Canceled 105-2A AT-240

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ADVISORY CIRCULAR

DEPARTMENT OF TRANSPORTATION
FEDERAL AVIATION ADMINISTRATION

SUBJECT: SPORT PARACHUTE JUMPING

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1. PURPOSE. This Advisory Circular provides suggestions to improve sport parachuting safety; information to assist parachutists in complying with Federal Aviation Regulations Part 105; and a list of aircraft which may be operated with one cabin door removed, including the procedures for obtaining Federal Aviation Administration (FAA) authorization for door removal.

2. CANCELLATION. Advisory Circular No. AC 91-1B, dated March 24, 1967, and AC 105-1, dated November 19, 1963, are cancelled.

3. GENERAL. Intentional parachute jumping activities are rapidly increasing. Participants in this sport are not certificated airmen and are not subject to training requirements. Accident statistics have shown that a very high percentage of fatal parachute accidents involve student jumpers. During 1966, for example, approximately 50 percent of the parachuting fatalities involved persons who were making their first jumps or who had made only a few previous jumps. Figures of this nature indicate that parachutists are exposed to their greatest danger during the process of learning. This circular is designed primarily for beginning parachutists, but much of the information will be helpful to experienced jumpers. In this development task, the FAA solicited and received the full cooperation and assistance of the United States Parachute Association and the military services.

4. SAFETY SUGGESTIONS.

   a. Medical. All would-be parachutists are urged to complete a general physical examination prior to their first jump. The physician should be informed of the purpose of the examination.

Initiated by: FS-442

b. Initial Training. Prospective parachutists should complete a controlled program of instruction prior to attempting any type of parachute jump. The initial program should cover at least the following areas:

(1) Familiarization with Parachutes.

(a) Types to be used.
(b) Main components of the sport parachute.
(c) Function of the sport harness.
(d) Fitting the harness.
(e) Proper maintenance and care of parachutes.

(2) Familiarization with the jump aircraft (the best training aid is the jump aircraft).

(a) Types used.
(b) Entering procedures.
(c) Seating procedures.
(d) Pre-jump preparation (fitting and attachment of static line, jumpmaster instructions, etc.).
(e) Rigging for the jump (buddy system, procedures, etc.).
(f) Exiting from the aircraft.

(3) Emergency Procedures.

(a) Verbal count of six seconds after exit to give main parachute time to open.
(b) Check of main chute deploying on count of six or immediately after opening.
(c) Corrective action for malfunctions.
(d) Drill on a suspended harness (correcting for malfunctions, dummy ripcord pull of auxiliary chute, etc.).
(e) Aircraft in-flight emergencies.
(f) Familiarization with the types of auxiliary chutes (including compatibility with the various types of main chutes).
(g) Auxiliary chute deployment procedures.

(4) Parachute Landing Falls (preferably from a jump platform).

(a) Types of landing falls.
(b) Points of body contact.
(c) Recovery from drags.
(d) Special landings (tree, high tension wire, water, etc.).

(5) Familiarization with Parachuting Accessories and Instruments.

(a) Altimeters.
(b) Stop watches.
(c) Flotation equipment.
(d) Personal equipment (boots, goggles, helmets, coveralls, etc.).

(6) Familiarization with Federal Aviation Regulations on Sport Parachuting.

(a) FAR Part 105.
(b) FAR Part 65.
(c) FAR Part 149.
(d) Technical Standard Order C23b.

NOTE: See paragraph 5 for more detailed information.

c. Initial Jumps. Upon completion of the above pre-jump training suggestions, the following minimum static line jump training should be completed prior to attempting a free fall jump (if a person has not engaged in parachute jumping activity during the preceding 90 days, static linejumps should be made prior to attempting any free fall jumps).

(1) At least five static line jumps should be performed from an altitude of at least 2,800 feet above the surface. Low altitude jumps should not be attempted by students.

(2) In order to simulate free fall type jumps, at least three successive static line jumps should be made during which a dummy ripcord pull is completed prior to opening of the main parachute canopy. These jumps should be accomplished without loss of stability or body control during the fall. (These demonstrations may be accomplished during the five jumps suggested in par. 4c(1) above, or it may be necessary to exceed that number.)

(3) Detailed equipment checks should be made by the jumper prior to each jump. The static line should be checked visually for hookup, and manually by two or three sharp tugs to determine security to the aircraft attaching point. The attachment in the aircraft and the static line attachment should be specifically designed and installed for the purpose intended.

(a) If automatic opening devices are used, a pre-jump check should be made for proper setting, arming, and operational reliability. Devices that depend upon battery power should include periodic check of battery output under a loaded condition. (See par. 4.d.(2).)

(b) An experienced parachutist, who acts as the jumpmaster, should make a final inspection of all equipment prior to each jump.

(c) Complex parachute rigs that require precise action on the part of the jumper should not be used during initial training.

d. Safety Devices and Equipment.

(1) Deployment assist device. FAR 105.43(b) prohibits any person from making a parachute jump using a static line attached to the aircraft and the main parachute unless an assist device is used to aid the pilot chute in performing its function, or, if no pilot chute is used, to aid in the direct deployment of the main parachute canopy.

(2) Automatic opening devices. Although student jumpers seem to feel more at ease if their auxiliary parachutes are equipped with an automatic opening device, recent service experience indicates that such devices may not be completely reliable. One type of automatic opener utilizes an aneroid type activator which is quite sensitive and could be damaged by a hard fall, or by tossing the parachute into a bin or on a table. Some automatic openers are operated by a timing spring which must be set prior to jumping. These devices are also subject to damage. A parachutist who uses any type of automatic opener should be aware of the reliability aspects of such devices and become very familiar with the device. A complete check of the device and its components should be made prior to each jump to insure proper functioning prior to each jump. If such devices are used, care must be exercised in setting the minimum opening altitude so as to insure sufficient time for complete deployment of the auxiliary chute. The jumper should always be prepared to manually pull the rip cord of the auxiliary chute no matter what type of automatic opener is used.

(3) Safety equipment. The area in which jumps are made will indicate the type of safety equipment which should be carried. In 1966 there were five fatalities caused by drowning. On August 27, 1967, 16 of 20 parachutists involved in a mass jump drowned in Lake Erie. No one should jump without some type of flotation gear except in the few areas where there are absolutely no water filled ditches or bodies of water in which the jumper could possibly land. Personal gear such as boots, helmets, etc., should be kept in good condition.

(4) Oxygen equipment. Jumpers should use oxygen equipment when the jump aircraft is at altitudes above 10,000 feet MSL (mean sea level) for more than 30 minutes. Oxygen equipment should be used continuously above 15,000 feet MSL. Above 25,000 feet MSL pressure demand oxygen systems should be used.

e. Parachute Packing. The FARs permit a parachutist to pack his own main chute. Auxiliary parachutes must be packed by a certificated parachute rigger with an appropriate type rating. No alteration or modification can be made to either the main or auxiliary parachute unless it is done by an appropriately certificated parachute rigger or a parachute loft. Even though a jumper can pack his own chute, he should not attempt to do so until he has been thoroughly checked out by a certificated parachute rigger.

f. Weather. Strong or gusty winds over 12 miles per hour can be dangerous, especially to student jumpers. Student parachutists should not attempt to make jumps when wind velocities or gusts are such as to impose the risk of injury. Parachutists should never jump unless there is adequate visibility. (see par. 5c.) The 16 parachutists who drowned in Lake Erie on August 27, 1967, jumped through an overcast.

g. Advanced Parachuting. The safety suggestions presented in this circular are intended primarily for the student parachutist. Individual experience and judgment dictate what additional training should be obtained prior to undertaking more advanced parachute activities. Use of highly modified parachutes should not be attempted without proper checkout and training. Free fall acrobatics should be worked up to gradually. High altitude jumps should not be made without first becoming familiar with the problems and hazards created by low temperatures, lack of oxygen, the various types of oxygen equipment, and under no circumstances attempted without an adequate supply of aviators' breathing oxygen (medical and welding oxygen unsuitable and could be dangerous).

5. INFORMATION ON REGULATIONS AND ASSOCIATED OPERATING PRACTICES.

a. Federal Aviation Regulations (FAR). The Parts of the Federal Aviation Regulations which are of interest to parachutists are described below. They may be obtained from the Superintendent of Documents, United States Government Printing Office, Washington, D. C. 20402.

(1) Part 65 - Certification: Airmen Other than Flight Crewmembers. Subpart F concerns parachute riggers, their eligibility requirements, privileges, and performance standards. Price - 30¢.

(2) Part 105 - Parachute Jumping. This Part is especially important to parachutists and to pilots who carry them, since it contains the rules on intentional parachute jumping. Price - 20¢.

(3) Technical Standard Order (TSO) C-23b sets forth the minimum performance and safety requirements for parachutes. TSO C-23b and this Advisory Circular may be obtained at no cost by writing the Department of Transportation, Federal Aviation Administration, Distribution Unit, TAD-484.3, Washington, D. C. 20590.

(4) United States Parachute Association (formerly the Parachute Club of America) has developed basic safety standards. These are standards for training, checking equipment, and conducting sport parachuting. While not officially approved by the FAA, these standards have been widely used for guidance by individuals and parachute clubs. Copies may be obtained at no cost from the United States Parachute Association, P. O. Box 409, Monterey, California 93942.

(5) This circular is based on FAR requirements in effect on the date the circular is published. The FARs may be amended at any time. Parachutists should keep up with changes in the FARs and always comply with current requirements.

b. Parachute Rules. By FAR Part 1 definition, a parachute is a device used or intended to be used to retard the fall of a body or object through the air. For the purposes of this circular, a parachute is an assembly consisting of a harness, canopy, suspension lines, container, rip cord, pilot parachute (if required), and in some cases a deployment sleeve or bag. There are, of course, some lesser parts associated with these main components, such as connector links, "D" rings, and pack opening bands. The term "pack" (such as backpack or chestpack) when used in this circular refers to the parachute assembly, LESS THE HARNESS. This distinction is essential for a clear understanding.

(1) Parachute equipment. FAR 105.43 prescribes that in intentional jumping the parachutists must wear a single harness dual parachute pack having at least one main parachute and one approved auxiliary parachute. The main pack need not be an "approved" pack, but the auxiliary (emergency) pack, and the harness, must always be of an approved type. "Approved" with respect to FAR 105.43(d) means:

(a) Parachutes manufactured under a type certificate (an early method of approval).

(b) Parachutes manufactured under TSO C-23. These TSO's (TSO C-23b is the most recent) prescribe the minimum performance and quality control standards for a parachute carried for emergency use. These standards are met before the manufacturer labels his parachute or components as complying with the TSO.

(c) Personnel-carrying military parachutes (other than high altitude, high speed, or ejection kinds) identified by an NAF, AAF, or AN drawing number, an AAF order number, or any other military designation or specification number. These parachutes are often referred to as demilitarized or military surplus parachutes.

(2) Parachute packing. The FARs require the auxiliary parachute to be packed by a certificated parachute rigger or by a certificated and appropriately rated parachute loft. A main parachute may be packed by persons authorized to pack auxiliary parachutes or by the person making the jump; however, the jumper should be thoroughly checked out before attempting to pack his parachute.

(3) Parachute alterations. Parachute alterations are changes to original configuration such as the removal of a gore, installation of a lift webbing or fitting, addition of a deployment sleeve or bag, changing standard canopy attachment fitting to quick release fitting and the dying of a canopy. Parachute alterations may be performed only by:

(a) a certificated and appropriately rated master parachute rigger;
(b) a certificated parachute loft with an appropriate rating;
(c) the manufacturer; or
(d) Any other manufacturer the Federal Aviation Administrator considers to be competent.
(e) Each person (listed above) who alters the auxiliary parachute or the harness of a dual parachute pack used for intentional jumping must do so in accordance with approved manuals and specifications. The method of altering a main parachute does not have to be specifically approved. A person seeking approval to alter an auxiliary parachute should submit a request and a description of the alteration to the manufacturer, or if FAA approval is sought, to an FAA General Aviation District Office (GADO). It may be necessary, in some cases to provide drawings and test data with the request to prove that the parachute still meets safety standards. The same procedures apply to alteration of a harness assembly.

(4) Removal of pilot parachute. A certificated senior or master parachute rigger may remove the pilot chute from an auxiliary parachute. When this is done, the parachute must be plainly marked "Pilot chute not installed. This parachute may be used for intentional jumping only."

(5) Extra equipment. When an instrument panel, knife sheath, or other extra equipment is secured to the pack by passing the pack opening bands through panel or sheath slots, it is not considered to be an alteration.

(6) Assembly of major parachute components. The assembly or mating of approved parachute components from different manufacturers may be made by a certificated and appropriately rated parachute rigger or parachute loft without further authorization by the manufacturer or the FAA. Each component of the resulting assembly must function properly and may not interfere with the operation of the other components. For example, a TSO pack may be assembled with a demilitarized harness, or vice versa, as long as the assembled components comply with the safety standards of the original design. Any question about the strength or operation of the assembly should be resolved by actual tests by the rigger or loft to make certain the parachute is safe for emergency use. The user of a single harness dual parachute pack may perform simple assembly and disassembly operations necessary for transportation handling, or storage between periods of use if the parachute is designed to facilitate such assembly and disassembly without the use of complex operations.

(7) Repairs. Parachute repairs can be classed as major repairs or minor repairs. A major repair, as defined in FAR Part 1, is a repair "that, if improperly done, might appreciably affect weight, balance, structural strength, performance, powerplant operation, flight characteristics, or other qualities affecting airworthiness." Other repairs are minor repairs. Major parachute repairs may be made by a master parachute rigger, a parachute loft, or a manufacturer. Examples of major repairs are: replacement of a canopy panel, suspension line, or connector link. Minor parachute repairs may be made by a senior parachute rigger in addition to those authorized to make major repairs. Examples of minor repairs are: replacement of a rip cord pocket, darning, or sewing a small patch on a canopy.

(8) Plating of fittings. Plating or replating of load-carrying parachute fitting may cause hydrogen embrittlement and subsequent failure under stress unless the plating is done properly. Chrome or cadmium plated harness adjustment hardware may also

have a smoother finish than the original and may permit slippage. The parachutist should be aware of these possible hazards.

c. Pilot Responsibilities. The pilot in command of a jump aircraft is solely responsible for complying with the requirements of FAR Parts 61 and 91. That is to say, the pilot must be properly certificated and rated, the aircraft must be airworthy, and the general operating and air traffic rules appropriate to the operation must be met. FAR 105 places joint responsibility for the safety of a parachute jump with the pilot and the parachutist. The joint responsibility rules can be identified by their first statement which reads, "No person may make a parachute jump, and no pilot in command of an aircraft may allow . . . ." No pilot in command of a jump aircraft may allow a person to make a parachute jump from that aircraft unless cloud conditions allow that person to comply with the requirements of FAR 105.29(a). After leaving the aircraft, the parachutist is responsible for complying with the clearance from cloud minimums. All parachutists and pilots should be aware of the fact that FAR 105 prohibits jumping into or through a cloud. It is a good practice for pilots to make sure that the jump target zone is plainly visible from the aircraft prior to releasing parachutists. When reporting altitudes to air traffic control, pilots must give their altitude in feet above mean sea level (MSL).

d. Radio Equipment Requirements. FAR 105.14 prescribes the two-way radio communications equipment requirements for aircraft used for parachute jumps in or into controlled airspace unless otherwise authorized by air traffic control. Radio communications must be established with the FAA air traffic control facility or FAA Flight Service Station at least five minutes before jumping activity is to begin for the purpose of receiving information on known air traffic in the vicinity of the jump area. Jumping activity cannot begin until this information is received. Additionally, a continuous watch must be maintained on the appropriate frequency until jumping activity is ended. When jumping activities are completed or discontinued, air traffic control should be so informed as soon as possible.

e. Authorization/Notification Requirements. Whether or not written or oral authorization is required for a parachute jump depends upon the type of airspace involved, and the area where the parachutist intends to land. The same criteria determine the type of pre-jump notification requirements. These requirements are explained in detail below. Appendix 1 is an easy reference table parachutists can use to determine what authorization or notification requirements are needed for various types of jumps.

(1) Jumps over or into congested areas or open air assembly of persons. FAR 105.15 requires written authorization for these jumps (except for emergencies and certain Armed Forces' operations). Advance application, of at least four days, is made to the FAA General Aviation District Office responsible for the area where the jump is to take place. This rule concerns jump over or into congested areas or open air assembly of persons. Jumps made into large open areas, even though near or within a populated area, or near an assembly of persons, do not require written FAA authorization. However, parachutists should be careful to completely clear the area of assembly of persons. The determiniation of whether the FAA will authorize the jump will depend on the circumstances of each case. The FAA will not authorize a jump that is hazardous to the public interest. One of the main considerations in granting authorization will be the skill of the parachutist making the jump. The FAA office may stipulate that only a well qualified jumper may participate in the activity. A demonstration of landing accuracy may be asked for, depending on factors such as the size of the landing area, individual parachutist record, license held, etc.

(2) Jumps over or onto airports. FAR 105.17 requires prior approval of the airport management for jumps made over or onto an airport. However, this does not prevent a parachutist from drifting over an airport without prior approval if his chute is fully deployed and properly functioning and he is at least 2,000 feet above the airport traffic pattern and avoids creating a hazard to air traffic or to persons and property on the surface.

(3) Jumps in or into control zones. FAR 105.19 requires an authorization for jumps in or into a control zone with a functioning U. S. operated control tower. Requests for these authorizations do not require a specified lead time, but reasonable notice is desirable so that control tower personnel can adjust the jumps to expected traffic conditions. The authorization and instructions that are issued by the tower for the jumps are based on Visual Flight Rules (VFR) and known air traffic, and do not relieve the parachutists, or the pilot in command of the jump aircraft from compliance with all air traffic and general operating rules. When jumps in or into control zones involved jumping over or onto an airport, FAR 105.17 must also be complied with as explained in paragraph (2) above.

(4) Jumps in or into positive control areas. FAR 105.21 prescribes the authorization requirements for parachute jumps in or into positive control areas.

(5) Jumps in or into other airspace. FAR 105.23 prescribes the advance notification requirements for parachute jumps in controlled and uncontrolled airspace other than those previously covered in items (1) through (4) above. The FAA Air Traffic Control facility or Flight Service Station nearest to the proposed jump site must be notified at least one hour before the jump is to be made, but not more than 24 hours before the jump is to be completed. ATC may accept written notification of a scheduled series of jumps to be made over a stated period of time not to exceed 12 calendar months.

6. AIRCRAFT OPERATING AND AIRWORTHINESS REQUIREMENTS.

a. Procedure. Persons using aircraft listed in Appendix 2 of this circular, and interested in obtaining authorization with operating limitations for operation of such aircraft for parachuting, or other special operations, should forward a written request to the FAA General Aviation District Office having jurisdiction over the area in which such operations are to be conducted. The request should contain the following information:

(1) Name and address of the registered owner of the aircraft.
(2) Make, model, and registration number of the aircraft.
(3) Place where the aircraft is normally based.
(4) Reason the aircraft is to be operated without a door.

b. List of Eligible Aircraft. Appendix 2 identifies the aircraft which can be operated with one cabin door removed. Other aircraft may be approved for this type of operation if the applicant shows approval by the FAA or the manufacturer.

c. Installation and Removal of Seats. Control wheels, jump steps, deflectors, etc., will be handled in accordance with the applicable sections of FAR Part 43.

d. Budget Bureau Approval (BOB 04-R0140). The reporting and/or record-keeping requirements contained in this paragraph (paragraph 6) have been approved by the Bureau of the Budget in accordance with the Federal Reports Act of 1942.

James F. Rudolph

Director
Flight Standards Service

TABLE OF AUTHORIZATION/NOTIFICATION REQUIREMENTS

Type of Jump	Kind of Authorization or Approval Required	Where to Obtain or Give Notice	When to Apply or Give Notice	FAR Reference
Over or into congested areas or open air assembly of persons	Certificate of authorization	FAA General Aviation District Office	At least 4 days before the jump	105.15
Over or onto an airport with or without a U.S. operated control tower	Prior approval	Airport Management	Before the jump	105.17
In or into control zone with a U.S. operated control tower	Authorization 1/	Control Tower	Air Traffic Control Communications 5 minutes before the jump	105.19
In or into positive control environments 2/	Authorization 1/	Nearest air traffic control facility or Flight Service Station	Air Traffic Control Communications 5 minutes before the jump	105.21
In or into other controlled airspace	None necessary (Notification)	Nearest air traffic control facility or Flight Service Station	At least 1 hour before but not more than 24 hours before jumping is to be completed	105.23
In or into uncontrolled airspace	(Same as above)	(Same as above)	(Same as above)	(Same as above)
Over or within restricted or prohibited area	Authorization 1/	The Agency in charge of the area	Before the jump	105.27

1/ Usually means VERBAL authorization.

2/ Presently, areas which cover most of the U.S. 24,000 feet upward to including 60,000 feet. (In some locations the effective altitudes start at 18,000 feet - see FAR 71)

NOTE: This table does not apply to jumps by the Armed Forces over or within restricted areas that are under the control of an Armed Force, or during military operations in uncontrolled airspace.

Information Required for Notification. (FAR 105.25)

1. Date and time jumping will begin.
2. Size of the jump zone in nautical miles (Radius around target).
3. Location of jump zone related to the nearest VOR radial, or nearest airport, town, or city.
4. Altitudes above the surface at which jumping will take place.
5. Time and duration of the intended jumping.
6. Name, address, and telephone number of the person requesting the authorization or giving notice.
7. Identification of the aircraft to be used.
8. Radio frequencies, if any, available in the aircraft.

NOTE: Although not specifically required by all authorization and notification sections of FAR 105, the FAA recommends that proposed jump areas be coordinated with the nearest ATC facility for advisory information concerning other airspace operations.

Clearance-From-Clouds Requirements and Visibility Minimums. (FAR 105.29, FAR 105.31)

Within the Continental Control Area: 1,000 feet under, 1,000 feet over, 1 mile horizontally from clouds. Flight visibility 5 miles.

Elsewhere: 500 feet under, 1,000 feet over, 2,000 feet horizontally from clouds. Flight visibility 3 miles.

NOTE: NO PERSON MAY MAKE A PARACHUTE JUMP INTO OR THROUGH A CLOUD.

"Controlled Airspace" means airspace, designated as continental control area, control area, control zone, or transition area, within which some or all aircraft may be subject to air traffic control. (FAR 1.1)

Parachute Equipment and Packing Requirements for Intentional Jumping. (FAR 105.43)

The parachutist must wear a single harness dual parachute pack, having at least one main parachute and one approved auxiliary parachute. The main parachute must have been packed by a certificated parachute rigger, or by the person making the jump, within 120 days before its use. The auxiliary parachute must have been packed by a certificated and appropriately rated parachute rigger within 60 days before its use.

BUDGET BUREAU APPROVAL (BOB 04-R0147). The reporting and/or recordkeeping requirements contained in Appendix 1 have been approved by the Bureau of the Budget in accordance with the Federal Reports Act of 1942.

Aircraft that may be operated with one cabin door removed

Aeronca 058B

Aeronca 15AC

Beech AT-11, 18 Series,
C-45 and TC-45 Series

Centaur 101

Cessna 120 Series

Cessna 140 Series

Cessna 150 Series

Cessna 170 Series

Cessna 172 Series

Cessna 175 Series

Cessna 180 Series

Cessna 182 Series

Cessna 185 Series

Cessna 190

Cessna 206 Series (with Cessna
Accessory Kit AK 206-1
installed)

Cessna 210 Series

Cessna (Ector) 305A

Champion (Aeronca) 7 Series

Curtiss Wright (Travel Air)
S-6000B

Douglas DC-3 (maximum airspeed cabin passenger door removed 170 knots CAS)

Fairchild 24 Series (R/H door)

Helio H 250

Helio H 295

Helio H 391

Helio H 395

Howard DGA-15 Series

Larson (Luscombe) 8 Series (R/H door - maximum airspeed 100 MPH)

Lockheed 402-2 (R/H rear door)

Macchi AL 60 (R/H rear door)

Noorduyn UC-64 Series (rear door)

Piper PA-12

Piper PA-18 Series

Piper PA-20 Series

Piper PA-22 Series

Piper PA-28-140-160-180-235

Stinson V-77

Stinson Jr. SR-4

Stinson SR-7B (R/H door)

Taylorcraft BC12-D

Temco (Luscombe) 11A (R/H door)

Universal (Stinson) 108 Series

NOTE: Some of the above aircraft may require installation of deflectors to reduce vibration while being operated with a door removed.

DEPARTMENT OF TRANSPORTATION
FEDERAL AVIATION ADMINISTRATION
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