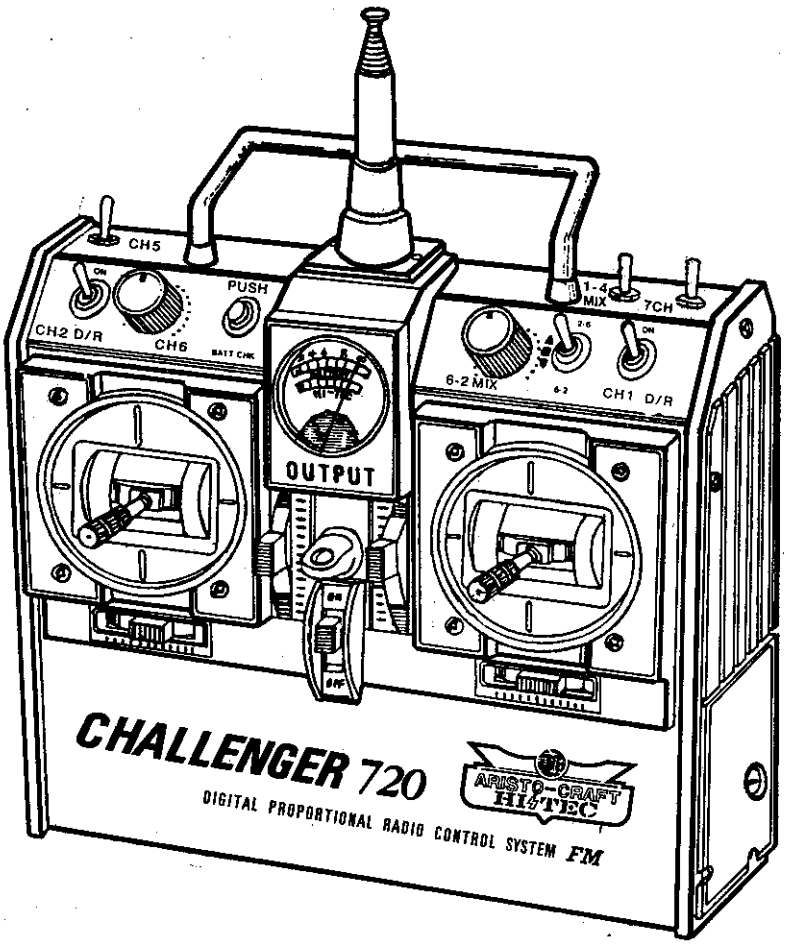
CHALLENGER 420 620 720

FM-Superheterodyne & Digital Proportional

OPERATION MANUAL 4,6, & 7 CHANNEL FM



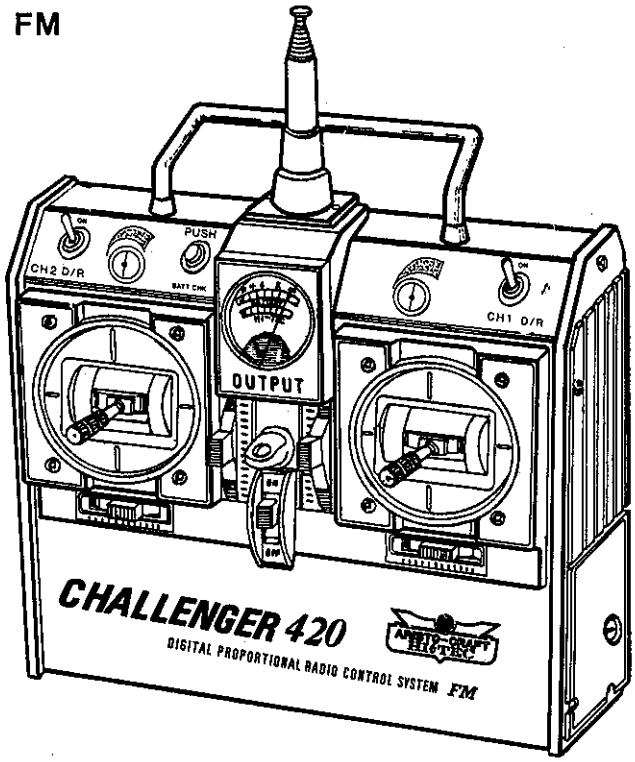
ARISTOCRAFT-HITEC

The ARISTOCRAFT-HITEC CHALLENGER is the latest technological development all solid-state radio control system with modern circuit design and high reliability components. Spend a little time learning about your CHALLENGER from this manual and you will enjoy many years of dependable control.

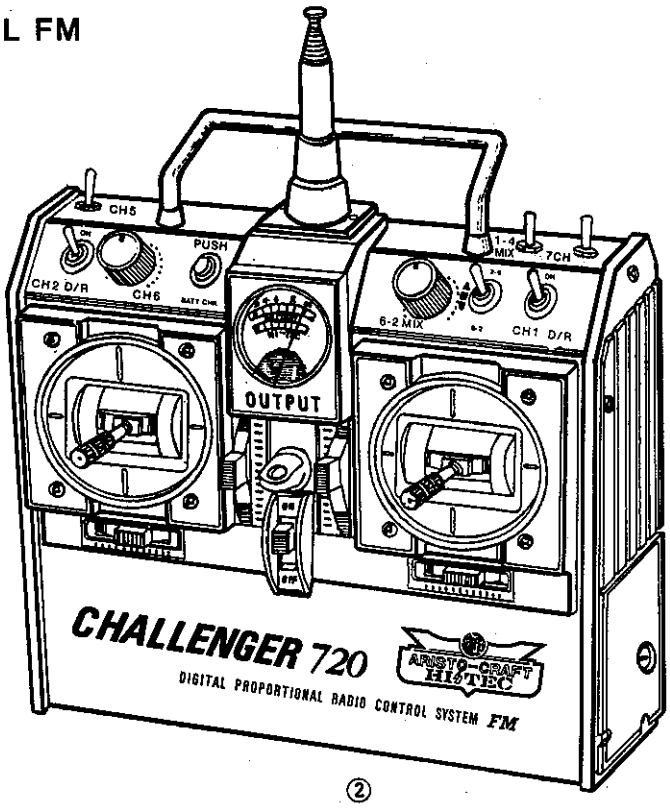
1. CONTENTS

2. CHALLENGER SERIES

4 CHANNEL FM



7 CHANNEL FM



3. FEATURES

The CHALLENGER series 4, 6, 7 channel FM digital proportional radio control systems feature a deluxe transmitter specially designed for greater operability, smooth operating sticks, and function modules system dreamed about by enthusiasts.

TRANSMITTER

- Specially designed case for ease of operation
- New accurate smooth operating control stick design
- Control stick length and tension adjustment for best control stick feel
- Travel of the throtte control stick is adjustable
- Easy access servo reversing switches
- Aileron and elevator dual rate
- Extended transmitter range
- High efficiency 10 section telescopic antenna
- Elevator flap mixing(6,7 CHANNEL ONLY)
- Rudder aileron mixing
- RF power out-put meter
- Battery check button
- Neck strap connector
- Charger connector for optional Ni-cad
- Specially designed battery case accepts alkaline or optional Ni-cad
- Quick change frequency module
- Electronic trim adjustments

RECEIVER

- Dual conversion
- Narrow band width for 1991 standard
- Dual gate FET RF amplifier
- Squelch circuit
- Voltage regulation
- Locking type connectors

SERVO HS-402

- Indirect drive for gear train protection
- Water resistant
- High Impact case
- Output torque: 42 oz/inch(3kg/cm)

4. CONTENTS AND RATINGS

TRANSMITTER 4 CH

Operating system	2 stick system
Transmitting frequency	72MHz
Module change system	precision module that permits frequency change within the same band.
Modulation system	FM (frequency modulation)
Power supply	9.6V~10.8V (8 or 9 Ni-CAD batteries)
Current drain	150mA (13.5) –130mA (10.8)

TRANSMITTER 7 CH

Same as the 4 CH plus elevator-flap mixing function.
Elevator-down mixing function.

RECEIVER

Receiving frequency	72MHz.
Crystal change system	Precision crystal that permits frequency change within the same band.
Intermediate frequency	455kHz, 10.7MHz
Power supply	4.8V (4 NiCd battery) AA size
Current drain	15mA
Dimensions	60×44×23mm(2.4″×1.7″×0.9″)
Weight	50g (1.8 oz)
Receiving range	1,500 ft on the ground, 3,000 ft or greater in the air

SERVO

Control system	+pulse width control (1550μS/N)
Operating angle	One side 45° or more (including trim)
Power supply	4.8V (4 NiCd) or 6V (4 alkaline battery) AA size.
Current drain	8 mA at 6.0V (stopped)
Output torque	3 kg-cm (max)
Operating speed	0.24 sec 60°
Dimensions	52×20×48mm (2″×0.8″×1.9″)
Weight	45g (1.6 oz)

5. 4CH TRANSMITTER FUNCTION

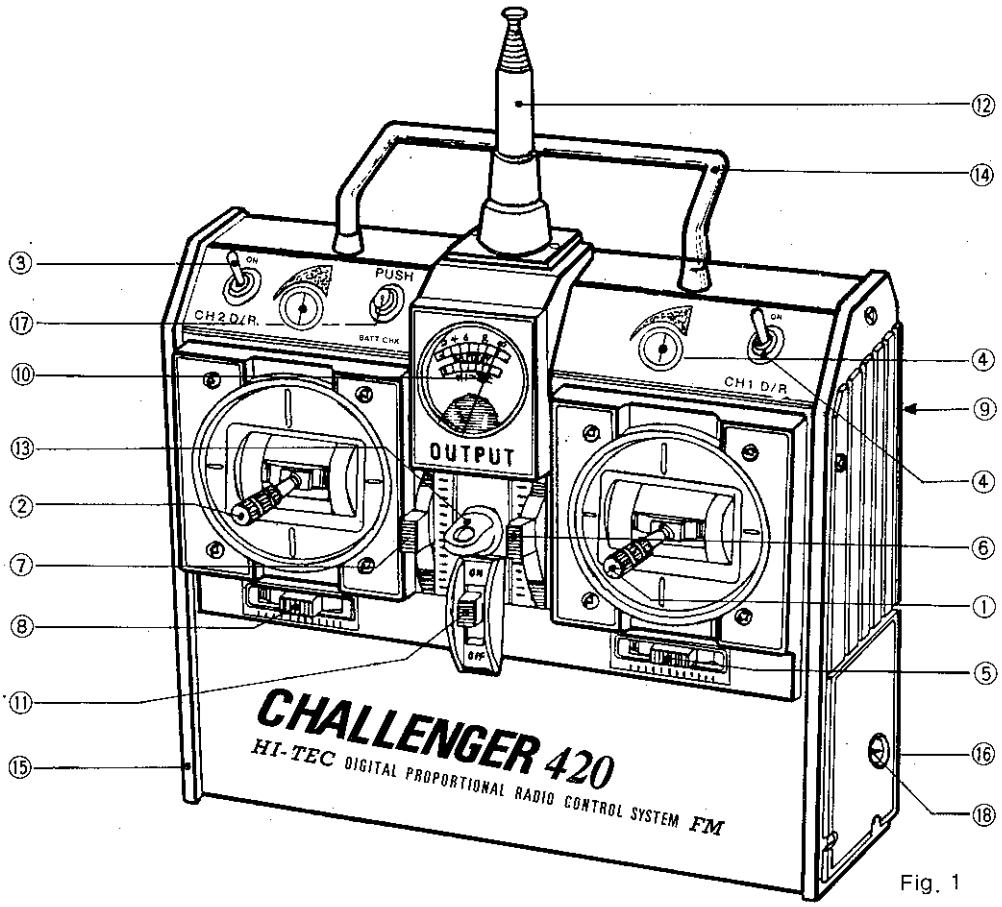


Fig. 1

Description of Fig. 1

1. Aileron /Elevator stick
2. Throttle/Rudder stick
3. Elevator dual rate (kick-up, kick-down) switch and trimmer
   Arbitrarily sets the elevator rudder angle. Rudder angle is normal when this switch is off and can be set within the 40—100% range when it is on.
4. Aileron dual rate (kick-up and kick-down & trimmer)
   The aileron rudder angle can be arbitrarily set. When the switch is OFF, the rudder angle is normal and when it is ON, the rudder angle is set with the trimmer. Rudder angle adjustment range 40-100%.
5. Aileron trim
6. Elevator trim
7. Throttle trim
8. Rudder trim
9. Transmitter module (back side)
10. Round level meter
11. Power Switch
12. Rod antenna
13. Neck-strap connector
14. Handle
15. Body
16. Reverse Switch (Back Side)

    Contains in the transmitter inside on the P.C.Board lower side.
17. Battery Check Switch.
18. Recharge Jack
    "Power switch should be off before recharge"
    ⊕ ····· ⊙ ····· ⊖ DC 12V.

6. 7CH TRANSMITTER FUNCTION

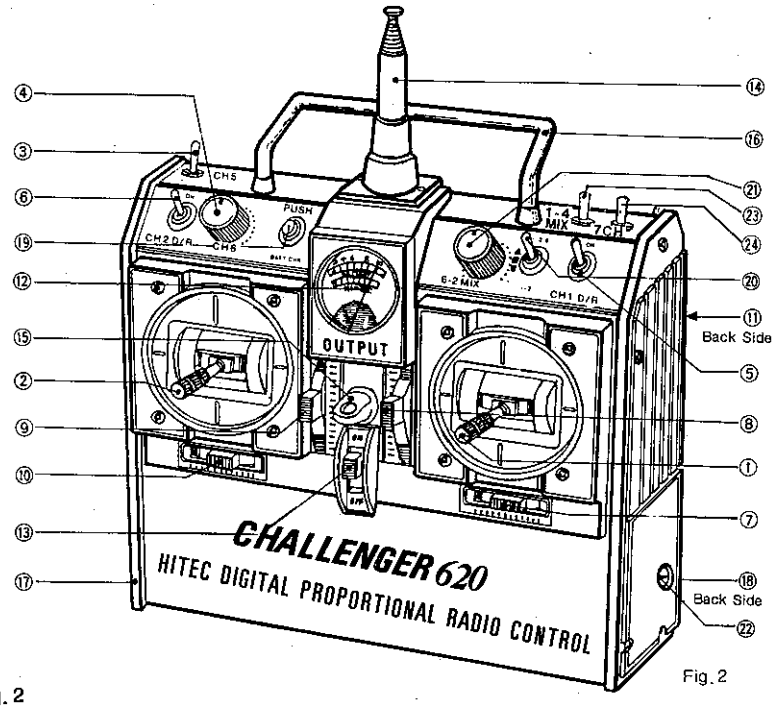


Fig. 2

Description of Fig. 2

1. Aileron/Elevator Stick
2. Throttle/Rudder Stick
3. Landing gear switch
   Used to lower and retract the landing gear with a landing gear servo. Also used as the gyro output selector switch for the 6 CH and 7 CH.
4. Flap (pitch) Knob
   Used as the flap or spare channel (CH6). Equipped with a 41-click ratchet. Sets the elevator to flap (CH6) mixing amount and direction when the elevator-flap mixing switch is "ON". Mixing amount range is 0~100%
5. Aileron dual rate (kick-up and kick-down & trimmer) ON/OFF switch.
   The aileron rudder range can be arbitrarily set. When the switch is OFF, the rudder angle is normal and when it is ON, the rudder angle is set with the trimmer. Rudder angle adjustment range 40-100%. Dual-rate trimmer is contained in the back panel.
6. Elevator dual rate (kick-up, kick-down) switch and trimmer
   Arbitrarily sets the elevator rudder angle. Rudder angle is normal when this switch is off and can be set within the 40-100% range when it is ON. Elevator dual rate trimmer is also located in the back panel.
7. Aileron trimmer
8. Elevator trimmer
9. Throttle trimmer
10. Rudder trimmer.
11. Transmitter module (Back Side)
12. Round level meter/battery meter
    Indicates the transmitter power supply voltage and out-put (power meter)
13. Power switch
14. Rod antenna
    High radiation efficiency 1190mm locakable antenna.
15. Neck-strap connector
16. Handle
17. Body
18. Reverse switch (Back Side)
    Located in the back panel lower right.
19. Battery Check Switch
20. FLAP (6CH) Knob (Elevator Flap Mixing ON OFF ON Switch)
    Ratchet knob that sets the elevator to flap mixing amount and direction when the elevator-down mixing switch in ON
21. Elevator Trim down mixing knob
    Sets the flaps (CH6) to elevator mixing amount and direction when the elevator-down mixing switch is ON.
22. Recharge Jack
23. 1 ⟷ 4 Mixing switch
    In some sets, may be located in back panel.
24. Channel 7

7. CHANGE OF FREQUENCY (MODULE CHANGE SYSTEM)

If you want to change frequency due to interference or other reasons, please change the module with different frequency. Also, do not forget to change the matching crystal in the receiver as well as the color flag.

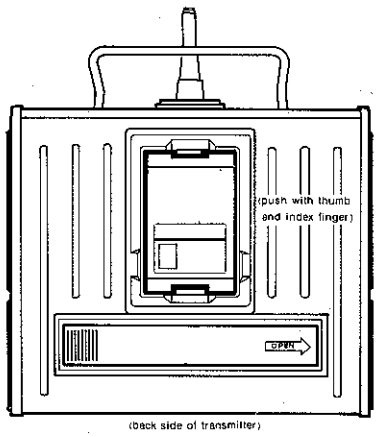


Fig. 3

8. SERVO REVERSE SWITCHES AND BACK PANEL

①CHANNEL 1 dual-rate trimmer: turn the aileron D/R switch in front to "ON". Now you can adjust the aileron rudder angle 40~100%.
②CHANNEL 2 dual-rate trimmer: turn the elevator D/R switch in front to "ON". Now you can adjust the aileron rudder angle 40~100%.
③Aileron-rudder mixing ON/OFF switch: turn "ON". When you need clean performance and improved characteristics.
④Elevator-flap mixing trimmer: turn the elevator-flap mixing switch to top position, then adjust mixing amount.
⑤Flap volume: turn the elevator-flap mixing switch in front(3 position toggle switch) to "OFF" then adjust flap volume
⑥The normal position of all the switches inside the transmitter on the P.C. board is in the transmitter lower side.
- The servo reverse switches reverse the direction of operation of the servo.

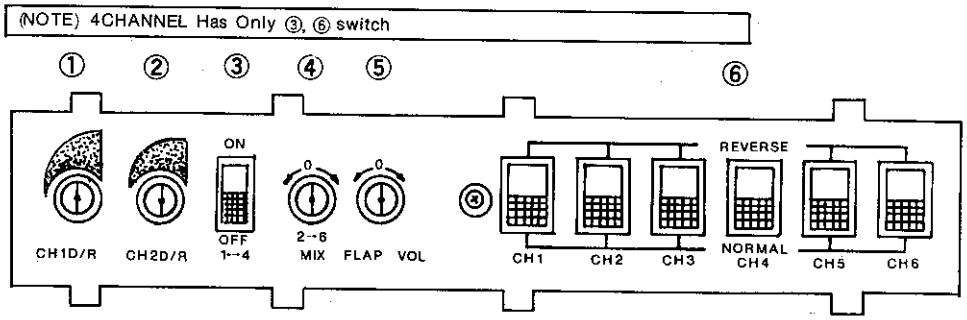
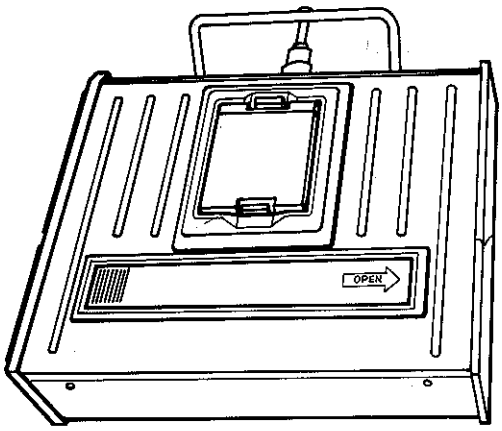


Fig. 4

- ③1 ⟷ 4 Mixing switch
  In some sets, may be located in front panel.



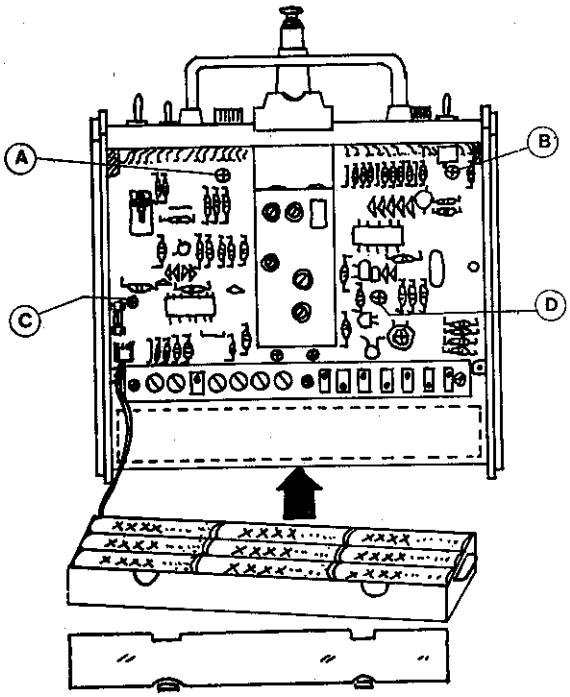
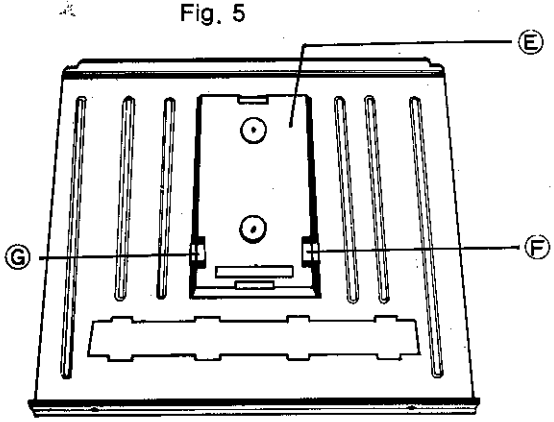


Fig. 5



(1) Remove module

(2) Remove 2 screws

(3) Hold side cover with both hands and push back cover bottom with your thumb and remove cover.

(4) Load batteries in the battery box paying careful attention to their polarity.

(5) Extend the antenna fully and set the power switch to "ON". The meter pointer should deflect to the green zone, when battery check button is pressed.

(6) Be sure to change the batteries or recharge them when pointer drops to the boundary between the red and green zones.

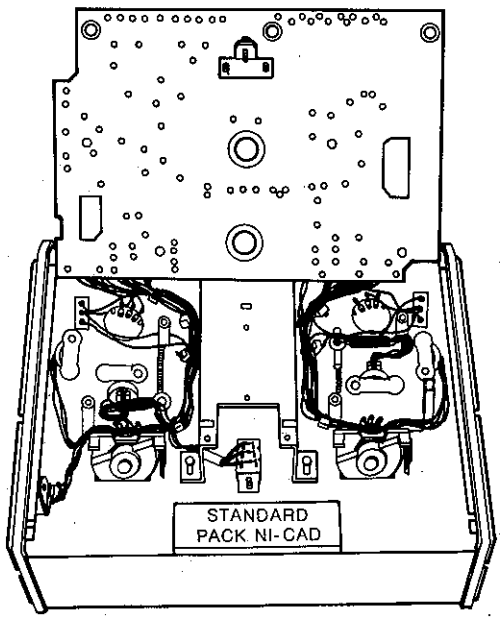
(7) The power supply is 9 penlight type alkaline batteries (13.5v). It can be changed to an optional Ni-cad battery pack sold seperately.

(8) Slim type Ni-cad battery can be inserted in place of 9 alkaline batteries, using the same plastic battery box provided.

(9) In case you have the standard pack Ni-cads you want to use, remove back cover, remove antenna then unscrew P.C.board and flip open P.C.board. Wrap Ni-cads tightly with both-way tape and firmly attach to inside wall and bottom. Replace cover and module. (remove screw Ⓐ Ⓑ Ⓒ Ⓓ to lift p.c. board)

(Caution)

When replacing the back-cover, first remove the module receptacle plastic (Ⓔ) by depressing points Ⓕ and Ⓖ. Then replace metal back cover, push in receptacle Ⓔ back and replace 2 screws. The precaution taken to remove Ⓔ first is to un-harm module pins.



10. STICK MECHANISM AND ITS ADJUSTMENT

- The new gimbal is open and has only been used in the most expensive radio control sets. It also has the first built-in tension adjustment mechanism of any open gimbal. The tension of the spring can be adjusted for best feel.
- CP-variable resistor improves the neutral characteristics and resolution tremendously.
- All molded parts are made of high-grade polycarbonate that is unaffected by temperature and humidity.

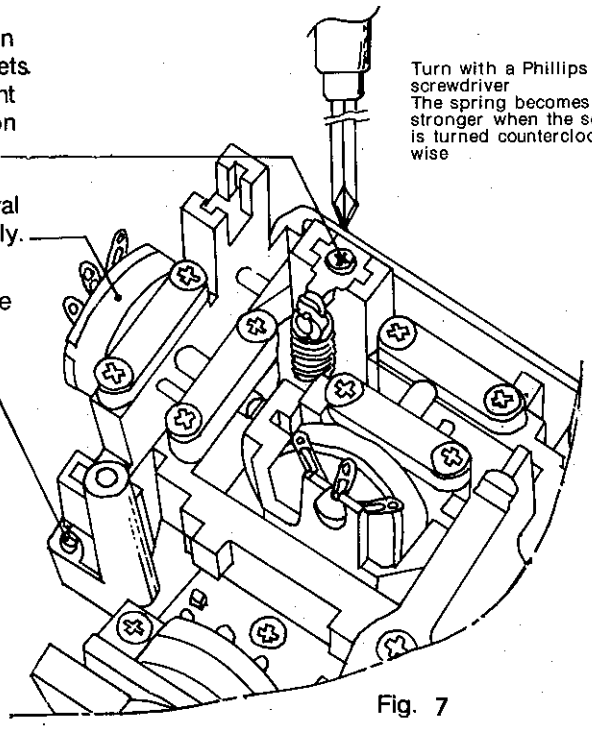


Fig. 7

Remove the transmitter rear cover and open the P.C. Board.

- The length of the nonslip adjustable lever head can be adjusted for easiest operation.

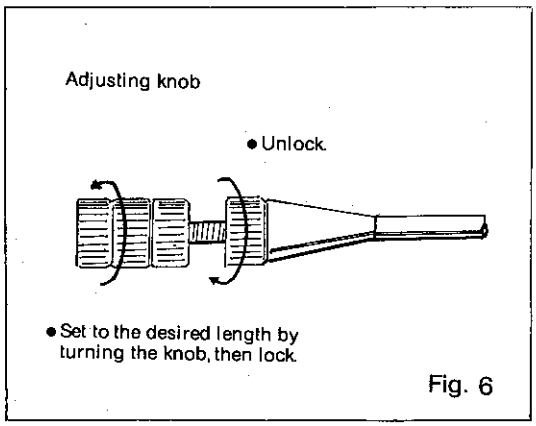


Fig. 6

- The trim lever is used to fine adjust each control surface. It is also used for neutral and flying posture adjustment after the mechanism has been mounted. However, after flight tests, set the trim lever to the neutral position and make any corrections with the rod adjuster, etc.

11. AILERON AND ELEVATOR DUAL RATE (KICK-UP, KICK-DOWN) ADJUSTMENT

When the dual rate switch is set to ON, the rudder angle can be made smaller within the range of the hatched lines in Fig. 8. The rudder angle can be set to maximum, full operating angle 100%, and minimum 40% by adjusting the trimmer in the back panel with a screwdriver. The dual rate switch should normally be OFF. However, when desired to make the rudder angle smaller for spins, etc., set the switch to ON and adjust the horn adjuster, and trimmer for level flight.
When the dual rate switch is set to OFF, kick-up is applied and the rudder angle becomes larger.

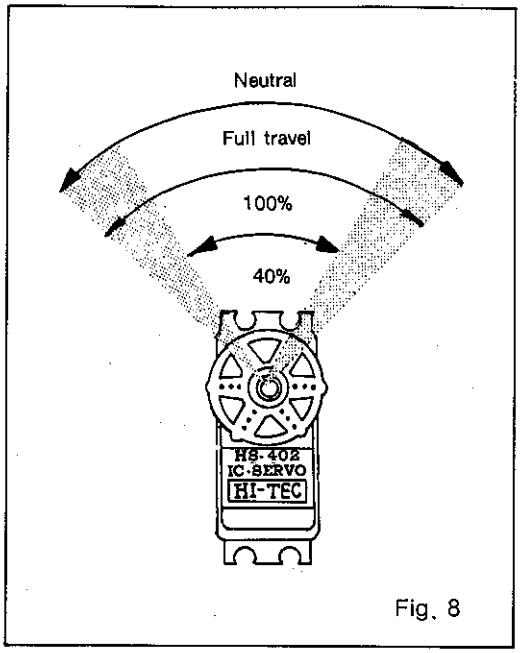


Fig. 8

12. CHARGING THE NiCd BATTERY

- Insert 4Ni-cad batteries (4.8V) into battery case & connect extra jack to charger into 110V AC outlet as shown on Fig. 9.
- Always charge the battery before use.
- The charging time is usually about 15hours. When the battery has not been used for some time, charge it 2 to 3times before use. (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 ni-cad batteries can be charged individually or simultaneously.
- Recharge batteries are not included in our model.

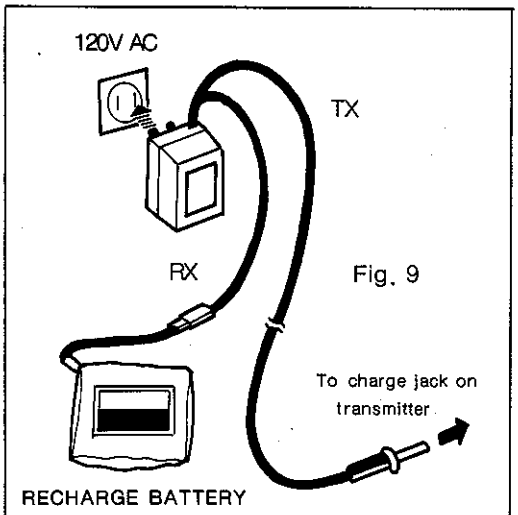


Fig. 9

Power Switch should be off before recharge.
Fasten with rubber band

13. RECEIVER, SERVO, SWITCHES, AND NiCd BATTERY CONNECTIONS AND USAGE PRECAUTIONS

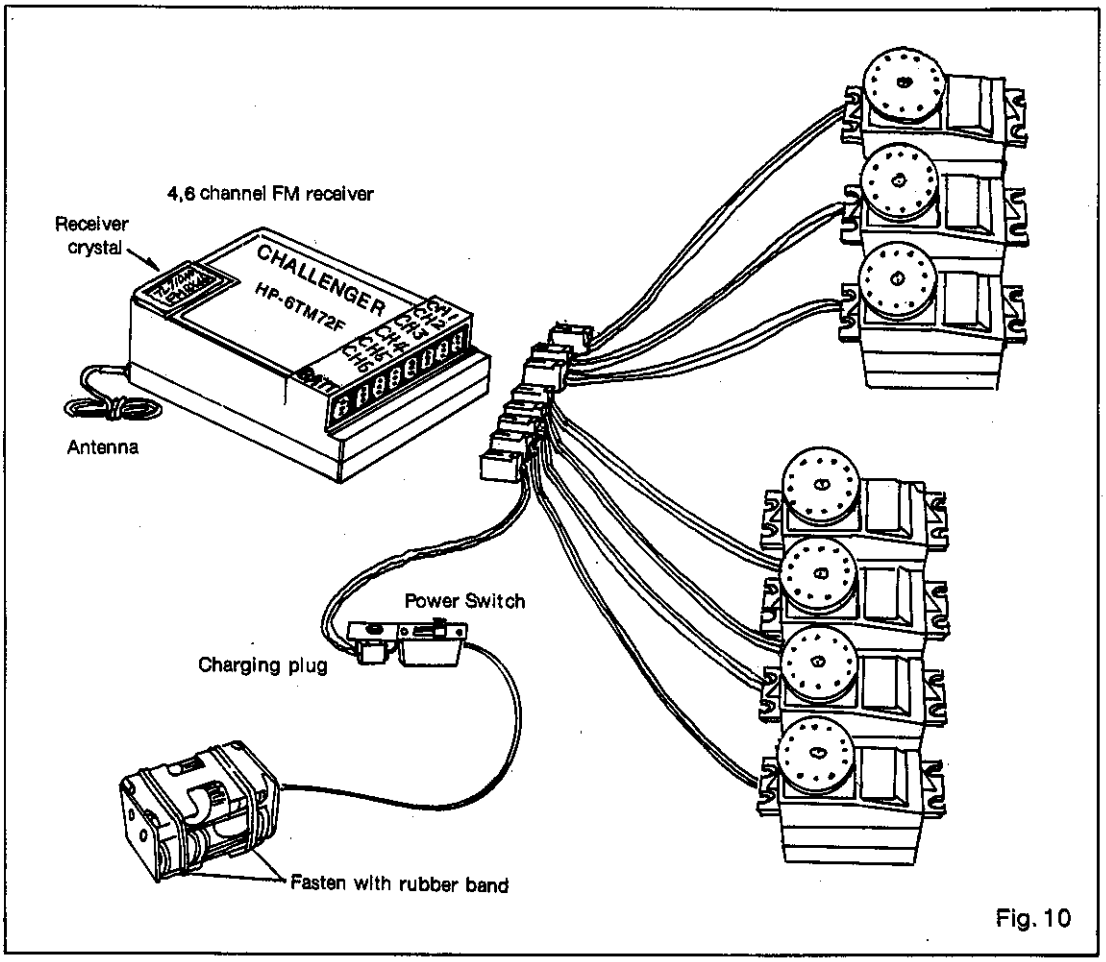


Fig. 10

- Connect the servos and switches firmly as shownin Fig. 10. Then extend the transmitter and receiver antennas fully.
- Set the transmitter power switch to ON, then set the receiver power switch to ON. The servos stop near the neutral position. Operate the transmitter sticks and check if the corresponding servos faithfully follow operation of the sticks.
- After setting the pushrods at the servo horns, check that the direction of operation of the transmitter sticks and the direction of operation of the rudders are the same.
- Operate each servo over its entire operating range and check if pushrods bind, or are too loose.
  Applying unreasonable force to the servo horn will adversely affect the servo and quickly drain the batteries. Always make the operating width of each rudder somewhat larger than the full stroke (including trim) of the servo horn. Adjust the servo horns so that they operate smoothly even when the trim lever and stick lever are operated simultaneously in the same direction.
- Warning : Never attempt to replace frequency Module module and/or open back cover with power switch turned "ON".

- Be alert for noise.
  If engine vibration causes metal parts touch, noise will be produced and the receiver and servos may operate incorrectly. We recommend the use of noiseless parts.
- When installing the switch, cut a rectangular hole somewhat larger than the full stroke of the switch and install the switch so it moves smoothly from ON to OFF.
- Even though the receiver antenna is long, do not cut or bundle it.
- Spare horns are supplied. Use them as needed.
- Wrap the receiver in sponge rubber. Place the receiver in a plastic bag and wrap a rubber band around the open end of the bag to waterproof and dustproof the receiver. Do the same with the receiver/servo battery.
- Use the rubber bands wrapped around the receiver to hold the servo and switch leads.
- After mounting is complete, recheck each part, then make the transmitter antenna as short as possible, extend the receiver antenna fully, and operate the set from a distance of 60 to 90 ft. The movement of each rudder(servo) should faithfully follow the operation of each stick of the transmitter.

14. CHALLENGER DIGITAL PROPOTIONAL FREQUENCY (FOR U.S.A)

- The frequency of CHALLENGER digital proportional set can be changed among bands (1)~(6) on the 27 MHz band only.
- However, a 27 MHz band set cannot be changed to 72 MHz band, and vice versa.
- Therefore, always attach the correct frequency flag to the end of the transmitter antenna. Each frequency band has its own designated color, as stated above. The frequency flag is intended for identification purposes.
- Also change the frequency flag when frequency is changed.
- CHALLENGER paired crystals are precisely matched. Always use a CHALLENGER crystal set(transmitter, receiver) when changing the frequency.
- If is illegal to change crystals of transmitter on the 72-75 MHz bands in the U.S.A.

FOR OTHER MARKETS, FOLLOWING FREQUENCIES ARE AVAILABLE.

	AM	FM
27MHz Band	×	○
29MHz Band	×	○
25MHz Band	×	○
40MHz Band	×	○
53/60MHz Band	×	○
72/75MHz Band	×	○

The authorized frequencies in each countries are as follow:
England ·····27 & 35 MHz AM and FM
Sweden ·····27 & 35 MHz AM and FM
Scandinavian countries ·····27, 35, and 40 MHz AM/FM
Australia ·····29MHz

Frequency	Channel No.	Flag Color
26-27MHz Aircraft /Car/Boat		
26.995	—	Brown
27.045	—	Red
27.095	—	Orange
27.145	—	Yellow
27.195	—	Green
27.255	—	Blue
72-75MHz Aircraft only shared		
72.030	12.	Brown-Red
72.080	—	White-Brown
72.160	—	White-Blue
72.240	—	White-Red
72.320	—	White-Purple
72.400	—	White-Orange
72.550	38	Orange-Grey
72.590	40	Yellow-Black
72.630	42	Yellow-Red
72.670	44	Yellow-Yellow
72.710	46	Yellow-Blue
72.750	48	Yellow-Grey
72.790	50	Green-Black
72.830	52	Green-Red
72.870	54	Green-Yellow
72.910	56	Green-Blue
72.960	–	White-Yellow
76.640	–	White-Green
75MHz Car/Boat only		
75.430	62	Blue-Red
75.470	64	Blue-Yellow
75.510	66	Blue-Blue
75.550	68	Blue-Grey
75.590	70	Purple-Black
75.670	74	Purple-Yellow
75.710	76	Purple-Blue
75.750	78	Purple-Grey
75.790	80	Grey-Black
75.830	82	Grey-Red
75.870	84	Grey-Yellow
53MHz Aircraft/Car/Boat FCC Amateur License Required		
52.100	–	Black-Brown
53.200	–	Black-Red
53.300	–	Black-Orange
53.400	–	Black-Yellow
53.500	–	Black-Green
53.600	–	Black-Blue
53.700	–	Black-purple not generally in use
63.800	–	Black-Grey

15. SERVICING

Should your CHALLENGER R/C system require warranty service;

1. Return system only, not your complete installation. Remove padding from receiver and battery case. Remove servos from their mounts or trays.
2. Return system in its original box, if this is not possible pack your system carefully in a strong cardboard container, fully insured and prepaid. ARISTOCRAFT-HITEC is not responsible for any damages or loss incurred during shipping.
3. Include a brief, but thorough, explanation of the problems and servicing required.
4. Be sure to include your name, address, zip code and telephone number.
5. Include your check or money order, payable to ARISTOCRAFT-HITEC, in the amount of $15.00 to cover the cost of handling and return shipping charges. If your system is out of warranty, we will notify you of repair costs before proceeding with any repairs.
6. Send your system to:

ARISTOCRAFT-HITEC
346 Bergen Avenue
Jersey City, NJ 07304

LIMITED WARRANTY

Your new CHALLENGER R/C system is warranted for 180 days(6 months) from the date of purchase against defects in workmanship and material.
This warranty is void and does not aply to any unit of the system and/or parts and components thereof which has been improperly installed, abused, damaged in a crash, modified or repaired by unauthorized service centers and/or technicians. Batteries, plastic enclosures and/or parts thereof are not covered by warranty.

WARRANTY REGISTRATION:

please follow the following Warranty procedure to be sure your CHALLENGER R/C system is registered and covered for warranted service:

1. Fill out warranty card completely and return to ARISTOCRAFT-HITEC within 10 days of purchase date.

ARISTOCRAFT-HITEC

PRINTED IN KOREA

Part No: 851030