COMMANDER 114TC

Capable Cruiser

Commander TCs now have ice protection, and more

BY THOMAS A. HORNE
PHOTOGRAPHY BY MIKE FIZER

Life is nice and picturesque cruising along at 13,000 feet, in smooth air, with a tailwind, and between showery stratus clouds. The sun, when it appears at all, looks like a dim yellow smudge oozing between murky cloud layers. The Stormscope shows but a few returns along my route from the Commander Aircraft Company's home field at the Wiley Post Airport in Bethany, Oklahoma, to the New Century Airport in Olathe, Kansas. I'm on and off instruments, in and out of rain showers, and surrounded by some very dark and damp clouds, but all in all it's a nice ride, and my (well, for the time being it's mine) brand-new Commander 114TC is behaving well. ■ The airplane's S-Tec System 55 autopilot is locked on to the ship's Bendix/King KLN89B, an IFR-approved GPS receiver; the S-Tec's yaw damper is engaged; and the horizontal

situation indicator needle is glued to dead-center. To stave off hypoxia, I'm wearing a mask plugged in to N6121A's built-in oxygen system, a standard feature in new 114TCs. With power set to 29 inches of manifold pressure and 2,400 rpm on the 270-hp Textron-Lycoming TIO-540-AG1A, I'd dialed in a fuel flow setting of 16.5 gph. The result was a turbine inlet temperature of 1,610 degrees—just below the 1,650-degree limit—and a true airspeed of 163 knots. I've been on a direct routing ever since crossing a point 29 DME north of the Will Rogers VOR, and I'll be at New Century in 15 minutes, for a total trip time of approximately 1.4 hours and a total fuel burn of about 37 gallons. Not bad at all.

The new 114TC, like all Commander singles, makes for a very comfortable four-place cross-country IFR airplane.

The big news: Commanders with the TKS "weeping wing" are now certified for flight into known icing.

For a piston single the cabin is big and beamy, and while having two doors doesn't sound exactly like a luxury, they certainly make entry and egress much smoother. Ever since the Commander singles made their debut in the 1970s, they've been known as ergonomically friendly—if not a tad slow and fuel-thirsty. The Rockwell engineers who designed the Commander obviously favored comfort over speed. And the four-place cabin is certainly one of the biggest and most comfortable of all the new singles now being manufactured. Speed penalties come chiefly from the frontal, interference, and parasite drag brought about by the wide-body fuselage.

The 114TC, the turbocharged version of the Commander, overcomes this little problem by letting you fly as high as 25,000 feet, which is the airplane's maximum operating altitude. Up there, true airspeeds at maximum continuous power can reach 183 knots, Commander says, and IFR ranges can go as far as 745 nautical miles at a 75-percent power setting.

New Commanders come with several improvements for the 1998 model year, some of them truly significant. The biggest news is known-icing certification. Commander 114Bs (the normally aspirated models) and 114TCs can be ordered with a TKS "weeping wing" anti- and

Typically equipped 114TCs leave the factory with sumptious panels. The airplane flown for this article has the S-Tec 55 autopilot, a Bendix/King KLN89B GPS, and air conditioning—and much more. Missing is the TKS ice protection system, which comes with a mini-control panel of its own.

deicing system. This system forces a glycol solution through microscopic holes in the wing and tail leading edges, and also protects the windshield and propeller from ice accretions. The system, when topped off with its three-hour supply of glycol, weighs 100 pounds and comes with dual pumps; a second, 85-ampere/hour alternator; an ice light; and a $42,000 price tag. For a turbocharged airplane like the 114TC, known-icing approval is a very, very good idea. It can let you climb through icing conditions to higher altitudes, descend through them to make an ice-free approach, and give you far more escape options.

The TKS system is very effective, too. I've flown in moderate icing conditions several times using the system, and I've never had a problem. There are two pump settings: a high setting that pumps fluid at a higher rate (meant for deicing) and a low setting for anti-icing (preventing ice from accreting). True, the weight penalty is stiff, but with normal passenger loads (i.e., a pilot and one or two passengers) you can still top the fuel tanks and be within weight and cg limits. It's only when you have another heavy option—the 100-pound air conditioning system—that you may have to consider trading fuel for payload. So far, Commander says that two-thirds of the 114TCs ordered since April will have the TKS option.

A second alternator is another option. In the past, only air-conditioned airplanes came with a second alternator. Other options include BFGoodrich's Skywatch collision avoidance system ($32,500 if ordered alone, $28,000 if coupled to a BFG WX-1000+ Stormscope); Argus's 5000 ($8,750) and 7000 ($10,500) monochrome moving map displays; Argus's 5000CE ($9,750) or 7000CE ($11,500) color moving map displays; and the Arnav MFD-5200 multi-function display (a $9,500 option). By year's end, the Avidyne Flight Situation Display should be available as another option.

There are other new features, standard with each airplane. Dual low-vacuum warning lights are one. (Dual vacuum pumps have been standard since Commander resumed production of the 114s in 1992.) A beefier upper door latch and gas-spring door stays are other welcome additions; gone are the scissors-type door stays. A digital OAT gauge, stainless steel cowl fasteners, two inches more leg room for rear-seat passengers, and a Shadin fuel management system are others. Commanders used to have Hoskins fuel totalizers. The new Shadin units provide much more in the way of fuel status

information, such as fuel to destination, endurance, specific fuel consumption, and fuel remaining at destination. In addition, TCs have an Insight GEM combination TIT and EGT gauge.

With the exception of the TKS system, N6121A is a typically equipped 114TC. Some might opt for the $32,000 Bendix/King KFC-200 flight control system instead of 21A's less-expensive ($29,500) S-Tec 55, but almost all new TCs have the S-Tec yaw damper ($4,150), and those who go with the S-Tec autopilot invariably choose S-Tec's altitude preselect and alerter ($3,950). A Stormscope's almost a given, as is air conditioning ($16,950) for those airplanes that will live in warmer climes.

Base price of a 114TC is $380,500. N6121A's suggested retail price comes in at $485,050.

So who buys new Commanders? Dean Thomas, Commander's vice president of marketing, says that most are low-time pilots who want high performance and don't yet meet the insurance requirements for flying larger, more powerful airplanes. Money doesn't seem to be an impediment to the buying decision. Since 1992, some 150 new Commanders have rolled out the company's factory doors, most of them 114Bs. Since the 114TC's introduction in 1995 (see "Commander 114TC," October 1995 *Pilot*), 22 TCs have gone out the door. Currently, the factory's production rate is two airplanes per month.

A leasing program is currently under consideration. Under this plan, customers would plop down 20 percent of the purchase price up front, then make payments over a seven-year term. Under this scheme, the story goes, monthly payments would be about the same as those needed to finance a new top-of-the-line Porsche.

The factory is also busying itself with a fairly active refurbishing business. So far, 98 older Commanders have been brought in for any number of upgrades, be they cosmetic, aerodynamic, panel, or powerplant-related.

Back at New Century, it's time for me to leave on my final leg in N6121A. This time I'll be taking it to Cincinnati's Lunken Field, where I'll drop it off with Greg Wilson, a Commander salesman.

Crossing the ramp, I spy a puddle of fuel beneath the airplane's belly. When parking fully fueled Commanders for extended periods of time, it's vital that you put the fuel selector in the Off position. Otherwise, fuel can drip out a crossflow vent in the center of the fuselage, which was exactly what happened—to the tune of nine gallons.

Since 1995, 22 brand-new Commander 114TCs have gone out the factory door.

A wide and comfortable cabin makes Commanders well-suited for long cross-country flights. Two doors mean easier access for both pilots and passengers.

Starting, taxiing, and checklist items are conventional for a fuel-injected engine. On the day of my departure, the surface temperature was 85 degrees (Fahrenheit, of course), so I turned on the air while taxiing out. Because of the air conditioner's power draw, engine rpm has to be kept between 1,300 and 1,500, so it's hard to avoid riding the brakes a bit. But this doesn't concern you too much if you've been sweltering away. In seconds, the air conditioner is chugging mightily, and cabin temperatures quickly plunge. This air conditioner really works—something you'd expect of an airplane built in Oklahoma.

For takeoff, select 10 degrees of flaps, turn off the air conditioner, turn on the fuel boost pump, and slowly run the manifold pressure up to the 39-inch maximum. Rotate at 70 knots, climb out at 100 (which is V_Y), and you're on your way in a sprightly climb. My climb maxed out at around 900 fpm, but it was difficult to gauge exactly because of the low-level turbulence. Conditions were VFR, but there was a 4,000-foot broken cloud layer all along my route of flight, and forecasts called for the tops of that lower layer to quickly grow, and perhaps create scattered thunderstorms.

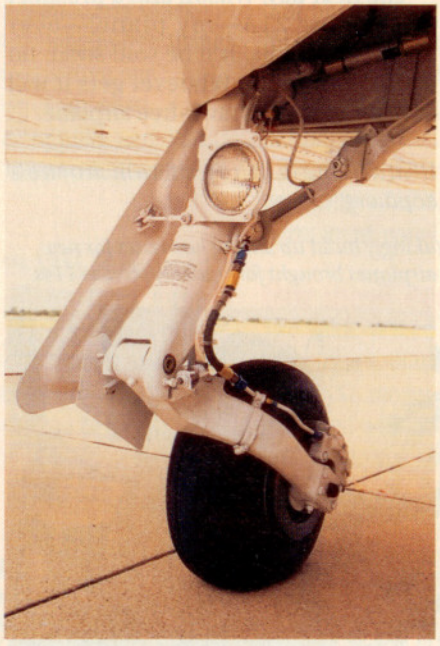
This flight was to be at a high cruise power setting, with manifold pressure set at the top of the green arc (29 inches) and 2,500 rpm. My first clearance was to 11,000

feet, where OAT was 10 Celsius, or 17 degrees Celsius warmer than standard. Once established in cruise, I leaned the mixture to a TIT of 1,610 degrees Fahrenheit, which produced a fuel flow of 18.5 gph and a true airspeed of 166 knots. The only problem was the cylinder head temperature, which was way at the top of the green arc, at 480 degrees Fahrenheit. The CHT red arc begins at 500 degrees. I decided to leave the electrically powered cowl flaps in the closed position, at least for the time being.

Nearing St. Louis airspace, ATC wanted to vector me 40 degrees off course to avoid their Class B airspace—even though I was on an IFR flight plan. I protested and was told that only by climbing to 17,000 feet could I keep going direct. No problem, I told them, and up I went.

At 17,000 the air was still ISA +17, at minus 1 degree Celsius. Now, in the much thinner air, CHTs became a big concern. With the power still set at 29 inches, 2,500 rpm, a fuel flow of 18.3 gph, and a TIT of 1,610, CHT rose to 500 degrees with the cowl flaps closed. With the needle heading into the red arc, it was time to pop the cowl flaps open. You do this by pushing on an annunciator-type switch, and the cowl flaps have only two positions—fully open or fully closed—so it's push once for open, another time for closed.

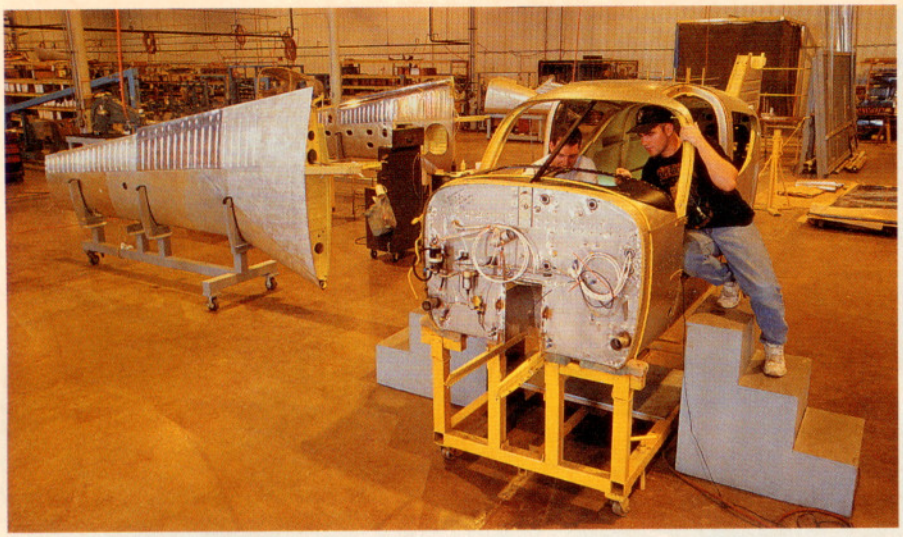
A four-second cycle time and beefy trailing-link main gear are two of a Commander's distinguishing features.



Opening the cowl flaps brought the CHT back to the green arc, down to 480 degrees. With the cowl flaps open, the rumble of the 270-hp Lycoming is much more pronounced. Opening the cowl flaps also causes drag, which brings indicated airspeeds down by seven to nine knots. With that penalty, my true airspeed worked out to be 170 KTAS. With them closed, I'd have come close to the airplane's advertised maximum cruise true airspeed of 183 knots. Groundspeeds ran from 175 to 188 knots for the rest of the trip.

At some point over Illinois I noticed the fuel flow needle rising and falling, accompanied by the Shadin's rapid fluctuations from 12 to 19 gph or so. The engine began to run a little rough. At this altitude, and at these comparatively high OATs, fuel vaporization was causing uneven fuel flows. Turning on—and leaving on—the fuel boost pump took care of the problem.

This all serves to underscore the importance of keeping a keen eye on a turbocharged engine at high altitude. Throttle and mixture control movements must be done gently, lest any change in the flow of air through the turbocharger cause fluctuations in manifold pressure or fuel flow. This is called bootstrapping, and it can keep you busy as you try to bring all the engine indications back into line. Increasing propeller rpm first, then resetting the other power variables seems to work best. Yes, the 114TC has an automatic wastegate, but up high, when the wastegate is fully closed, the



On the factory floor, a 114 is readied for wing-to-fuselage mating. New 114Bs can now be ordered with 88-gallon fuel tanks—the same tank setup that's standard in 114TCs.

engine becomes extraordinarily sensitive to even the slightest throttle, mixture, or airspeed changes.

From my perch I looked way down on a layer of growing, turbulence-filled cumulus clouds that stretched across the entire Ohio Valley. I stayed in smooth air once again, on oxygen, until 60 miles west of Lunken, when I began a descent into Cincinnati's airspace. At 12,500 feet, I eagerly yanked off the oxygen mask. The approach and landing at "sunken Lunken" was uneventful, but it did involve descending through 3,000 feet worth of rowdy cumulus clouds.

Down low, the turbocharger's pressure controllers let the engine behave more or less like a normally aspirated piston engine (just don't jockey the throttle, or there's always the chance you could overboost the manifold pressure, in spite of the overboost protection devices); and for the back course approach to Runway 3 I used 17 inches of manifold pressure, 2,300 rpm, 15 degrees of flaps, and gear down to maintain a 100-knot, 500-fpm descent down final. On short final, I went to 20 degrees of flaps (35 degrees is maximum deflection), bled off power, slowed to 90, then flared for an acceptable touchdown, thanks in part to the Commander's trailing-link landing gear. Total time and fuel burn for the approximately (there were vectors around a firing range in Indiana) 530-nautical-mile trip from IXD to LUK: three hours, 27 minutes; 62.8 gallons.

The next day, Wilson and a prospect were flying 21A—my plane!—over northern Illinois. It'll be sold soon, no doubt about that. Whoever gets it will have a capable, squawk-free airplane. □

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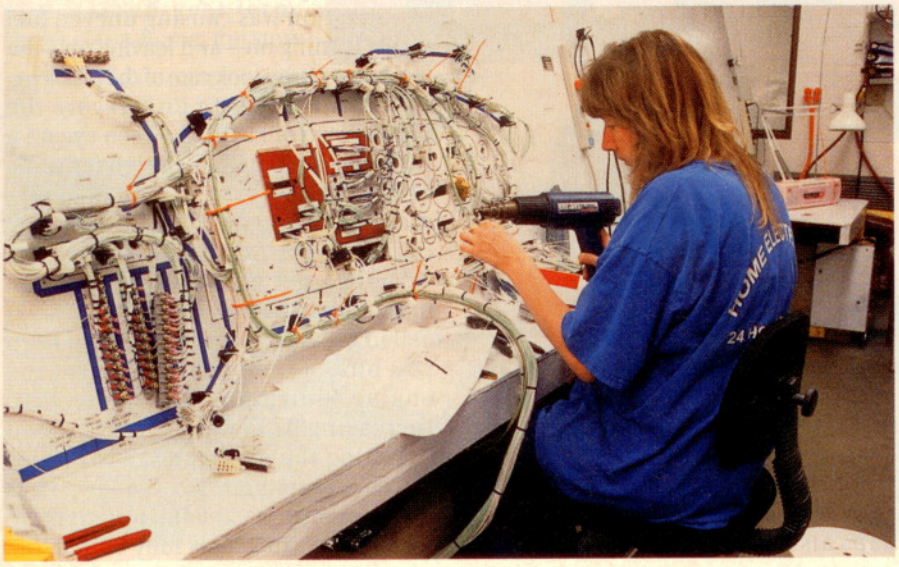
Technicians at the Commander factory painstakingly build up wiring harnesses for new airplanes and also upgrade the panels of other airplanes brought for trade-in on new 114s.



Commander 114TC
Base price: $380,500
Price as tested: $485,050

Specifications

Powerplant	Lycoming TIO-540-AG1A, 270 hp @ 2,575 rpm
Recommended TBO	2,000 hr
Propeller	McCauley three-blade, 75.5-77-in diameter
Length	24 ft 11 in
Height	8 ft 5 in
Wingspan	32 ft 9 in
Wing area	152 sq ft
Wing loading	21.7 lb/sq ft
Power loading	12.2 lb/hp
Seats	4
Cabin length	75 in
Cabin width	47 in
Cabin height	49 in
Empty weight, typically equipped	2,245 lb
Maximum gross weight	3,305 lb
Useful load, typically equipped	1,060 lb
Payload w/full fuel	532 lb
Maximum landing weight	3,140 lb
Max zero fuel weight	3,000 lb
Oil capacity	10 quarts
Fuel capacity, std	90 gal (88 gal usable) 540 lb (528 lb usable)
Baggage capacity	200 lb, 22 cu ft

Performance

Takeoff distance, ground roll	1,350 ft
Takeoff distance over 50-ft obstacle	2,070 ft
Maximum demonstrated crosswind component	19 kt
Rate of climb, sea level	1,050 fpm
Cruise speed/endurance w/45-min rsv, std fuel (fuel consumption)	
@ 75% power, best economy 25,000 ft	183 kt/ 3.8 hr (94 pph/ 15.7 gph)
@ 55% power, best economy 12,000 ft	130 kt/ 6.4 hr (66 pph/11 gph)
Maximum operating altitude	25,000 ft
Landing distance over 50-ft obstacle	1,200 ft
Landing distance, ground roll	720 ft

Limiting and Recommended Airspeeds

V_X (best angle of climb)	75 KIAS
V_Y (best rate of climb)	100 KIAS
V_A (design maneuvering)	117 KIAS
V_{FE} (max flap extended)	
To 20 degree deflection	149 KIAS
20 to 25 degree deflection	121 KIAS
25 to 35 degree deflection	112 KIAS
V_{LE} (max gear extended)	187 KIAS
V_{LO} (max gear operating)	
Extend	129 KIAS
Retract	129 KIAS
V_{NO} (max structural cruising)	
SL to 12,500 ft	162 KIAS
25,000 ft	121 KIAS
V_{NE} (never exceed)	
SL to 12,500 ft	187 KIAS
25,000 ft	139 KIAS
V_R (rotation)	70 KIAS
V_{S1} (stall, clean)	66 KIAS
V_{SO} (stall, in landing configuration)	59 KIAS

For more information, contact Commander Aircraft Company, Wiley Post Airport, 7200 N.W. Sixty-third Street, Bethany, Oklahoma 73008; telephone 405/495-8080, fax 405/495-8383; or visit the Web site (www.commanderair.com).

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.