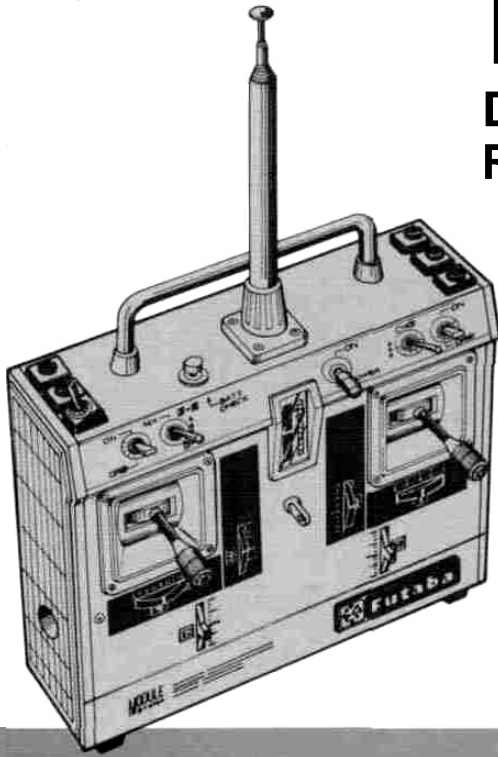


Futaba

DIGITAL PROPORTIONAL
RADIO CONTROL



INSTRUCTION MANUAL

FP-8JN J. MODULE



FUTABA CORPORATION OF AMERICA
FUTABA CORPORATION

***THANK YOU for purchasing a Futaba digital
proportional radio control set.
Please read this manual thoroughly before using your
new set.***

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• FEATURES

This radio control set has been developed for FAI RC acrobatic F3A use. Please read this manual thoroughly before using your set.

Transmitter FP-T8JN

- The transmitter employs a module system. The frequency band and modulation method can be changed with one touch.
- The servos can be operated without transmitting radio signals. Wire operation is possible by using the special cord furnished with the set.
- A reversing device is self-contained. **The servo** can be reversed by switching a switch.
- An aileron and elevator angle switching device is self-contained.
- Open gimble sticks provide maximum feel.
- An travel adjuster is self-contained.
Servo travel is independently adjustable to the left and right (up, down).
- Elevator and flap **mixing. Amount and direction** are variable. Release switch is also provided.
- Flap and spoiler mixing. Amount and direction are variable. Release switch is also provided.
- Two roll buttons. Elevator angle and direction can be freely adjusted.
- Two snap roll buttons. Aileron, elevator, and rudder angle and direction can be freely adjusted.
- Throttle button. Throttle half can be freely adjusted.
- Hook band is standard. Since this transmitter has numerous accessories, hanging it from your neck with this band makes operation easier.
- Buit-in antenna. Locked when pulled up one stage.
- Human engineered exterior. Superior operability.

Receiver FP-R8J

- Module type. The frequency band and modulation method can be changed with one touch, the same as the transmitter.
- Eight channels packed in a compact, lightweight, and rugged case.
- All connectors have trouble-free, metal plated pins. Housing is also special and provides an excellent feeling. Resistance against vibration and shock has been improved substantially.
- One-stage FET RF amplifier. Two signal characteristic is superb.
- Servos can be controlled without transmitting by connecting the transmitter directly to a "C" terminal.

FP-S121, FP-S121H and FP-S121G servos

- Compact, lightweight, rugged.
- Powerful output torque (3kg-cm).
- Output shaft is supported by two ball bearings to assure excellent neutral characteristics and ample durability.
- Waterproof, dustproof type.
- Special 16/0 micromotor.
- High-speed servo (FP-S121 H) is also available.
- Standard equipment includes two 8-channel, 6 servo landing gear servos (FP-S121G).

• SET CONTENTS AND RATINGS

Set name	FP-8JN
Transmitter	FP-T8JNx1
Receiver	FP-R8JX1
Servo	FP-S121x4
Landing gear servo	FP-S121Gx2
Switch	R4-SWJx1
NiCd battery	NR-4Hx1
Accessories	Charger, extension cord, landing gear adapter, DSC cord, ribbon, horn, servo tray

Transmitter FP-T8JN

Operating system : Two-stick, 8 channels
 Transmitting frequency : 27MHz, 53MHz Bands
 72MHz Band
 Modulation system : AM or FM
 Selectable by changing modules.
 Power requirement : 9.6V 8/500mAH
 Current drain : 150mA

Receiver FP-R8J

Receiving frequency : 27MHz, 53MHz **Bands**
 72MHz Band
 Selectable **by changing** modules.
 Intermediate frequency : 455kHz
 Power requirement : 4.8V
 Current drain : 16mA
 Dimensions : 49.0 x 42.0 x 24.0mm
 Weight : 52g
 Receiving **range** : With FP-T8JN transmitter
 500m on the ground
 1000m in the air

Servo FP-S121

Control system + pulse width control
 1520uS.N
 Operating angle One-side **45° or greater**
 (including trim)
 Power requirement 4.8V
 Current drain 8mA (when stopped)
 Output torque 3.0kg-cm
 Dimensions 39.0 x 19.0 x 31.5mm
 Weight 36g

Servo FP-S121G

Control system + pulse width control
 Operating angle 160° or greater
 Power requirement 4.8V
 Current drain 8mA (when stopped)
Output torque 3.5kg-cm
 Dimensions 39.0 x 19.0 x 31.5mm
 Weight 36g

Charger FBC-2 or FBC-2L

Input voltage : AC110V,50/60Hz,
 4VA
 Output : Tx side 9.6V 45mA
 Rx side 4.8V 45mA

NiCd battery for receiver servo NR-4H

Voltage : 4.8V 4/500mAH
 Dimensions : 32.5 x 32.5 x 57.0mm
 Weight : 115g

• TRANSMITTER CONTROLS

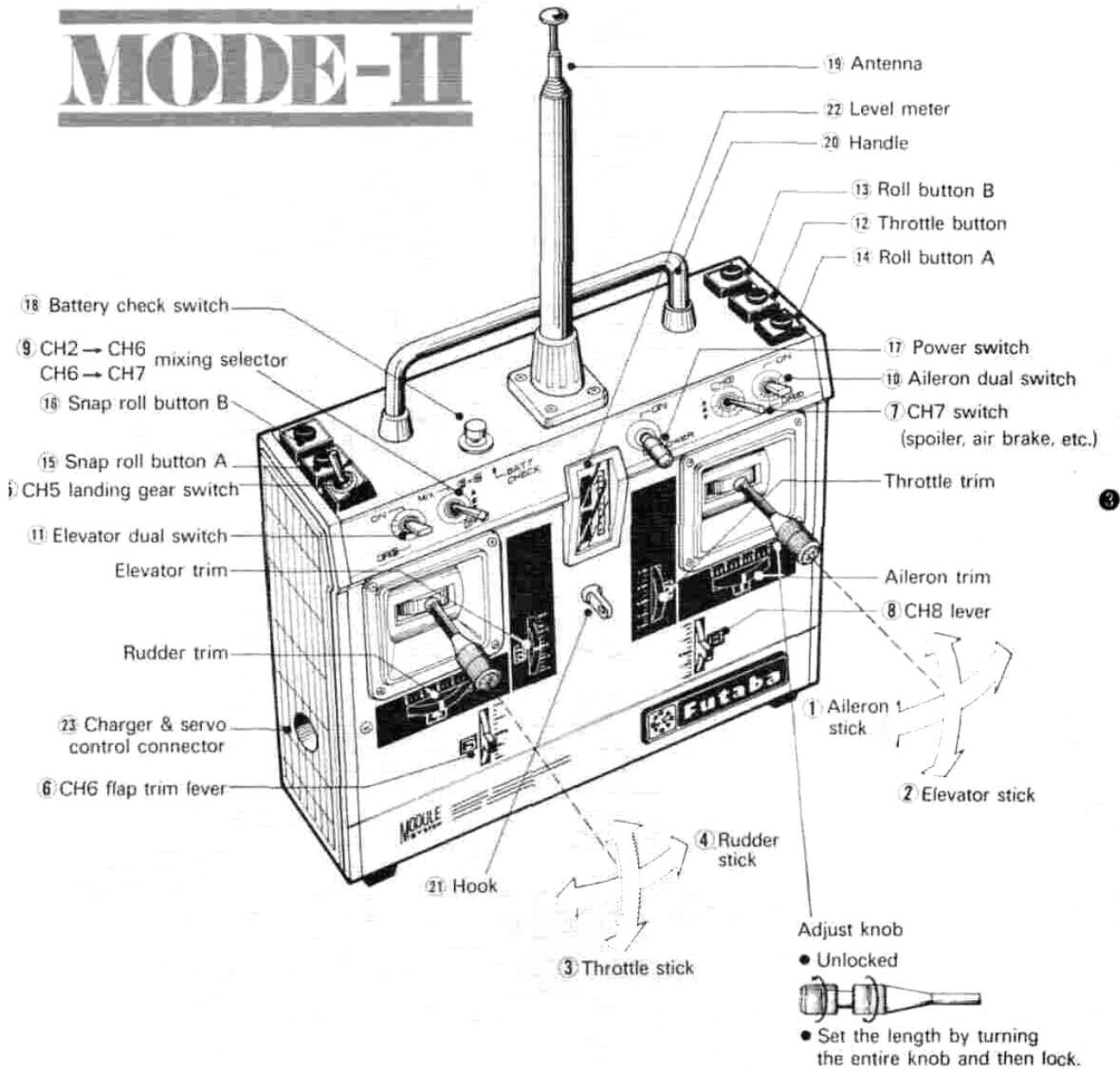


Fig.1

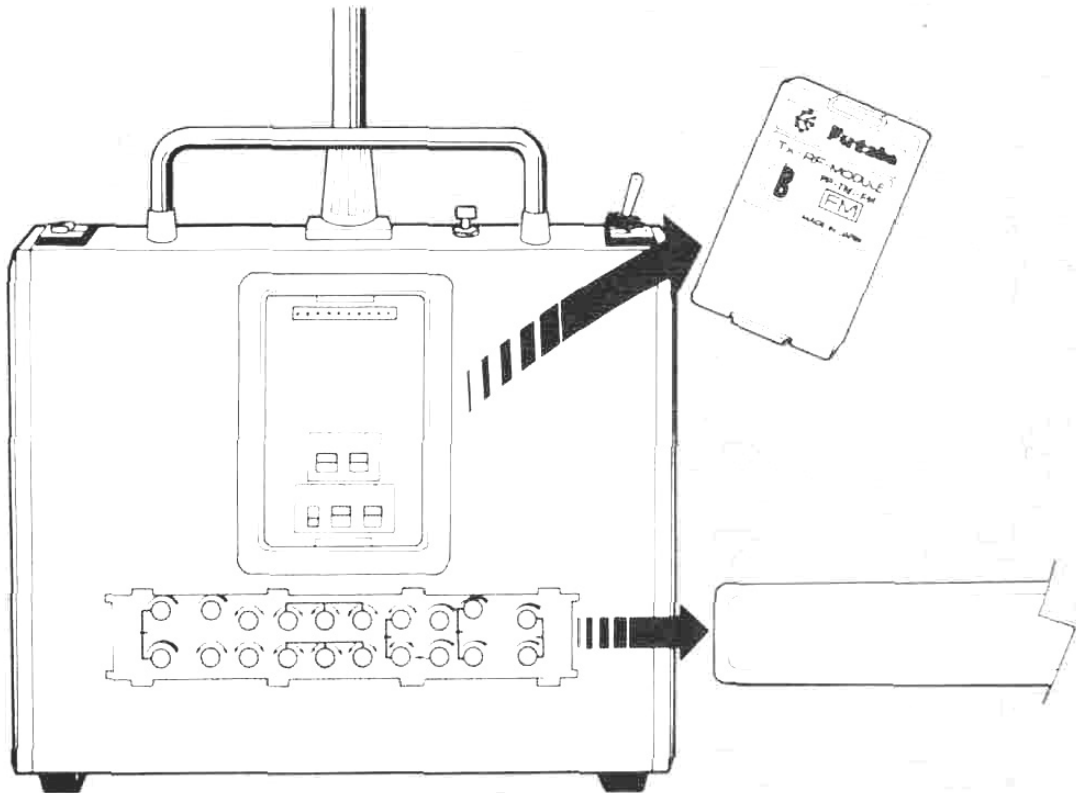


Fig. 2

Purpose of switches and trimmers in Fig. 2

- The numbers in circles represent the channel number. The channel numbers on the front of the transmitter correspond to the receiver connector output numbers.
- ① Aileron reverse switch
 - ① **NORM-REV** This switch reverses the direction of rotation of the aileron servo.
- ② Elevator reverse switch
 - ② **NORM-REV** This switch reverses the direction of operation of the elevator servo.
- ③ Throttle reverse switch
 - ③ **NORM-REV** This switch reverses the direction of operation of the throttle servo.
- ④ Rudder reverse switch
 - ④ **NORM-REV** This switch reverses the direction of operation of the rudder servo.
- ⑤ **ALT (Adjustable Limit Throttle)**
This switch selects whether the operating angle is varied at the HIGH side of the stick or the LOW side of the stick when the maximum operating angle of the servo is adjusted with the throttle trim. Normally use at the LOW side.
- ⑥ Aileron ATV (Adjustable Travel Volume) R
 - ① **AIL, ATV-R** This trimmer adjusts the aileron travel in the right direction when the aileron reverse switch is in the NORM position.
Travel is continuously variable from 50% to 100% of the total travel range.
- ⑦ Aileron ATVL
 - ① **AIL, ATV-L** This trimmer adjusts the aileron travel in the left direction when the aileron reverse switch is in the NORM position. Adjustment range is the same as that of ⑥ above.
- ⑧ Aileron dual trimmer
 - ① **AIL DUAL** This trimmer adjusts the aileron travel when the aileron dual rate is ON. (This trimmer is adjusted at kick down.)
Travel is continuously variable from 40% to 100% of the total travel range.

- ⑨ Throttle button trimmer
 ③ **THROT** The throttle servo is operated at the position set by this trimmer by pushing the throttle button.
 The total travel can be **set at throttle stick neutral position**.
- ⑩ Roll A button trimmer 1 **ROLL (A)**
- ⑪ Roll B button trimmer 1 **ROLL (B)**
 This trimmer sets the aileron travel when the roll button is pushed.
 The travel is variable over the entire travel range at aileron stick neutral.
- ⑫ Snap roll A button aileron trimmer
SNAP ROLL (A) 1 AIL
- ⑬ Snap roll B button aileron trimmer
SNAP ROLL (B) 1 AIL
 These trimmers set the aileron travel when the snap roll button is pushed.
 The travel can be varied over the entire travel range.
- ⑭ Snap roll A button elevator trimmer
SNAP ROLL(A) 2 ELEV
- ⑮ Snap roll B button elevator trimmer
SNAP ROLL(B-> 2 ELEV
 This trimmer sets the elevator travel in the same manner as trimmers ⑫ and ⑬
- ⑯ Snap roll A button rudder trimmer
SNAP ROLL(A) ④ RUD
- ⑰ Snap roll B button rudder trimmer
SNAP ROLL (B) ④ RUD
 These trimmers set the rudder travel in the same manner as trimmer ⑫ and ⑬
- ⑱ Elevator, flap MIX trimmer
MIX ② ELEV-> ⑥ FLAP
 This trimmer adjusts the amount of mixing from the elevator to the flap.
 The travel can be varied **over the entire travel range** at flap channel neutral.
- ⑲ Spoiler (channel 7), flap (channel 6) MIX trimmer
MIX ⑦ SPOIL-> ⑥ FLAP
 This trimmer adjusts the **amount of mixing** from the spoiler to the flap.
 Travel range is the same as that of trimmer ⑱
- ⑳ Elevator dual trimmer
 ⑦ **ELEV. DUAL**
 This trimmer adjusts the travel at elevator dual rate ON.
 The travel is continuously variable from 40% to 100% of the total travel range.
- ㉑ Channel 6 flap neutral trimmer
MIX ⑥ NEUTRAL
 This trimmer sets flap neutral at spoiler (channel 7) and flap (channel 6) mixing.
 Neutral adjustment is possible in all spoiler states.
- ㉒ Elevator ATV U trimmer
 ② **ELEV. ATV-U**
 This trimmer adjusts the elevator travel in the UP direction when the elevator reverse switch is in the NORM position. Adjustment range is the same as that of the aileron **ATV ⑥**.
- ㉓ Elevator ATV D trimmer
 ② **ELEV. ATV-D**
 This trimmer adjusts the elevator travel in the DOWN direction when the elevator reverse switch is in the NORM position. Adjustment range is the same as that of the aileron **ATV ⑥**.
- ㉔ Rudder ATV R trimmer
 ④ **RUD. ATV-R**
 This trimmer adjusts the rudder travel in the right direction when the rudder reverse switch is in the NORM position. Adjustment range is the same as that of aileron **ATV ⑥**.
- ㉕ Rudder ATV L trimmer
 ④ **RUD. ATV-L**
 This trimmer adjusts the rudder travel in left direction when the rudder reverse switch is in the NORM position. Adjustment range is the same as that of aileron **ATV ⑥**.
- ㉖ Transmitter module
 The frequency, frequency band and modulation method can be changed by changing this **module**. The method of changing this module is shown in Fig. 12.
- ㉗ Trimmer panel
 This panel is removed by sliding it in the direction of the OPEN arrow.

• USING THE TRANSMITTER

Before using the transmitter, charge the NiCd battery.

- Connect the DIN connector of the FBC-2L charger to the charging jack of the transmitter and the 3P connector to the receiver servo NiCd battery (NR-4H), and plug the charger into an AC110V outlet as shown in Fig. 3. The Tx, Rx charging indicator LED illuminate to indicate that the battery is being charged.

- The charging time is normally 15 hours. But if the battery has not be used for **some** time, charge it for about 20 hours. (If the battery is left in the discharged state for a long time, its capacity and life will be adversely affected.)

- The transmitter and receiver NiCd batteries can be charged simultaneously, or independently.

- The battery can usually be used about **10** times at a rate of about 10 minutes/time.

- Extend the antenna.

Pull the first stage of the antenna up and turn it counterclockwise until it locks as shown in Fig. 4.

- If the antenna is not locked, it will not be connected to the internal circuitry.

- The power switch is a lock type switch. When it is set to ON while pulling it forward, the level meter pointer will deflect, indicating the antenna output. The transmitter is OK if the pointer deflects to graduation 7 with the antenna extended fully.

The pointer indication is different when the antenna is contracted and when it is extended fully.

[The pointer indication will also be different when the antenna is grasped with your hand and when it is not grasped.]

When the antenna is contracted, the transmitter **does** not deliver an output even though the level meter pointer deflects. **DO NOT USE THE TRANSMITTER UNDER THIS STATE.**

- Push the battery check switch. The level meter pointer will indicate the battery voltage at this time. The battery is OK if the meter pointer deflects to within the green zone. If the pointer deflects to near the boundary between the green and red zones, recharge the battery.

- Using the D.S.C. function

The servos can be operated without transmitting by connecting the D.S.C. cord furnished with the set to the connector (Fig. 1 23) of the transmitter and the C terminal of the receiver. This allows adjustment of the aircraft while awaiting your turn to fly.

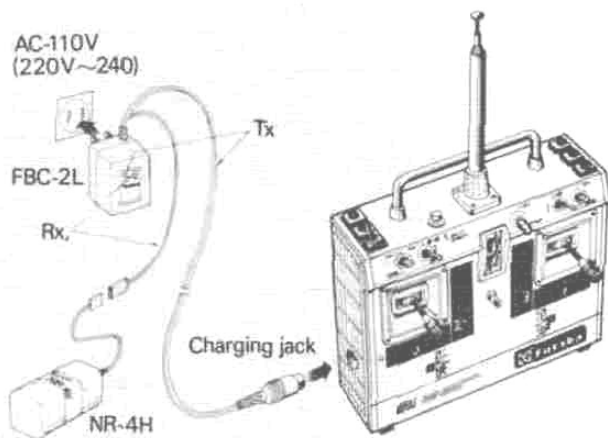


Fig. 3

Lock the antenna securely

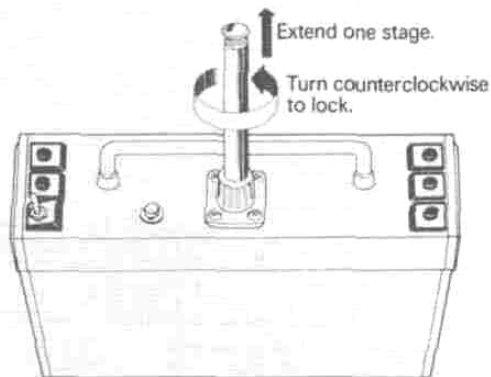


Fig. 4

(Use this function with the power switch of the transmitter set to the OFF position. Although the D.S.C. Function will be operative when the power switch is set to ON, it will be meaningless.)

- Using dual travel

(DR 1 —aileron, DR 2 —elevator)

When the dual travel switch is set to ON, the steering angle becomes small (within the range indicated by the hatched lines in Fig. 5). The steering angle can be varied from 40% (minimum) to 100% (maximum) of the total steering angle by adjusting the trimmer (1 AIL DUAL, 2 ELEV DUAL

on the trimmer panel for channel 8) next to the switch with a screwdriver. The dual switch should normally be set to OFF. However

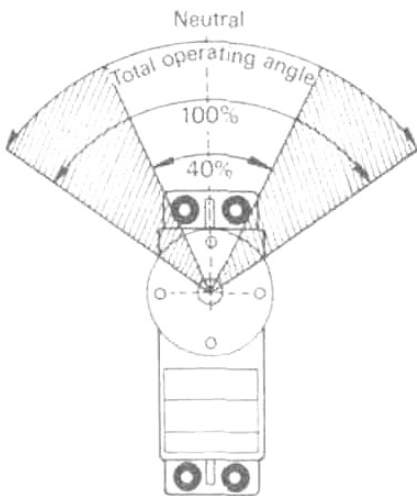


Fig. 5

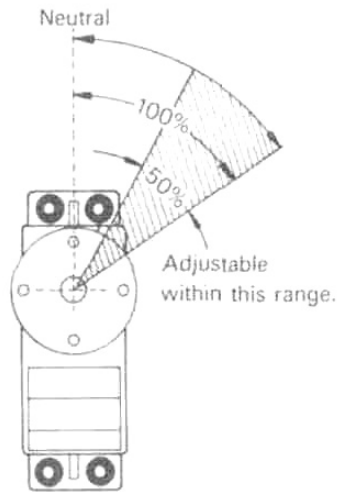


Fig. 6

when desiring to make the spin and other steering angles large, set it to ON and adjust the horn, adjusters, and trimmers for level flight.

When the dual travel switch is set to OFF, kick up is set, and the steering angle becomes large.

- Aileron, elevator, and rudder right and left (UP. DOWN) angle adjustment

[ATV (Adjustable Travel Volume)]

The aileron, elevator, and rudder steering angles can be made small within the range of the hatched lines in Fig. 6.

When the aileron right roll and left roll rates are different, they can be made the same by adjusting

the **6** ^R AIL-ATV and **7** ^L AIL-ATV trimmers of Fig. 2.

This also applies to the elevator and rudder. An elevator UP and DOWN difference can also be provided for easier flying.

The elevator ATV trimmers are

22 ^U **2** ELEV ATV **23** ^D **2** ELEV ATV of Fig. 2.

The rudder ATV trimmers are

24 ^R **4** RUD ATV **25** ^L **5** RUD ATV of Fig. 2.

- Elevator and flap mixing adjustment

Connect the flap servo to channel 6 of the receiver.

When the **9** MIX switch of Fig. 1 is set to **2** ⁶ , the elevator and flaps are mixed. Set the steering

18 ^F ELEV → **6**

point, linkage is extremely simple.

Dual travel is operative even at elevator and flap mixing.

Use the **6** CH6 flap trim lever of Fig. 1 to adjust the flap neutral position. Use this trimmer in the same manner as a trim lever (aileron trim and elevator trim).

Mixing is released when the MIX switch is set to the center position (• mark). The flap neutral position is not changed at this time.

(NOTE) Channel 6 is for the flaps, but can also be used as a spare channel. However, since the travel range is slightly narrow, adjust the linkage.

- Adjustment when mixing spoiler, etc. and flaps

(When using the flaps and spoiler as an air brake) Connect the flap servo to channel 6 of the receiver and the spoiler servo to channel 7.

When the **9** MIX switch of Fig. 1 is set to **7** ⁶ , the spoiler is mixed with the flaps. When the **7** CH7 switch of Fig. 1 is set to **4** ⁷ , the spoiler and flaps are operated simultaneously.

The amount of mixing at this time is adjusted with the **18** ⁷ SPOIL → FLAP trimmer of Fig. 2.

The direction and amount can also be set.

When the MIX switch is set from RELEASE (■) to **7** ⁶ , the flap neutral position may deviate.

If this occurs, adjust the **21** ⁶ NEUTRAL trimmer of Fig. 2 so that the flap neutral position does not change when the MIX switch is set to any position.

(NOTE) Always release ⑦ CH7 switch (spoiler) of Fig. 1 before releasing ⑨ MIX switch when releasing mixing.

If these switches are released in the reverse order, only the flaps will be released and the spoiler will remain open, placing the aircraft into an extremely dangerous state.

•Roll button A (Fig. 1 ⑫ **ROLL[A]**)

The ailerons can be stopped at an arbitrary position while this button is being pushed. This is used at slow roll, etc.

Adjust the steering angle with the ⑩ ① **ROLL(A)** trimmer of Fig. 2. Both right roll and left roll can be adjusted. Neutral adjustment is also possible. (At neutral the button has no effect even if pushed.)

•Roll button B (Fig. 1 ⑬ **ROLL[B]**)

This is the same as roll button A. Adjust the steering angle with the ⑪ ① **ROLL(B)** trimmer of Fig. 2. (Using roll button A for right roll and roll button B for left roll is extremely convenient.)

•Throttle button (Fig. 1 ⑭ **THROT**)

The throttle can be stopped at an arbitrary position while this button is being pushed at snap roll, etc. Adjust by setting the throttle stick to HIGH, and pushing the button.

Setting the engine to medium throttle with the ⑨ ③ **THROT** trimmer of Fig. 2 is perfect.

•Snap roll button A (Fig. 1 ⑮ **S.ROLL[A]**)

The aircraft can be placed into a snap roll by simply pushing this button.

The direction and amount of aileron, elevator, and rudder can be freely switched with the trimmer of Fig. 2.

Each servo can also be adjusted to neutral.

(At neutral the servos are not operated even if you push the button.)

•Snap roll B (Fig. 1 ⑯ **S.ROLL[B]**)

This is similar to snap roll A. The direction and amount of aileron, elevator, and rudder are set with the trimmer of Fig. 2.

Using snap roll button A for right snap roll and snap roll button B for left snap roll is extremely convenient. Adjust to match the aircraft.

The snap roll buttons may also be used as spin buttons.

•Using the aileron, elevator, throttle, and rudder reverses

(Devices which reverse the direction of operation of the servos)

There must be no play in the aircraft linkage direction.

The switches are built into the module case of the transmitter.

① Aileron ② Elevator ③ Throttle ④ Rudder

•Throttle ALT (Adjustable Limit Throttle) is a new mechanism that trims only the LOW side of the throttle control.

The trim lever is almost inoperative at the throttle stick HIGH side, but is operative at the throttle stick LOW side. The LOW side can be set to any desired position with the trim lever by setting the throttle rod at the engine HIGH side. This is very convenient because the HIGH side remains unchanged even when the trim lever is operated.

Always use with this switch set to the LOW side.

•The elevator trim lever is at the left side and the throttle trim lever is at the right side. The elevator trim lever has been placed at the left side because the right side (aileron, elevator) has priority in MODE II.

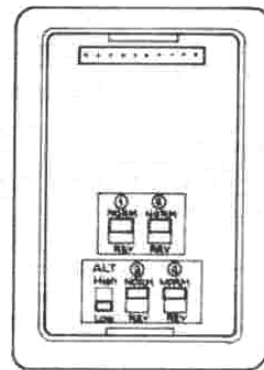
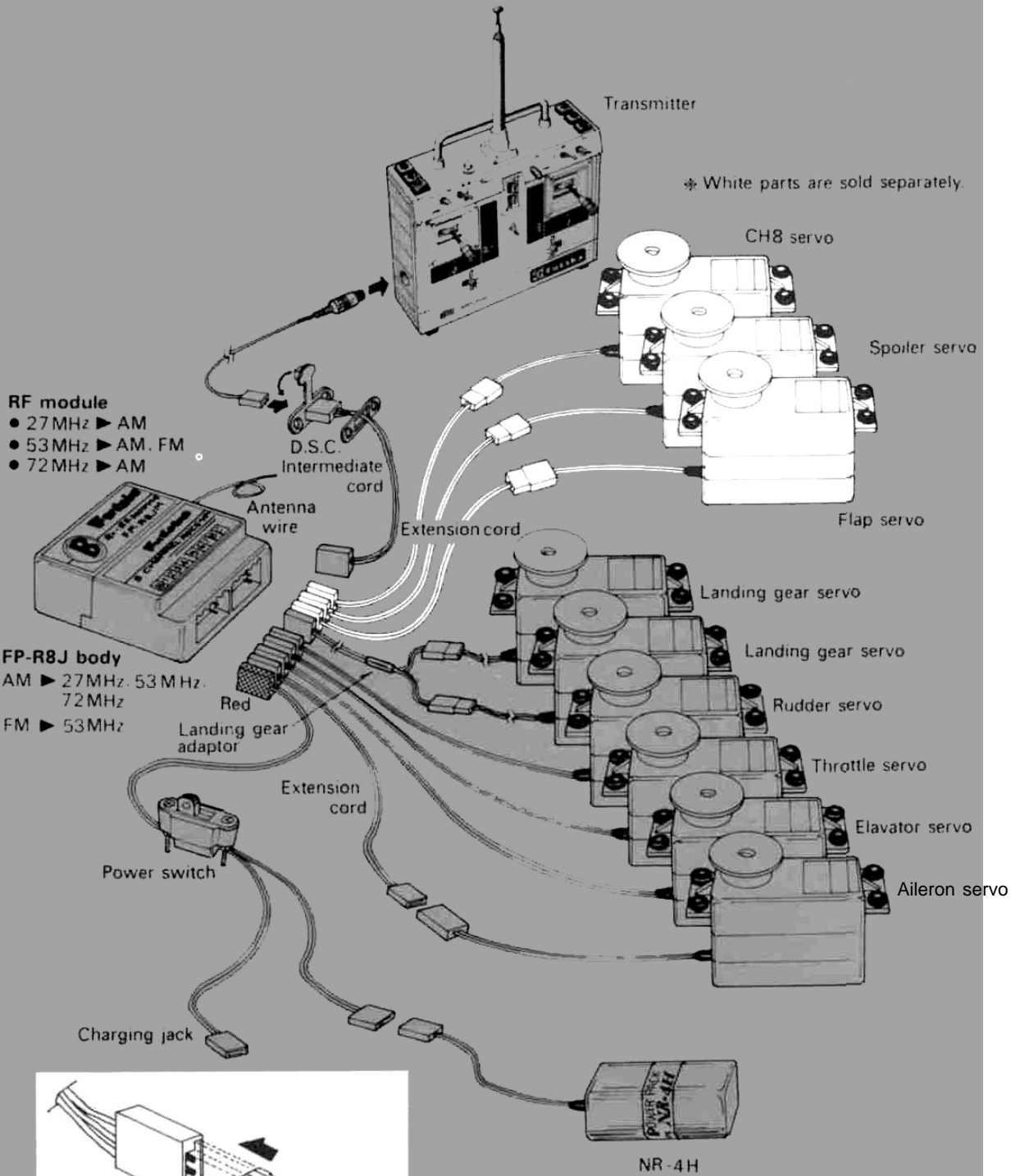


Fig. 7

(NOTE) The buttons should be set to neutral before you are completely familiar with the set. Use these buttons only after you have become completely familiar with the set.

• USING THE RECEIVER SERVOS



9

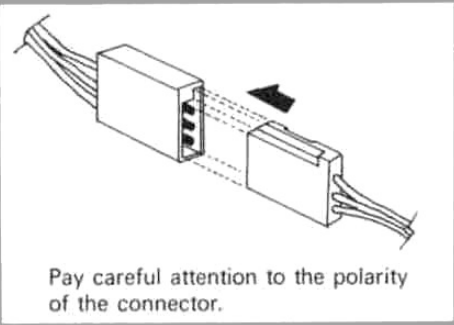
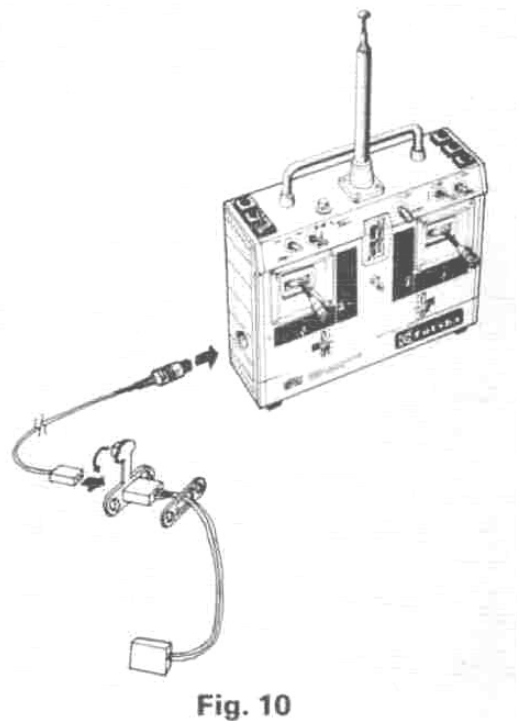
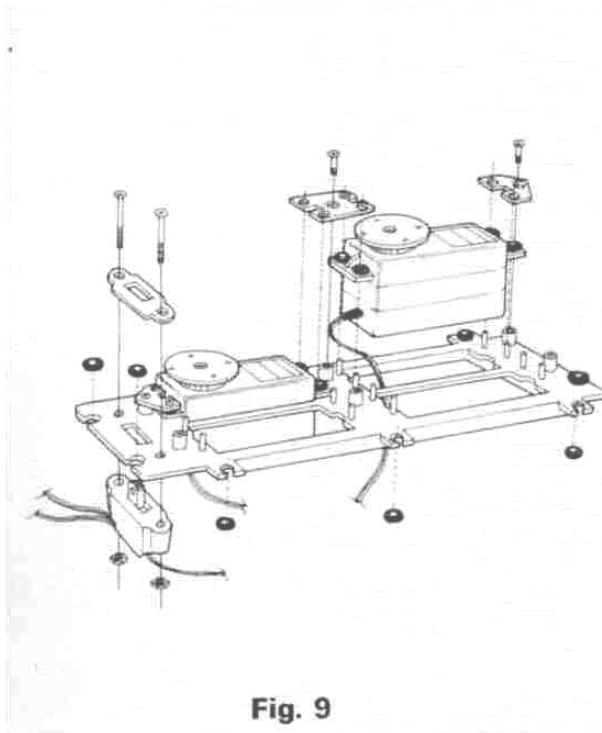
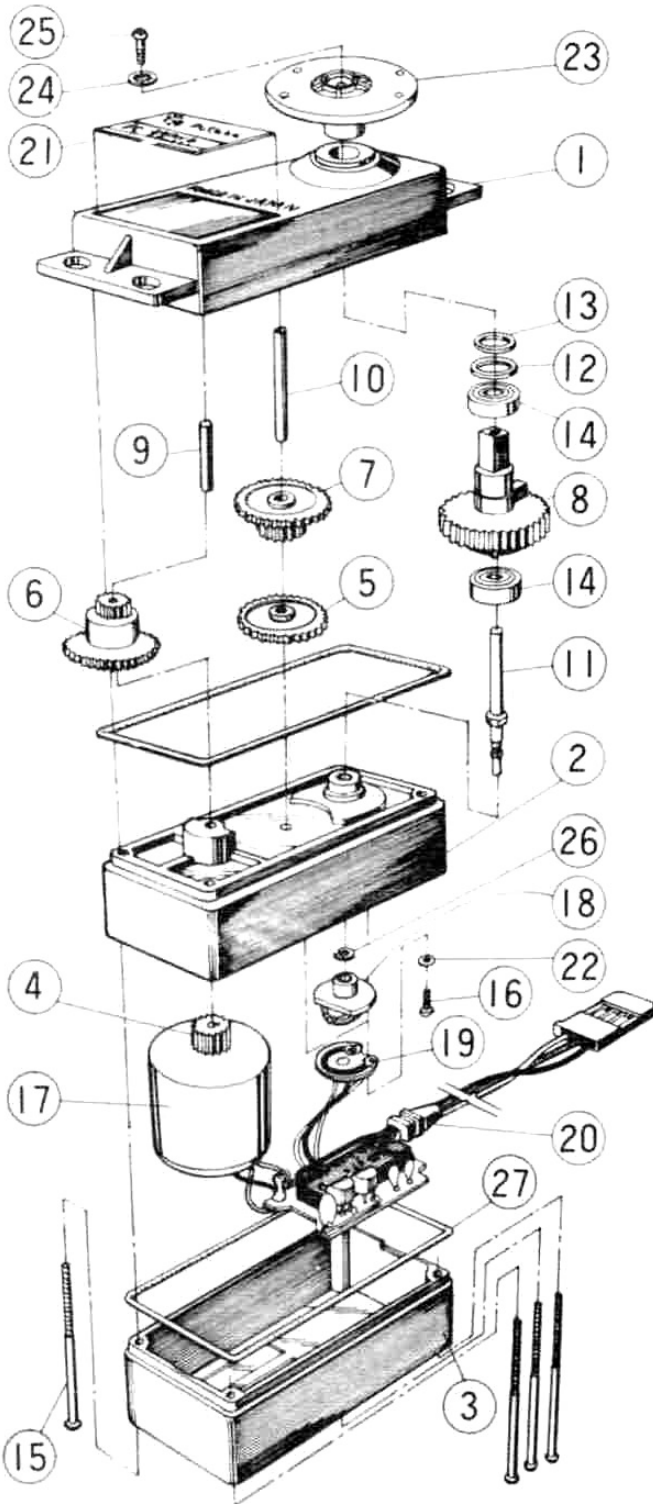


Fig. 8

- The receiver channel order is shown in Fig. 8. Stick the channel tabs furnished with the set to the servo lead wires for identification.
- Use an extension cord matched to the fuselage.
- Wrap the receiver in sponge and fasten to the fuselage with rubber bands.
- Install the receiver so that the antenna wire is as straight as possible.
- Mount the servo as shown in Fig. 9.
- Mount the servos so that the flexible wire, hinges, and other steering mechanisms operated smoothly.
Be especially careful when the steering angle is large.
- When mounting the landing gear servo, match the landing gear stroke and the landing gear servo horn stroke precisely so that pulling and pushing are neither excessive nor insufficient.
- Install the receiver servo NiCd battery (NR-4H) by wrapping it in sponge and attaching it to the fuselage with rubber bands, the same as the receiver.

- All the servos can be controlled from the receiver (direct servo control system) by applying the signals from the transmitter to terminal C of the receiver. In this case the transmitter current drain will drop to about 1/4 that when transmitting. Connect the intermediate cord with lug to terminal C and fastening it to the side of the fuselage as shown in Fig. 8 beforehand.
- All the servos, except the landing gear servo, are designed and manufactured to the same standards and can be used at any channel.
- Pay careful attention to noise.
This set is especially resistant to noise, but is not completely noise-free.
The use of noiseless parts is recommended.
- When used in seaplanes and boats, pay careful attention to waterproofing.
The servos are waterproof, but the receiver, connectors, and NiCd battery are not. Place these components in a vinyl bag and amply waterproof the entire mechanism chamber.





No.	Details	Quantity	Remarks
1	Upper case	1	
2	Middle case	1	
3	Bottom case	1	
4	Pinion motor	1	
5	1 st gear	1	
6	2nd gear	1	
7	3rd gear	1	
8	Final gear	1	
9	2nd shaft	1	
10	Intermediate shaft	1	
11	Output shaft	1	
12	Spacer washer	1	
13	Seal ring	1	
14	Radial ball bearing	2	
15	Pan head screw	4	M2x24
16	Truss screw	2	M2x5
17	Motor	1	16
18	Slider	1	
19	Volume	1	
20	Grommet	1	
21	Name plate	1	
22	Fiber washer	2	
23	Servo horn	1	
24	Toothed washer	1	M2
25	Phillips pan head screw	1	M2x5
26	E ring		
27	O ring		

Fig. 11

• MODULES

The frequency, frequency band, and modulation (AM, FM) of the J Module Series can be changed. The transmitting and receiving modules are available as a pair.

EXAMPLE 1. : Switching from 27.195MHz to 27.045MHz

Replace both the transmitting and receiving modules with the 27.045 MHz RF module.

EXAMPLE 2. : Switching from 27.145MHz to 72.080MHz

Replace both the transmitting and receiving modules with the 72.080 MHz RF module.

EXAMPLE 3. : Switching from 72.240MHz to 53.400MHz (AM)

Replace both the transmitting and receiving modules with the 53.400 MHz (AM) RF module.

EXAMPLE 4. : Switching from 72.080MHz to 53.200MHz (FM)

Replace both the transmitting and receiving modules with the 53.200 MHz (FM) RF module, and also replace the receiver with an FM receiver.

EXAMPLE 5. : Switching from 53.100MHz (FM) to 53.500MHz (AM)

Replace both the transmitting and receiving modules with the 53.500 MHz (AM) RF module, and replace the receiver with an AM receiver.

Futaba PROPORTIONAL FREQUENCIES

• 27 MHz Areas (AM only)

26.995MHz (Brown)
27.045MHz (Red)
27.095MHz (Orange)
27.145MHz (Yellow)
27.195MHz (Green)

• 53 MHz Areas (AM and FM)

53.100MHz (Brown/Black)
53.200MHz (Red/Black)
53.300MHz (Orange/Black)
53.400MHz (Yellow/Black)
53.500MHz (Green/Black)

This frequency requires an amateur operator license.

• 72 MHz Areas (AM only)

* 72.080MHz (Brown/White)
72.160MHz (Blue/White)
* 72.240MHz (Red/White)
72.320MHz (Violet/White)
* 72.400MHz (Orange/White)
72.960MHz (Yellow/White)
* 75.640MHz (Green/White)

Remarks: Mark* Model Aircraft use only.

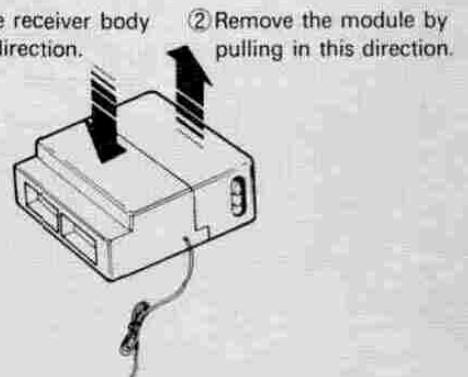
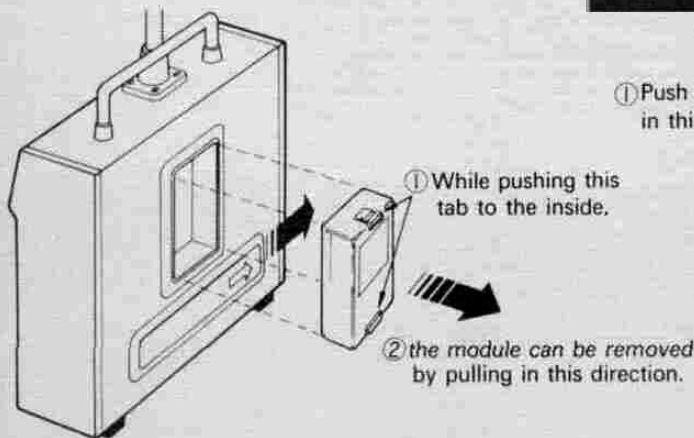


Fig. 12



GUARANTEE

Your NEW FUTABA Digital Proportional R/C system is guaranteed against defects in workmanship and material for 180 days from the date of purchase when the attached registration card is returned to us within ten days of purchase.

This Guarantee is null and void if the R/C system has been improperly handled, damaged in a crash, or tampered with and does not cover the replacement of plastic housings or electronic components damaged due to the use of improper voltages.

When service is required, please take your equipment to your local authorized service station or ship it directly to us. All postage, shipping, and insurance charges must be paid by the user.

This guarantee only applies to the continental U.S.A., Hawaii, and Alaska.

FACTORY REPAIR SERVICE

To insure prompt service, please follow the instructions given below.

1. Charge the batteries for at least 18 hours prior to shipment.
2. Return the system only. Not your complete installation. Remove the servos from their mounts and remove the foam padding from the receiver.
3. Plugs or other modifications which interfere with factory test procedures will be returned to factory standard at your expense.
4. Carefully pack all components individually, using sufficient packing material to prevent damage during shipment.
5. Include a brief but thorough explanation of all problems and service required and tape it to the back of the transmitter. Place a label describing the functions of the servo on each servo.
6. Be sure to include your full address and zip code inside the box as well as on the outside.
7. Include a packing list of all items being returned, and double check to make sure that all items are packed.
8. Upon receipt of damaged equipment at the FUTABA factory, an estimate of the cost of repair will be sent to you. Your equipment will then be repaired and returned to you upon receipt of payment.

This factory repair service applies only to the continental U.S.A., Hawaii, and Alaska.



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