

The Stinson 108 Voyager
<http://www.westin553.net>
Larry Westin - 01/17/96

UPDATED - REV F - 09/03/14 - Page 1 of 11

As World War II entered its final stages, Stinson decided to use the pre-war model 10 Voyager as the starting point for its first post war airplane. Converting a company owned model 10A Voyager, the first prototype Stinson model Voyager 125 was built in late 1944. Initially this was still a three seater powered by a Lycoming 125 HP engine and known as the Voyager 125. First flight of the postwar Voyager was December 1, 1944. The first prototype (of two) was registered NX31519. First configuration of this airplane shows it with a tail, both vertical and horizontal, similar to the model 10A Voyager.

Stinson's new post war aircraft was first named the Voyager 125. It was almost 2 feet longer, 250 pounds heavier and had 35 more horse power than the pre war Voyager. The pre war Voyager 10 was slightly under powered and the additional power was thought adequate to correct this deficiency. Flight tests showed a disappointing performance and the decision was made to use a higher powered engine.

Substituting a 150 HP Franklin 6A4-150-B4 created the Voyager 150. The added power allowed Stinson to make some additional changes by increasing the cabin width, lengthening the fuselage about a foot, and increasing gross weight another 285 pounds, to 2150 pounds. These changes not only improved performance, but it also made the Voyager into a 4 place airplane. The second prototype, registered NX51532, was also a converted model 10A Voyager owned by Stinson.

Interestingly these airplanes were assigned serial numbers 108-1 and 108-2 respectively. After only a short period they were reduced to scrap. Apparently the first two production airplanes then used serial number 108-1 and 108-2. Rather unusual so I list NX31519 and NX31532 as prototypes.

Sometime in this period the original model 10A Voyager wooden tail was replaced by a new all metal tail. The new all metal tail included both redesigned vertical and horizontal stabilizers of different shape. Also the horizontal stabilizer was relocated much higher as compared to the model 10A.

Stinson showed the Voyager 150 at the San Diego Air Show in November 1945. Production began in January 1946 and approved type certificate A-767 is widely reported as being granted on 7/19/46. This date seems unlikely to me because Stinson was in full production of the model 108 since early January 1946. There were in fact more than 200 built before July 1946.

At this time, early 1946, the Stinson Voyager pretty much had the 4 place market to itself. Most general aviation manufactures were building 2 place aircraft. Cessna was building the models 120 and 140, Piper the J-3, PA-11 and PA-12, Aeronca the 7AC,

Taylorcraft the BC-12 and other manufactures were concentrating on two place training aircraft. Beech and North American were not yet ready with the Bonanza and Navion, which, with retractable landing gear, were a step above the Stinson 150.

Voyager sales were brisk in the immediate post war period. There was something of an identity problem with the name Voyager 150, which did not seem to catch on. Model 108 is the official designation but the popular name is "Voyager."

Unlike the 2 place aircraft, which are basically training airplanes, the Voyager is a cross country airplane. The larger size, adequate fuel load, and optional full instrumentation, made the Stinson Voyager a popular business airplane.

Two gross weights are specified for the model 108, 2150 pounds in the normal category, and 1900 pounds in utility category. The model 108 was also licensed with Edo pontoons and as a seaplane a gross weight of 2235 pounds is permitted, normal category only.

Stinson built 741 model 108 Voyagers, serial numbers 108-1 through 108-742. Serial number 11 (108-11) is listed as a model 108-1, and I believe serial number 11 was the prototype 108-1.

Late 1946 saw the introduction of an improved model, the 108-1, first shown at the National Aircraft Show in Cleveland. Major changes included an increase in gross weight to 2230 pounds normal, and 1925 pounds in the utility category. Seaplane gross weight remained at 2235 pounds. Power remained the same Franklin 6A4-150-B4 engine of 150 HP.

Two models of the 108-1 were offered, the Voyager and the Station Wagon. Station Wagon models have a strengthened rear floor with plywood siding in the rear. The strengthened rear floor provided extra utility which allowed up to 600 pounds of cargo.

Model 108-1 production totaled 1506 aircraft. Serial numbers are 108-743 through 108-2249, minus 108-1474. Apparently 108-1474 became the prototype for the model 108-2.

A significant change occurred during 108-1 production. Stinson model 108-1's through serial number 108-1469 did NOT have an external baggage door. Beginning with model 108-1 serial number 108-1470 Stinson added an external baggage door. The external baggage compartment door would remain standard on all future Stinson 108's. The advertising brochures for the model 108-1 does NOT show the external baggage compartment door.

Serial number 108-3100 is also listed on the type certificate as a model 108-1 but it was not built by Stinson as a 108-1. Serial number 108-3100 was originally built as a 108-2. About two years after it was manufactured an engine problem occurred and the 108-2

Franklin 165HP engine was replaced with a 108-1 Franklin 150HP engine. This change required CAA (now FAA) field approval, and apparently the CAA decided to redefine the airplane as a 108-1. As of this writing the airplane data plate lists it as a 108-2 and the bungee required of the 108-2 is still installed, while the type certificate says 108-1.

One airplane from the 108-1 production line, serial number 108-1563, was used to test many new configurations. These included a new single strut wing, different engines and propellers and a new tail. Most of the features would not be used in production, the new tail however would emerge on production airplanes with the model 108-3. This airplane was converted back to a standard model 108-1 before delivery.

Later in 1947 Stinson brought out the model 108-2. The external baggage compartment started part way through 108-1 continued and the 108-2 sales brochures now show the external baggage door on the right side of the fuselage. Model 108-2 production totaled 1252 aircraft. Serial numbers are 108-2250 through 108-3500, plus 108-1474 which I believe is the prototype.

Major difference of the model 108-2 was increased power, now the Franklin 6A4-165-B3 of 165 HP. The additional power with the same size vertical stabilizer and rudder made a bungee necessary. Gross weight remained 2230 pounds normal and 1925 pounds utility, same as the 108-1.

During July 1947 two Stinson 108-2's, Station Wagon models, NC9381K and NC9382K, serial numbers 108-2381 and 108-2382 respectively, were flown by the U.S. Army at Fort Bragg, North Carolina. In the Stinson 108 production summary records these are listed as "Army Demonstrators." The Stinson 108-2 took best off the shelf airplane available. I'm unaware of any US military designation or U.S. military serial number assigned to either of these airplanes. NC9381K remains on the FAA register, and I believe NC9382K still exists in Alaska, but is unregistered. This is the only U.S. military use of the Stinson 108 I'm aware of, however France and Spain both used model 108-3's in their military service.

Major changes improved the Stinson with the model 108-3, the 1948 model. Most obvious was a completely re-engineered vertical stabilizer and rudder. While earlier versions have a ground adjustable rudder trim tab, the 108-3 incorporated a cockpit adjustable rudder trim tab adjustable in flight from the cockpit. "Big tailed Stinson" is the term which refers to the model 108-3 and also applies to the models 108-4 and 108-5.

Engine remained the Franklin 6A4-165-B3, as used in the 108-2. Gross weight increased to 2400 pounds normal, 2000 pounds utility. Door latches changed to flush type.

About this time the U.S. aviation industry was experiencing a massive down turn in sales. Stinson's were being built much faster than they were being sold. Late 1948 saw several hundred (about 325) unsold Stinson 108's and the parent company

Consolidated Vultee decided on a change. In what was an industry surprise, Consolidated Vultee sold the assets of the Stinson Division to Piper aircraft on Nov. 29, 1948.

The last Stinson Voyager built at the Wayne, Michigan plant was serial number 108-5260 in early July 1948. Serial numbers for 108-3's are from 108-3501 to 108-5260. Published material indicates that Piper sold some 325 Stinson aircraft. Sources indicate approximately 125 aircraft were assembled by Piper in Michigan. Piper did NOT build any model 108's. These 125 model 108-3's were completely assembled by Stinson, however they were not painted. Piper painted then sold the 125 airplanes.

Sources indicates that the dies for the vertical stabilizer and rudder were scrapped and the last 108-3's airplanes built used the earlier small tails, similar to those used on the 108 through 108-2. I believe the dies probably were scrapped, however I doubt small tails were actually installed on the 108-3. My own airplane, a model 108-3 serial number 108-4968, nominally falls into the published group which should have had the small tail. It does not, the tail is standard model 108-3. Two Homepage viewers with even later serial numbers than mine indicate their airplanes have the big 108-3 tail. For the then CAA to approve changing the vertical stabilizer and rudder would have required a significant test flight program and likely a model number change.

Piper sold Stinson airplanes through early 1951. The standard 108-3 paint scheme was used with a slight modification. The name on the cowl was changed from "Stinson Flying Station Wagon" to "Piper Flying Station Wagon."

Researching the Stinson production summary revealed a model 108-4. Very little information is available on the 108-4, however it is known only a single example was built, serial number 108-4693, NX149C. Originally a model 108-3 serial number 108-3149, had registration NC149C assigned. However s/n 108-3149 was exported and that "N" number was not used on the 108-3, so Stinson used it on the only 108-4 changing it from NC149C to NX149C because the model 108-4 was experimental, never certified. It was the last 108 model developed by Stinson. It was flown by both Stinson, and later Piper, but never progressed through to the type certificate.

At one time I believed that serial number 108-1563, NX8563K, described earlier, the aircraft flown for awhile with a single lift strut, is the model 108-4. That is NOT the correct. So if you have earlier information from me, this page now corrects my earlier error. The single model 108-4 was serial number 108-4693, NX149C.

Sherman Oxford, a homepage viewer, sent me a Stinson drawing labeled as the 108-4. This drawing showed only the entry door. Unusual about this is the door is shown with what appears to be an aluminum brace through the entry door window. Using 1940's auto terminology this would be a "wind wing" type window as used in cars of the period. I have never seen a photo of such a door on a Stinson.

Piper purchased the Stinson aircraft primarily to remove competition with its own Pacer. Although Piper did fly the 108-4, No further development was undertaken by Piper of the model 108. A June 15, 1955 Piper Service Letter announced the sale of the approved type certificate, manufacturing rights, engineering data and spare parts for the Stinson 108, 108-1, 108-2, 108-3 and the L5. Piper made the sale to Vest Aircraft Company, Sky Ranch Airport, Denver, Colorado.

Univair Aircraft in Aurora, Colorado is the current owner of the Stinson 108 series type certificate. Sky Ranch is, I believe, now defunct except for possibly some hangers. It may be that Univair's current building is located adjacent to what was Sky Ranch airport.

Final model to date, is the 108-5. Univair is responsible for the 108-5 and it is essentially a 108-3 with a Franklin 6A4-335-B1 engine. Type certificate A-767 lists the serial numbers of the model 108-5 as 108-3501 and above, which is identical to the 108-3. Janes All The Worlds Aircraft, 1976-1977, page 397, says a prototype and 17 production versions were completed by 1 March 1976. Shown is a photograph of a 108-5, N5576V, however it is not listed on the current register. I believe that Univair built only a single model 108-5, although at one time a number of Stinson 108-3's were shown on the FAA register as model 108-5.

Structurally the Stinson uses 4130 welded chrome molly steel for the fuselage. All models are essentially the same with some changes for the added weight of later models. Most of the fuselage is covered with fabric, with aluminum covering the fuselage forward of the cabin doors. A strong carry through structure, essentially under the front seats, provides points for the lift struts and landing gear to attachments.

Wings use front and rear aluminum spars with stamped aluminum ribs. Airfoil is NACA 4412. Each wing root has a fuel tank. Models 108, 108-1 and 108-2 have 20 gallon tanks. Model 108-3, 108-4 and 108-5 have two 25 gallon tanks, with 23 usable. Each wing is attached to the top of the fuselage with two bolts, one for each wing spar. Front and rear lift struts support each wing. The lower end of the front lift strut connects to the lower forward fuselage carry through, just behind the main landing gear rear attach point, and the upper end to the front spar. The lower end of the rear lift strut connects to the lower end of the front lift strut, and the upper end of the rear lift strut connects to the rear spar. Two landing lights are installed in the left wing, as is the pitot tube. Some later model 108-3's had the optional Safe Flight stall warning vane on the left wing.

All Stinsons were delivered with radio as standard. Model 108's were equipped with the General Electric AS-1B transmitter receiver. This radio can transmit on one frequency, originally 3105 KHz. Sometime in the late 1940's or early 1950's the FCC changed the standard light aircraft transmitter frequency to 3023.5 KHz. All Stinson's I have seen, which still had the LF radio, had the later 3023.5 KHz crystal installed. The AS-1B has a two band, tunable receiver, covering the 190 to 400 KHz aircraft band, and the 550 to 1600 KHz broadcast band.

Stinson models 108-1, 108-2 and 108-3's had the Hallicrafters CA-2 Skyfone radio installed as standard. The Hallicrafters also had a single LF transmitter frequency of 3023.5 KHz, with a two band tunable receiver.

Two antennas were installed as standard on all Stinsons, a long wire antenna for transmitting and receiving, and an unique directional antenna. Models 108, 108-1 and 108-2 had the transmitter receiver antenna from the top of the cabin to the tip of the tail.

Model 108-3 had the antenna from the top of the cabin to the tip of the tail with additional long wire elements to each wing tip. The antenna elements from the tail to the wing tips had quick detachments at each wing tip to ease hangar storage. Transmitting at 3 MHz range (either 3105 or 3023.5KHz) required a loading coil located close to the forward insulator near the top of the cabin.

During the production period of the Stinson 108, radio navigation consisted primarily of four course ranges. Both the General Electric and Hallicrafters were capable of receiving the four course range signals, which were transmitted in the 190 to 400 KHz range. The antenna configuration used to create the four course range made them unusable for direction finding. Instead of watching a needle or other display as is done today, the four course range was tracked by listening carefully to the radio receiver audio. On course the pilot heard a steady tone, off course the pilot heard either the morse code for the letter "A" (. -) or the morse code for the letter "N" (- .). When the airplane was "on course" the pilot heard a steady tone which was known as being "on the beam" or "flying the beam."

Stinson also installed a unique manual directional antenna which consisted of a loop of wire inside the fuselage. Both radios had a selector for which antenna the receiver used, either long wire or loop. Manual direction finding does not use an indicator in the instrument panel, rather manual directional capability comes from listening to the audio strength of the signal. Most directional antennas of the period were heavy loops on the fuselage with a mechanical means inside the cockpit to rotate the antenna. Some Stinson model 108's were equipped with manual rotatable loop antennas on the top of the cabin roof.

After tuning in the station on the long wire, the directional antenna is selected and rotated until the lowest signal (null) is heard. This would then give the pilot the angle difference between his heading the direction to the station. Since the Stinson had only a fixed loop antenna as standard the entire airplane had to be turned to determine the null audio heading. Once the null was determined the airplane was heading to or from the station. A far cry from today's VOR/DME, LORAN C or GPS systems.

Interestingly, when I completely restored my own Stinson 108-3 beginning in 1984, the fixed loop directional antenna was still in the aircraft although the LF radio had been removed many years before.

Both of the standard Stinson radio's were quite narrow. When I restored my airplane I installed modern Narco, King and Terra solid state avionics. Since today's radio's are wider the radios had to be angled to allow for full control movement for the elevators.

Stinson's were available with three different instrument panels, the standard, basic blind flying and advanced blind flying. The standard panel provided for three standard size (3 1/8 inch) instruments, airspeed, altimeter and tachometer, plus five small size (2 1/4 inch) instruments, oil pressure, oil temperature, fuel, ammeter and compass.

The basic blind flying panel had all the standard instruments plus to standard size instruments, the turn and bank and the rate of climb. Also added was one more small size instrument, a clock. The advanced blind flying panel included all the instruments in basic blind flying panel plus two WWII standard size instruments, an artificial horizon and a directional gyro.

Sales literature for the Stinson Voyager often mentioned the terrific sound proofing installed as standard. A cabin loudspeaker was installed, which was very unusual for a light aircraft in 1946. Fiberglass sound proofing was installed around the entire cabin during production. Personally I believe the sales claims were rather optimistic. I use, and recommend, either head phones or a headset.

As delivered from Stinson the airplane was covered with Grade A cotton fabric with 8 coats of dope. Today most have a synthetic fabric, either Stits or Ceconite. Several STC's are available to metalize the airplane.

Interior of the first airplanes was a grey wool mohair fabric with a vinyl insert. Cushioning was from horse hair dipped in formaldehyde. Later models, particularly the Station Wagon, may have used an all vinyl interior.

Flight characteristics are excellent, The Stinson 108 is a very stable airplane in the air. Landings are not difficult compared with other conventional gear airplanes. Pilot's whose only experience is with tri-cycle gear ("training wheel") aircraft may not completely agree with that statement. The large air oil struts make wheel landings easy, much easier than a Cessna 140 or Citabria with the spring steel landing gear, at least in my opinion.

Stalls are light, the wing slots provide very good lateral control at low speed. Published speeds seem a bit optimistic to me. During cruise I true about 118 to 122 mph depending on altitude and temperature, at 2500 RPM. A recent flight which was on a cooler day, at 2550 RPM, N6968M was trueing a respectable 128 mph! My airplane has 8 external antenna's, 7 more than standard, however I do not think the large number of antenna's detract that much from speed.

Stinson 108 Serial Numbers

Model	Serial Numbers	Total Built	Remarks
Prototypes	108-1 & 108-2	(2)	Two model 108 prototypes (converted model 10A airplanes).
108	108-1 thru 108-10, 108-12 thru 108-742	741	108-11 is the prototype model 108-1 150 hp Franklin, gross 2150
108-1	108-11, 108-743 thru 108-1473, 108-1475 thru 108-2249	1507	108-1474 is the prototype model 108-2 150 hp Franklin, small tail, gross 2230
108-2	108-1474, 108-2250 thru 108-3500	1252	165 hp Franklin, small tail, bungee rudder assist, gross 2230 - after delivery s/n 108-3100 was changed by the CAA to a model 108-1, see note 1 below
108-3	108-3501 thru 108- 4962, 108-14964 thru 108-5260	1759	165 hp Franklin, big tail, gross 2400
108-4	108-4963	1	190 hp Lycoming, not certified
108-5	108-5001	1	180 hp Franklin engine, built by Univair, duplicated 108-3 serial number, see note 2 below
Total Stinson model 108's built		5261	(total does NOT include prototypes)

Total model 108's built by Stinson 5260, total model 108's built by Univair 1, total 5,261

NOTE 1 - I list serial number 108-3100 here as a 108-2, which is what Stinson built it as, and what the data plate says. Shortly into its life a problem with the original engine caused the owner to install a 150 HP Franklin. The then CAA decided that change really made the airplane a model 108-1. So on the current Type Certificate Data Sheet A-767 serial number 108-3100 is shown as a model 108-1.

NOTE 2 - when Univair built the single model 108-5 they inadvertently reused a serial number which had already been used on a model 108-3.

Stinson 108 Main Differences

Year	Model	Length	Wing Span	Height	Gross Weight	Fuel	Horse Power
1946	108	24' 6"	33' 11"	6' 6"	2150	40	150 hp Franklin
1947	108-1	24' 6"	33' 11"	6' 6"	2230	40	150 hp Franklin
1947	108-2	24' 6"	33' 11"	6' 6"	2230	40	165 hp Franklin
1948	108-3	25' 2"	33' 11"	7' 6"	2400	50	165 hp Franklin
1948	108-4	25' 2"	33' 11"	7' 6"	2400	50	190 hp Lycoming
1975	108-5	25' 2"	33' 11"	7' 6"	2400	50	180 hp Franklin

Stinsons with 150 hp used the Franklin 6A4-150-B4 engine, Stinsons with 165 hp used the Franklin 6A4-165-B3 engine.

Approximate Stinson 108 Factory Weights

Year	Model	Empty Weight	Useful Load	Gross Weight
1946	108	1206	944	2150
1947	108-1	1224	1006	2230
1947	108-2	1265	965	2230
1948	108-3	1320	1080	2400
1948	108-4	unknown	????	2400
1975	108-5	unknown	????	2400

NOTE about aircraft weights. The empty weight is what the airplane weighed from the factory with standard equipment. The useful load value is also from the factory with standard equipment. Gross weight is defined by the type certificate data sheet, the weight shown is for a land plane.

Whenever additional equipment is added the empty weight increases, with the useful load decreasing the same amount the empty weight increases. The gross weight does not change.

Identical Dimensions for all Stinson 108 models

Horizontal Stabilizer	11' 2"
Ailerons	7' 6"
Flaps	6' 8"
Slots	3' 2"
Wing Cord	4' 9"

Stinson 108 Areas in Square Feet

Wing Area	155.00
Each Aileron	9.01
Each Flap	6.11
Horizontal Stabilizer	14.66
Elevator including trim tab	17.24
Elevator trim tab	0.94
Fin (108, 108-1, 108-2)	8.55
Fin (108-3, 108-4, 108-5)	14.28
Rudder (108, 108-1, 108-2)	6.28
Rudder including rudder trim tab (108-3, 108-4, 108-5)	6.78
Rudder Trim tab (108-3, 108-4, 108-5)	0.49

Stinson model 108 Performance

With modern airplanes most performance data is contained in the Pilot Operating Handbook. That is NOT the case with the Stinson model 108 series airplanes. Performance data is detailed in the airplane flight manual. When a different propeller was installed a new chart was installed in the airplane flight manual. The Stinson 108 flight manual is a two page document, printed on both sides so there are 4 pages of 8 ½ by 11 inch size paper which makes up the FAA approved airplane flight manual. In

addition to performance data the airplane flight manual also contains an equipment list and the approved center of gravity limitations. Every Stinson model 108 **MUST** have a copy of the airplane flight manual on board the airplane to be airworthy!

Looking through the airplane flight manuals provided details on stall speed, rate of climb, take off and landing distance. Maximum and cruise speeds are NOT defined in any airplane flight manual I can locate.

The airplane charts show many different values depending on temperature and altitude. Listed below are reasonable performance for a Stinson 108-3 with the Franklin 165 Hp engine, a McCauley 1A170-7654 metal propeller, on a day which the temperature is 75 degrees Fahrenheit at sea level.

Stinson 108-3 Performance

Stall speed, flaps up	65
Stall speed, flaps down	62
Takeoff distance at sea level, 75F	2,383 feet
Rate of Climb at sea level, 75F	675 fpm
Landing distance at sea level, 75F	1,955 feet
Maximum speed	133 mph
Cruise speed	128 mph
Fuel consumption at 2550 RPM at 7,500	10 gph
Endurance, 46 gallons usable fuel	4.5 hours
Range with reserves approximately	450 miles

This is where I am as of today. More material and information will be added as time and energy permit. If you have additional data and or information please send it to me, my contact information is below. Have fun, and fly safe, with your Stinson!

Postal Address
Larry Westin
21721 Verde St
Tehachapi, California
U.S.A. 93561-9437
Phone (661) 823-4707

E-Mail
Larry Westin
westin@westin553.net