during the descent. Farther down final, squeeze off another 200 or so foot-pounds, push the prop levers forward, and put down the second, final increment of flaps if you've got the field made. Fence speed should be 103 KIAS, then

Beechcraft Super King Air B200
Base price: $3,578,300

Specifications

Powerplants	Two Pratt & Whitney PT6A-42, 850 shp ea
Recommended TBO	3,000 hr
Propellers	Two McCauley 94LA-0 four-blade, full-feathering, constant speed, reversing, variable pitch, 94-in diameter
Length	43 ft 10 in
Height	14 ft 10 in
Wingspan	54 ft 6 in
Wing area	303 sq ft
Wing loading	41.3 lb/sq ft
Power loading	7.4 lb/hp
Seats	8 to 15
Cabin length	22 ft 0 in
Cabin width	4 ft 6 in
Cabin height	4 ft 9 in
Basic empty weight	8,158 lb
Max ramp weight	12,590 lb
Useful load	4,432 lb
Payload w/full fuel	697 lb
Max takeoff weight	12,500 lb
Max landing weight	12,500 lb
Zero fuel weight	11,000 lb
Fuel capacity, std	544 gal (544 gal usable) 3,645 lb (3,645 lb usable)
Oil capacity, ea engine	14 qt
Baggage capacity	550 lb, 53.5 cu ft

Performance

Takeoff distance, ground roll	1,856 ft
Takeoff distance over 50-ft obstacle	2,579 ft
Accelerate-stop distance, flaps 40%	3,400 ft
Accelerate-go distance	4,700 ft
Rate of climb, sea level	2,450 fpm
Single-engine ROC, sea level	740 fpm
Cruise speed/range/endurance w/45-min rsv, std fuel (fuel consumption, ea engine)	
@ Max cruise speed	290 kt/1,340 nm/4.7 hr
22,000 ft	(700 pph/105 gph)
@ Normal cruise speed	284 kt/1,630 nm/5.9 hr
28,000 ft	(540 pph/81 gph)
@ Max range speed	232 kt/2,030 nm/8.6 hr
32,000 ft	(340 pph/51 gph)
Max operating altitude	35,000 ft
Service ceiling	above 35,000 ft
Single-engine service ceiling	21,900 ft
Landing distance over 50-ft obstacle	2,845 ft
Landing distance, ground roll	1,760 ft

Limiting and Recommended Airspeeds

V_{MC} (min control w/critical engine inoperative)	86 KIAS
V_{SSE} (min intentional one-engine operation)	104 KIAS
V_X (best angle of climb)	100 KIAS
V_Y (best rate of climb)	125 KIAS
V_{XSE} (best single-engine angle of climb)	115 KIAS
V_{YSE} (best single-engine rate of climb)	121 KIAS
V_A (design maneuvering)	181 KIAS
V_{FE} (max flap extended)	200 KIAS
V_{LE} (max gear extended)	181 KIAS
V_{LO} (max gear operating)	
Extend	181 KIAS
Retract	163 KIAS
V_{MO} (max operating)	259 KIAS
M_{MO} (max Mach)	0.52 Mach
V_R (rotation)	95 KIAS
V_{S1} (stall, clean)	99 KIAS
V_{SO} (stall, in landing configuration)	75 KIAS

For more information, contact Beech Aircraft Corporation, Post Office Box 85, Wichita, Kansas 67201-0085; telephone 316/681-7111.

All specifications are based on manufacturer's calculations. All performance figures are based on standard day, standard atmosphere, sea level, gross weight conditions unless otherwise noted.

it's time to start pulling. With any luck at all, you'll touch down mains first, at around 80 KIAS. Let the nosewheel touch down, then lift up on the power levers and pull back to put the propellers into reverse pitch. Get on the binders, and you can stop in about 2,200 feet. That's assuming a 12,000-pound landing weight and clearing the 50-foot obstacle. If obstacles were no factor, the ground roll itself would be only about 1,200 feet.

Our trip to Dallas and back averaged 1.5 hours each leg. We could have moved faster flying in the low 20s, where the B200 could have reached its maximum cruising speed of 290 KTAS for our conditions, but we wanted to stay high to avoid any excessive vectoring. We hauled a big load comfortably and could have flown into and out of 3,500-foot runways and still had enough distance to comply with accelerate-stop requirements. For accelerate-go conditions, we would have needed a 5,200-foot-long runway.

This ability to operate large loads out of short runways is just one reason for the B200's enduring success. Fuel economy is another. Beech says that many B200 buyers are lured away from small jets for this reason. On short routes, small jets often spend a lot of time being vectored—and wasting fuel—as they climb to their most fuel-efficient altitudes. The King Air may roll along 100 knots slower than a typical business jet, but by the time it pulls into the chocks after a 300-nm jaunt, the jet may have beat it by a mere 10 to 15 minutes. For that whopping 10-minute lead, the jet will have burned substantially more fuel than the B200.

There are other, more emotional reasons why the B200 is such a hit. Image-conscious prospects often don't want the spendthrift symbology that a jet may carry. Even though it has 850-shaft-horsepower engines and weighs 6-plus tons, the sight of propellers signals a sort of humility to the average ground-pounder.

And yet the airplane is massive enough to inspire confidence and respect. There's a feeling of substance that's backed up by Beech's construction methods. One very important point is the use of damage-tolerant, multiple load path wing spar attach points. Should any one element of a spar fail, the other elements can bear the load. Compliance with damage-tolerant standards is normally found only in FAR Part 25–certified airplanes. Beech switched to this type of construction in 1985 as part of its continual upgrading of the B200 line.

After 30 years, the Beech King Air series marches on at a steady gait. By the time you read this, the 5,000th King Air should have been delivered, making this series of airplanes the most popular turboprop twins in the world.

Without a doubt, the 90-series King Airs, the ones that started it all in 1964, have proven the most popular, with 2,167 deliveries to date. But the 200 series, with 1,922 deliveries, comes in a close second. B200s have been selling at a rate of about 40 airplanes per year, and thanks to ongoing fleet buys from the military and foreign governments (which use B200s for everything from executive transport to electronic surveillance to medical transport), the 200s may soon outsell the 90 series.

As long as Beech continues to improve on a good thing, there's every reason to expect the B200 to soldier on into the next century. □