The R/Cer's Partner

OPERATION MANUAL

2 MODEL 3 MIXING EASY ACCESS
4/5 CHANNEL PROGRAMMABLE
RADIO CONTROL SYSTEM

Flash

hitec

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INTRODUCTION

While computerized radios are now a common sight at most flying fields around the country, until now they have all been 6 to 9 channel versions loaded with exotic mixing functions and programs. They also had an equally exotic price tag. With the introduction of the Hitec Flash series of computer controlled radios, that has now been changed. By placing our emphasis on simplified programming and enhanced flight control, even novice modellers can now enjoy the benefits of computer control.

Starting from the premise that all modellers could benefit from the control provided by digital electronics and computerized mixing, Hitec's engineers looked at every feature available on today's four and five channel radios. The first step was to design a new ergonomic transmitter case that is truly comfortable to hold and is well balanced when in use. They eliminated the mechanical trim levers and replaced them with precise digital electronic switches. To improve safety, an engine cut feature allows the pilot to kill the engine at the touch of a button. A low battery alarm along with a built in timer guard against flying when batteries are too low to fly safely.

On the inside, the Flash employs our custom designed E^2PROM chip with a non volatile memory for up to 10 years of use without having to depend on back up batteries. This assures that all trim memories, mixes and settings will remain just as you assigned them until you are ready for them to change. In fact, with the digital trim feature, this means no more accidental trim changes while your radio sits in the impound area.

To get the most out of your new Flash radio system, we suggest that you read through these instructions while charging up the batteries. After the batteries are fully charged, plug in the battery and servos to the receiver and walk through each procedure to fully familiarize yourself with each of the functions available. Please note that the Flash system operates on the FM (frequency modulation) mode only and cannot be converted to PCM mode.

SPECIAL NOTE: These instructions were written using a radio set up for Mode II operation which is the normal mode for most U.S. and Canadian fliers. For those fliers in countries where Mode I is the standard, the Flash radios will be delivered in that configuration. All programming sequences remain the same regardless of stick configuration.

FEATURES AND SPECIFICATIONS

TRANSMITTER
- 4/5 channel Microprocessor design .
- 2 model memory capability
- In flight timer and alarm .
- Changeable from MODE II to MODE I stick configuration .
- Low battery warning signal for transmitter .
- End Point Adjustment for channels 1 through 4 .
- Dual Rate switches for Aileron And Elevator (FLASH 5 Only)
- Exponential rates for channels 1 through 4 .
- Trim Memory for channels 1 through 4 .
- Trim Reset function (to factory defaults) .
- 3 preset mixing functions (AIL/RUD, ELEVON, V-TAIL) .
- Master data reset function (to factory defaults)
- Channel 5 retract landing gear switch (FLASH 5 Only)
- Trainer jack and switch (FLASH 5 Only) .
- Power supply: 9.6 volt AA nicad pack, internal .
- Power consumption: 200 mA .

RECEIVER (HFD-08RD/HFD-07RA/HFS-04MI)

A. HFD-08RD (FLASH 4/5 FM 72/60MHZ)
- Dual Conversion.
- Dimension : 58.6 X 35.2 X 21.5 mm (2.3 X 1.4 X 0.8")
- Weight   : 38 g (1.34 oz)

B. HFD-07RA (FLASH 5 FM 35/36/40/41MHZ)
- Dual Conversion.
- Dimension : 37 X 61 X 22 mm (1.5 X 2.4 X 0.9")
- Weight   : 50 g (1.76 oz)

C. HFS-04MI (FLASH 4 FM 35/36/40/41MHZ)
- Single Conversion.
- Dimension : 29 X 48 X 19 mm (1.1 X 1.9 X 0.8")
- Weight   : 26 g (0.94 oz)

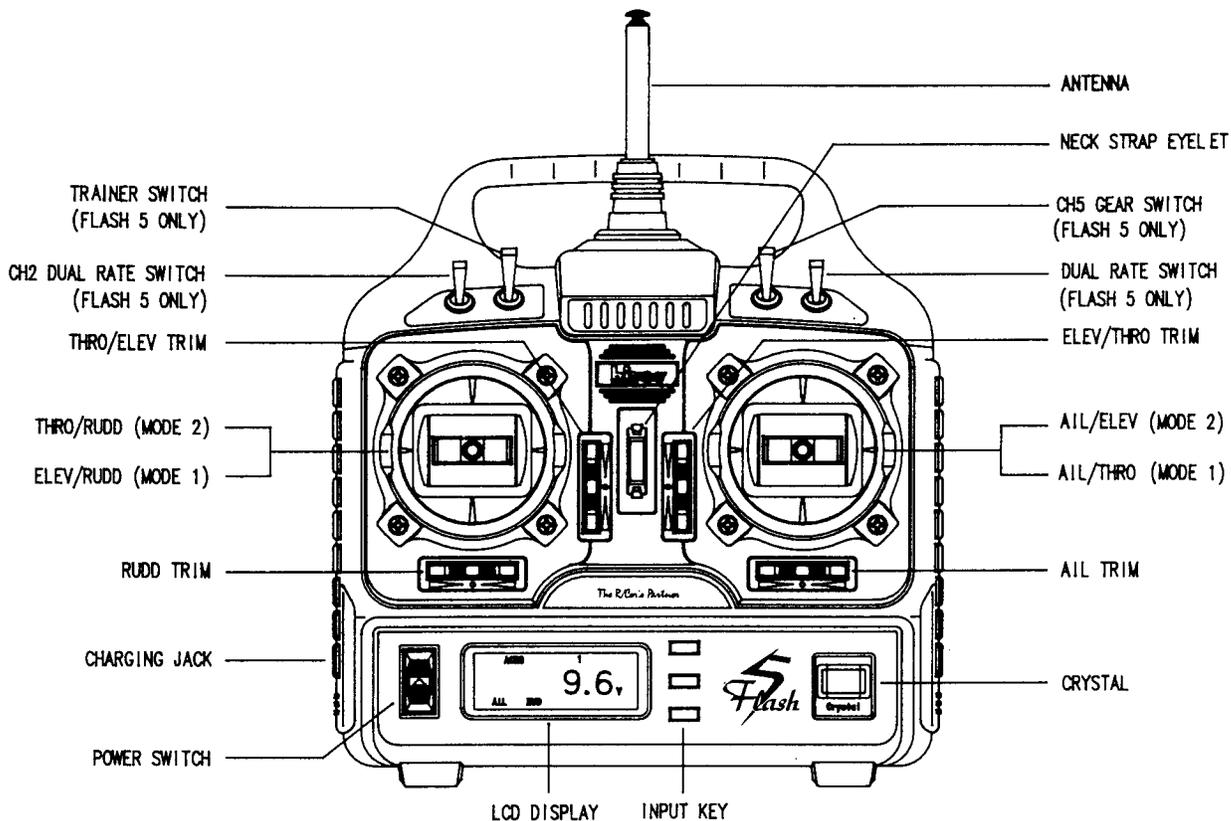|	
Power Requirement	: 4.8 volts (4 cell Ni-cad)
Current Drain	: 22 mA (receiver only)
Receiver Range	: 3000 ft or greater in the air
Operating Voltage Range	: 3.7-7.0 volts DC

FACTORY DEFAULT SETTINGS

INITIAL MODE MENU

Symbol	Function	Default
St	Stick mode	Mode I/II
none	Timer	10:0
AIL = RUD	Ail/Rud mix	off
ELEVON	Elevon mix	off
V-TAIL	V-tail mix	off

MAIN EDIT MODE MENU

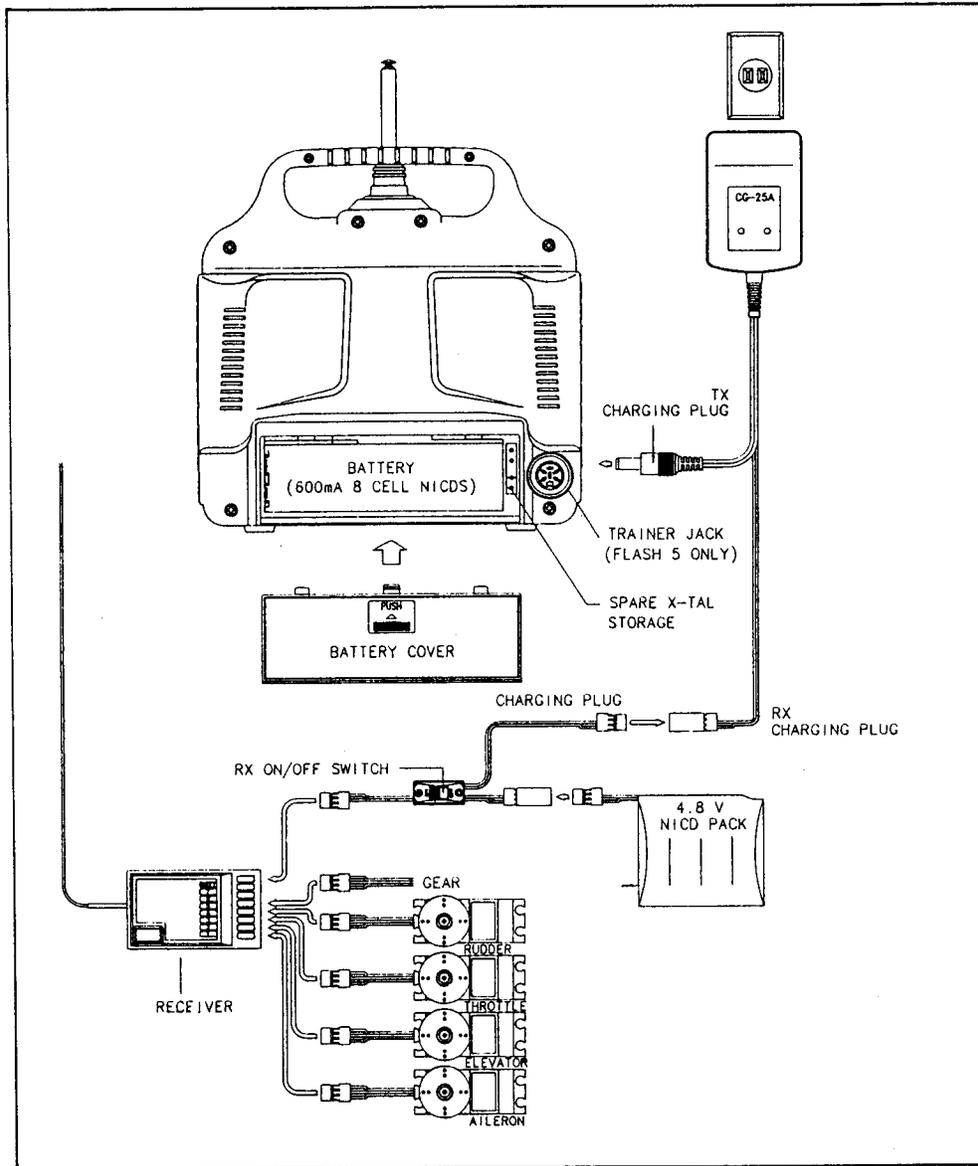| Symbol	Function	Default
EPA	End Point Adjustment	100% for channels 1,2,3,4,5
EXP	Exponential Stick Rates	0% for channels 1,2,3,4
D/R	Dual Rates	100% for channels 1 & 2
NOR	Servo Reversing	Normal (NOR) for channels 1,2,3,4,5
TRM	Trim Settings	0% for channels 1,2,3,4
RST	Trim Reset	0% for channels 1,2,3,4

TRAINER SWITCH (FLASH 5 ONLY)
CH2 DUAL RATE SWITCH (FLASH 5 ONLY)
THRO/ELEV TRIM
THRO/RUDD (MODE 2)
ELEV/RUDD (MODE 1)
RUDD TRIM
CHARGING JACK
POWER SWITCH

ANTENNA
NECK STRAP EYELET
CH5 GEAR SWITCH (FLASH 5 ONLY)
DUAL RATE SWITCH (FLASH 5 ONLY)
ELEV/THRO TRIM
AIL/ELEV (MODE 2)
AIL/THRO (MODE 1)
AIL TRIM
CRYSTAL

9.6v

Flash

The R/Cer's Partner

LCD DISPLAY   INPUT KEY

A. CHANNEL ASSIGNMENT

Channel 1	Aileron .
Channel 2	Elevator .
Channel 3	Throttle .
Channel 4	Rudder .
Channel 5	Gear (Flash 5)

As shipped from the factory, your radio was set up to operate in either Mode II or Mode I configuration. Mode II means that the four primary control channels have been assigned to work from the sticks in the following manner:the right stick controls the ailerons (channel 1) and elevator (channel 2), while the left stick controls the throttle (channel 3) and the rudder (channel 4). For those who so desire, the transmitter is easily converted to the Mode I configuration wherein the right stick will control the ailerons and throttle and the left stick will control the elevator and rudder. See page 10 of the owners manual for complete details of this procedure.

For Flash 5 owners: The channel 5 switch (customarily used for retractable landing gear) is located in the upper right corner of the radio. Dual rate switches for channel 1 (aileron) and channel 2 (elevator) are located at each of the upper corners. The trainer switch is located in the upper left corner of the transmitter.

Diagram labels:
- CG-25A
- TX CHARGING PLUG
- BATTERY (600mA 8 CELL NICDS)
- TRAINER JACK (FLASH 5 ONLY)
- PUSH
- SPARE X-TAL STORAGE
- BATTERY COVER
- CHARGING PLUG
- RX CHARGING PLUG
- RX ON/OFF SWITCH
- 4.8 V NICD PACK
- GEAR
- RUDDER
- THROTTLE
- ELEVATOR
- AILERON
- RECEIVER

B. DIGITAL TRIMS

Your Flash radio system features electronic, digitally controlled trim switches as opposed to conventional, mechanically operated trim levers. This digital trim feature, allows for very precise trim movements that are just not possible with mechanical trim levers. Setting the trims is quite similar to conventional radios with the exception that for each input, either plus or minus, you will hear a short beep to let you know that a change has been made. After the initial trimming out flight, all you have to do is land the plane and then save the trim settings in the memory. Should you turn off the transmitter prior to saving these trims, the transmitter will return you to the previous setting that was in the memory and you will have to perform this operation all over again. We will explain this procedure in more detail in the Trim Memory section of this manual.

C. SYSTEM OVERVIEW

In order to take full advantage of the Flash radio system programming, you will need to take a few moments to become familiar with input keys which make this all possible. The input operation requires the use of the following keys and switches on the transmitter:

. The LCD display
. The 3 main input keys (UP, DN/TIMER, CUT/SAVE)
. Rudder (ch. 4) trim switch
. Aileron (ch. 1) trim switch
. Main power switch

The flash has two main menu programs to select from when setting up your model(s) with each menu having separate methods of access to a particular menu. This prevents the accidental editing of programs in the incorrect "mode". The first menu you will need to access is called the "INITIAL MODE" menu and is comprised of the following sub-routines:

. Mode configuration (Mode I or Mode II)
. Flight timer settings
. Aileron/Rudder mixing activation (on) or deactivation (off)
. Elevon mixing activation (on) or deactivation (off)
. V-Tail mixing activation (on) or deactivation (off)
. Data memory save
. Data memory reset (to factory defaults)

It is through this menu that you begin the process of customizing your radio to suit the needs of your particular aircraft. Once you have completed input for the initial mode program and have saved everything in the memory, it is time to access the "MAIN EDIT MODE" menu. It is in the MAIN EDIT MODE menu that you make the basic servo adjustments required to make your model fly correctly. We will use the same transmitter keys and switches, that we used in the INITIAL MODE menu. Within the main edit mode program, you will be able to access the following sub-routines:

. End point adjustment (EPA)
. Exponential rate adjustment
. Dual rate adjustment (Flash 5 only)
. Servo reversing
. Trim memory
. Trim memory reset
. Aileron/Rudder mixing
. Data save to memory

NOTE: The aileron /rudder mixing sub-routine will only appear on the screen if you have selected that mixing function in the INITIAL MODE program. Otherwise, the menu goes directly to the data save sub-routine after trim memory reset.

D. ADDITIONAL FEATURES

When you first turn on your Flash transmitter, you will notice that a voltage reading appears on the LCD screen. The Flash constantly monitors and updates this reading to provide you with a precise battery condition. When the transmitter battery voltage drops to 9.2 volts, an audible alarm will sound. In addition to the audible alarm, the screen will begin flashing to notify you of the low battery state. **Should you hear this alarm while flying an aircraft, land immediately! If the visual warning signal is seen prior to flying your aircraft, do not attempt to fly. Stop and recharge the batteries at once.** As soon as voltage drops below 9.4 volts, you are advised to recharge the transmitter batteries BEFORE attempting another flight.

The last feature to talk about in this section is the ENGINE CUT feature which allows you to instantly take the throttle servo to its lowest setting at the touch of a button. When properly set up, the pilot will be able to kill the engine at any time provided that the throttle stick is at the half way mark or less. Detailed instructions for this procedure are provided in the End Point Adjustment and Trim Memory section of this manual.

E. TRAINER SYSTEM (FLASH 5 ONLY)

Pulling down the trainer switch will switch over the control to the student transmitter. Releasing the switch will enable master transmitter to resume control. When attaching the trainer cable (Optional item sold separately. Spare part# 8310: one way trainer cord), the cable must be connected to the correct side as the master side should be connected with the master transmitter. The purpose is obvious. Connected properly, the student transmitter cannot be activated even if it is accidentally turned on, a unique feature not present in other systems.

MASTER   #8310   STUDENT
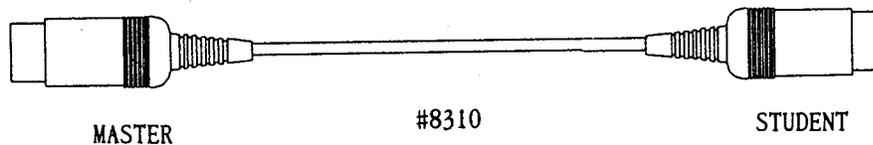
NOTICE for Auto Throttle Limit (ATL)

Supplement note for owners of Flash 4 and 5 radio system:
Please note that the throttle trim function will be disengaged once the throttle stick passes the halfway point on its way up towards the full throttle position. Pulling the throttle stick back past the halfway point towards the low throttle postion will re-engage the throttle trim function for setting up a reliable engine idea.

PROGRAMMING YOUR FLASH RADIO SYSTEM

1. MODEL SELECT

The Flash offers the modeller the ability to store information for two separate models in a nonvolatile memory. As a safety feature, the Hitec Flash has a separate access procedure to recall the model you wish to either begin flying or to bring up for programming purposes. To make the model selection, simply depress both the DN/TIMER key and the CUT/SAVE key simultaneously. While holding both these keys down, slide the power switch to the "on" position (up). You should now see an SL, with either a small 1 or 2 above it, displayed on the LCD screen. To make your model selection, press the CUT/SAVE key once to change the model number. Pressing the CUT/SAVE key again will return you to the previous model number. After you have made your model selection, simply turn off the transmitter and this model number will be stored in the default memory until you repeat this process and change it. **Remember that all programming changes from this point on affect only the model you currently have selected.** The other model memory will not be affected.

LCD DISPLAY

```
   ACRO      1 / 2
             5 L
```
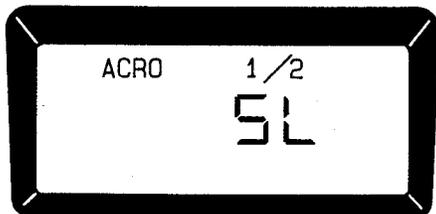
a. While pressing both ⌷DN⌷ and ⌷CUT⌷ keys down, turn main power "ON".
b. Press ⌷CUT⌷ key to select the model desired.
c. Turn the main power switch "OFF" and turn "ON" again to activate the model selected.
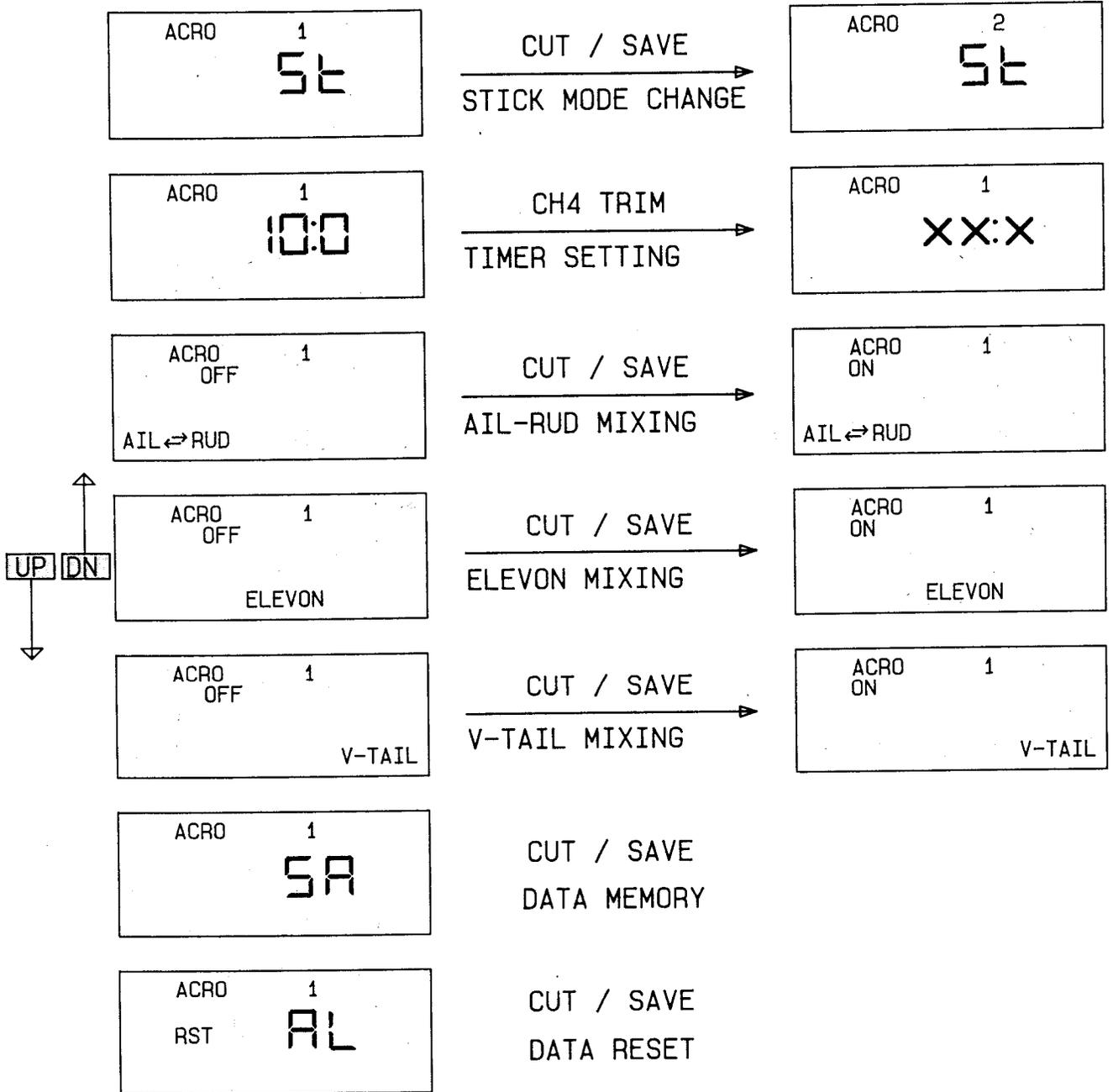
2. INITIAL MODE PROGRAMMING

As the title indicates, the initial mode menu is used to define how you wish the transmitter to operate and to designate which mixing options you wish to employ. This needs to be defined prior to accessing the MAIN EDIT MENU since selections made in this programming mode affect the programming decisions in the main edit menu.

To access the initial mode menu, it will be necessary to have the transmitter turned off. Verify that the power switch is in the down position. Next, while depressing both the UP key and the DN/TIMER key simultaneously, slide the power switch to the on position (up). The LCD should now display the message ACRO plus a small number to verify which model you have selected to work on. If this message does not appear on your screen, turn the power off and repeat the process making sure that both the UP key and the DN/TIMER key are being pressed at the same time. We are now ready to begin the programming process.

INITIAL MODE FLOW CHART

Press both [UP] and [DN] keys and turn power switch ON

|		
ACRO 1 **5t**	CUT / SAVE → STICK MODE CHANGE	ACRO 2 **5t**
ACRO 1 **10:0**	CH4 TRIM → TIMER SETTING	ACRO 1 **XX:X**
ACRO 1 OFF AIL⇔RUD	CUT / SAVE → AIL-RUD MIXING	ACRO 1 ON AIL⇔RUD
ACRO 1 OFF ELEVON	CUT / SAVE → ELEVON MIXING	ACRO 1 ON ELEVON
ACRO 1 OFF V-TAIL	CUT / SAVE → V-TAIL MIXING	ACRO 1 ON V-TAIL
ACRO 1 **5A**	CUT / SAVE DATA MEMORY	
ACRO 1 RST **AL**	CUT / SAVE DATA RESET	

[UP] [DN]

A. STICK MODE CHANGE

The FLASH transmitter can be converted to either Mode I or Mode II, regardless of factory set Mode. Mode II means that the throttle and rudder controls are operated by the left stick and the aileron and elevator controls are operated by the right stick. The Mode I means the elevator and rudder controls are operated from the left stick and the throttle and ailerons are operated from the right stick.

If you decide you want to change from Mode I to Mode II or vice versa, the procedure is as follows: The LCD screen should now show the message "ACRO" 1 (or 2 depending on which model you are working on). Press the UP key once. The LCD screen should now show the symbol "St" on the screen with a small number above it (either 1 for Mode I or 2 for Mode II). Press the CUT/SAVE key to select which Mode you have decided fits your style of flying. Once you have made your selection, press the UP key until you see the SA (save) message on the screen and press the CUT/SAVE key. You will hear two beeps confirming the information has been saved.

LCD DISPLAY
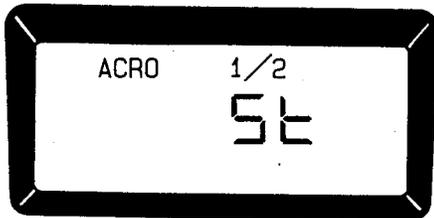

```
ACRO    1/2
        St
```

a. While pressing both [UP] and [DN] keys down, turn main power switch "ON".
b. Press either [UP] or [DN] key until the display shows the stick mode change menu.
c. Use [CUT] key to select the desired stick mode.
d. Go to the Initial Mode Save menu by using either [UP] or [DN] key and press CUT/SAVE key to save the input data.
e. Change the position of the throttle ratchet.(See below)

Notice: If you have chosen the Mode I control configuration, the following transmitter changes will be necessary. The following example shows a change from Mode II to Mode I (Please note since the drawing shows the back side of sticks, the throttle is now on right side of the picture which we want to move to the left side of the picture.)

a. Move the Ratchet Copper piece from (A) to (A)'
b. Add spring tension on (B) by turning the screw clockwise and then loosen tension by turning counter-clockwise the (B)' screw.
c. Move the spring limit bracket from (C) to (C)'.
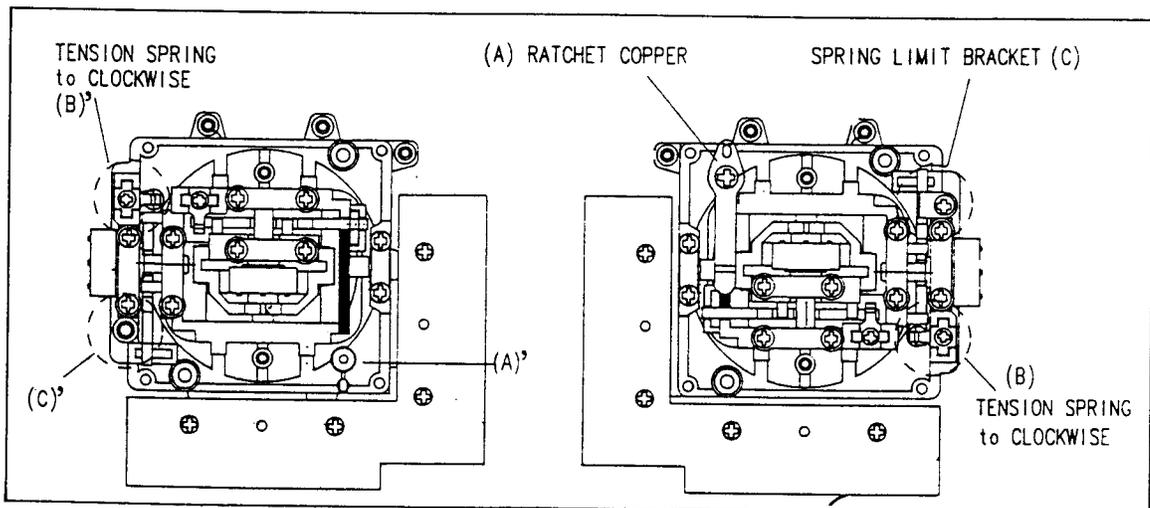
B. COUNTDOWN TIMER FEATURE

Your Flash radio is equipped with a built-in timer to alert you to any number of situations such as low fuel, low receiver battery or even task completion. To set the timer, press the UP key until the time indicator starts flashing. The factory default for the timer is set at ten minutes. You may change this to as much as 30 minutes or to as low as 1 minute.

To change the timer, locate the rudder (channel 4) trim switch. To increase the amount of time on the timer, press the right side of the trim switch. To decrease the amount of time, press the left side of the trim switch. In either case, you will hear a beep for each minute of time added or subtracted from the timer.Once again you need to save this setting. Press the UP key or the DN/TIMER key until the SA (save) message is seen on the display, press the CUT/SAVE key and your timer information is now in memory.

LCD DISPLAY
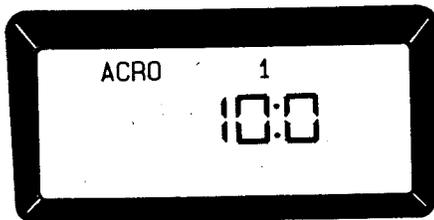
```
ACRO      1
  10:0
```

a. While pressing both [UP] and [DN] keys down, turn main power switch "ON".
b. Press either [UP] or [DN] key until the display shows the timer setting menu.
c. Use CH 4 trim to input time value.
d. Go to the Initial Mode Save menu by using either [UP] or [DN] key and press CUT/SAVE key to save the input data.
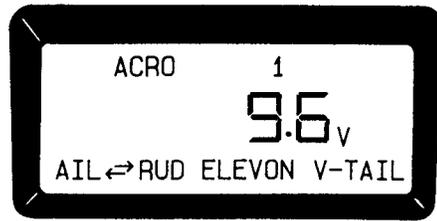
Please note that when you access the timer indicator screen in the Initial Mode menu, it will be displayed as 10:0. There is no 1 second read out. Additionally, when you activate the timer during the operational or flying mode, the timer will show 9:5. This is due to the fact that the timer actually starts at 9:59. Since the 1 second intervals are not displayed, all you see is 9: 5 and the numbers will then change every ten seconds.

An audible countdown will be heard when the timer reaches :0 and will beep at each second of the countdown. To activate the timer under normal flight operation, depress the DN/TIMER key once and the screen will automatically switch from the transmitter voltage display to the countdown timer and immediately start the countdown sequence in 10 second increments with the last 10 seconds being audible. Should you desire to stop the countdown at any time, simply press the DN/TIMER key once. To restart from where you left off, press the DN/TIMER again and the countdown resumes. To reset the timer and start over, press the UP key followed by the DN/TIMER key. The countdown is now reset.
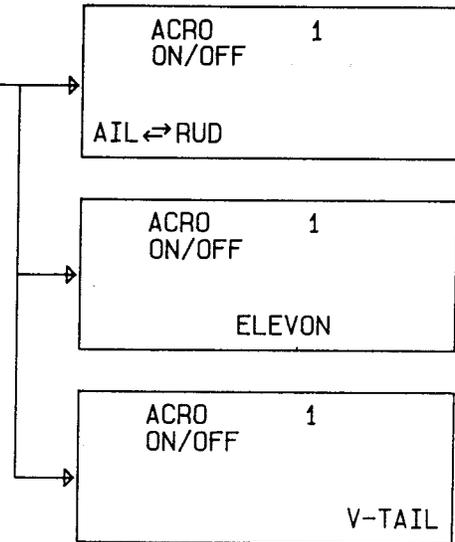
C. MIXING FUNCTIONS

The Flash radio systems offer you a choice of three separate mixing functions: Aileron/Rudder, Elevon or V-tail. While still in the Initial Mode menu, press the UP key until you come to the first of the three mixing options. This will be the AIL-RUD option. Just above this will be a flashing "on" or "off" message. If you wish to engage this mixing option and the "off" message is flashing, press the CUT/SAVE key once and the message will now read "on". Scroll with the UP key until you see the SA (save) message and press the CUT/SAVE key. The transmitter is now set up for aileron/rudder mixing.

The other two mixing options, elevon and v-tail, are activated in the same manner as the AIL/RUD mix performed above. After selecting one or the other of the mixes, remember to save them in the memory. **Please note that you may select only one mixing option per model. That means if you designate a model as having one mixing, the other two mixing options are automatically turned off.**

```
   ACRO        1                              ACRO        1
                                              ON/OFF
      9.6 v
                                              AIL⇌RUD
   AIL⇌RUD ELEVON V-TAIL
```

```
                                              ACRO        1
                                              ON/OFF


                                                      ELEVON
```

a. While pressing both UP and DN keys down, turn main power switch "ON"

b. Press either UP or DN key until the display shows the mixing menu.

c. Select mixing ON/OFF by CUT/SAVE key

d. Go to the Initial Mode Save menu by using either UP or DN key and press CUT/SAVE key to save the input data.

```
                                              ACRO        1
                                              ON/OFF


                                                      V-TAIL
```

D. DATA RESET FEATURE

The final option available in the INITIAL MODE menu is called DATA RESET. The message on the LCD screen will show "rst AL". This option allows you to reset all of the Initial and Main Edit Mode settings to the factory default settings. In other words, the transmitter reverts back to the programming just as it came to you from the factory.

To utilize this option, press the UP key until the reset message is shown. Press the CUT/SAVE key to activate the reset function then go to the save (SA) screen and press CUT/SAVE again. This may seem to be redundant, but it will prevent accidental erasure of all data from the memory.

LCD DISPLAY
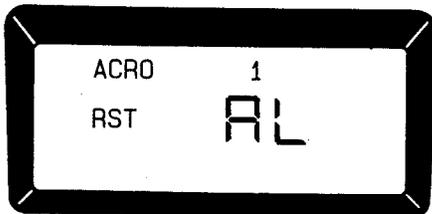
```
   ACRO        1

   RST      AL
```

a. While pressing both UP and DN keys down, turn main power switch "ON".

b. Press either UP or DN key until the display shows the data reset menu.

c. Press CUT/SAVE KEY to reset all data to the factory default settings.

d. Go to the Initial Mode Save menu by using either UP or DN key and press CUT/SAVE key to save the input data.

Please note that this procedure affects only the model you are presently working on and will have no effect on the other model memory.

E. INITIAL MODE PROGRAMMING REVIEW

We have now completed the first phase of the transmitter programming routine. Before proceeding to the MAIN EDIT MODE menu, we need to take a few minutes to verify that the data we input during the INITIAL MODE is exactly what was called for. To do this, turn off the transmitter and then turn it back on. The LCD screen should display the following items: In the upper left hand corner, the word ACRO will appear. To the right of this will appear the number 1 or 2 designating which model was programed. Just below this will be the transmitter voltage readout. If you have programmed one of the three mixes, the message will appear on the bottom of the screen.

Now check the timer to determine that you have the correct countdown time on the indicator. Press the DN/TIMER and the screen will now change to the timer indicator. If you have designated a time allotment of say 15 minutes (a typical flight duration), the screen should now show 14:5 and will countdown in 10 second increments.

If you are satisfied that the timer is functioning as desired, it is time to check out the stick mode configuration. To do this; remove the servos, receiver and receiver battery pack from the box and set them in front of you. Plug in all the servos in channels 1 through 4. Make sure the transmitter is turned on to prevent random radio signals from being processed by the receiver which could result in damage to the servos. Next, plug the receiver battery into the appropriate slot marked B or BATT.**(NOTE: When plugging in the servos and battery, make sure the black wire always faces out or towards the right.)**

To check that you have the correct stick mode programed into the transmitter, move the left stick up and down to verify that the channel 3 servo operates. If it does, you have now confirmed that the transmitter is set up for Mode II operation. If you have chosen the Mode I configuration, move the right stick up and down to verify that the channel 3 servo operates. Now move both sticks in a random manner to verify everything is in working order.

To check that any mixing function you may have designated is actually engaged, perform the following test: For elevon mixing, move either the aileron or elevator stick and look to see if both the channel 1 and channel 2 servos move at the same time. For V-tail mixing, move either the elevator or rudder stick and look to see that both the channel 2 and channel 4 servos are moving at the same time. If you have chosen the aileron/rudder mixing option, there is no way to observe this coupling until after we have programed servo mixing percentages while in the MAIN EDIT MODE menu. For the time being, if this mix appears on the screen, we can safely assume that everything is normal and we can now proceed with the MAIN EDIT MODE programming routine.

3. MAIN EDIT MODE PROGRAMMING

In this mode, the modeller can perform all the necessary servo adjustments required prior to taking the airplane out on its initial flight. This includes setting the end points, exponential rates, servo reversing, etc. The Flash radio system allows these adjustments to be performed quickly and easily in any model. Both the novice as well as the expert pilot will easily grasp the fundamentals of customizing the programs to suit their flying needs. Take a moment to review the MAIN EDIT MODE flow chart and you will see how the menu selection process works.

Because you will be able to see the servos respond as you as soon as you input the data, it is suggested that you install the radio gear into the model you wish to set up at this time. If this is not feasible, continue with the receiver and servos set out in front of you and watch the results of the data input.

To access the MAIN EDIT MODE menu, you will need to exit the INITIAL MODE menu. To do this, simply turn off the radio, let the LCD screen go blank and turn the radio back on. The screen should now prominently display the transmitter voltage. Next, with the transmitter still on, press both the UP key and the DN/TIMER key simultaneously. You should now be in the MAIN EDIT MODE menu with the EPA routine now showing on the screen. You should turn on the receiver at this point to see the full effect of your programming.

A. END POINT ADJUSTMENT (EPA)

The End Point Adjustment function allows you to determine the amount of travel a servo will have from both sides of the center position. This will insure that you do not over rotate the servo risking damage to the control linkage or to the servo itself. It also allows you to set up control surfaces that are "mild" (decreased servo travel) for the novice pilot or to set up extremely sensitive control surfaces for the expert pilot by extending the servo travel range. Adjustment of any one channel can be affected from 0% (no movement) to 125% of normal servo travel. Normal servo travel is considered to be 45 degrees each side of center for a total servo range of 90 degrees. The factory default for each of the available EPA's is 100% of normal servo movement.
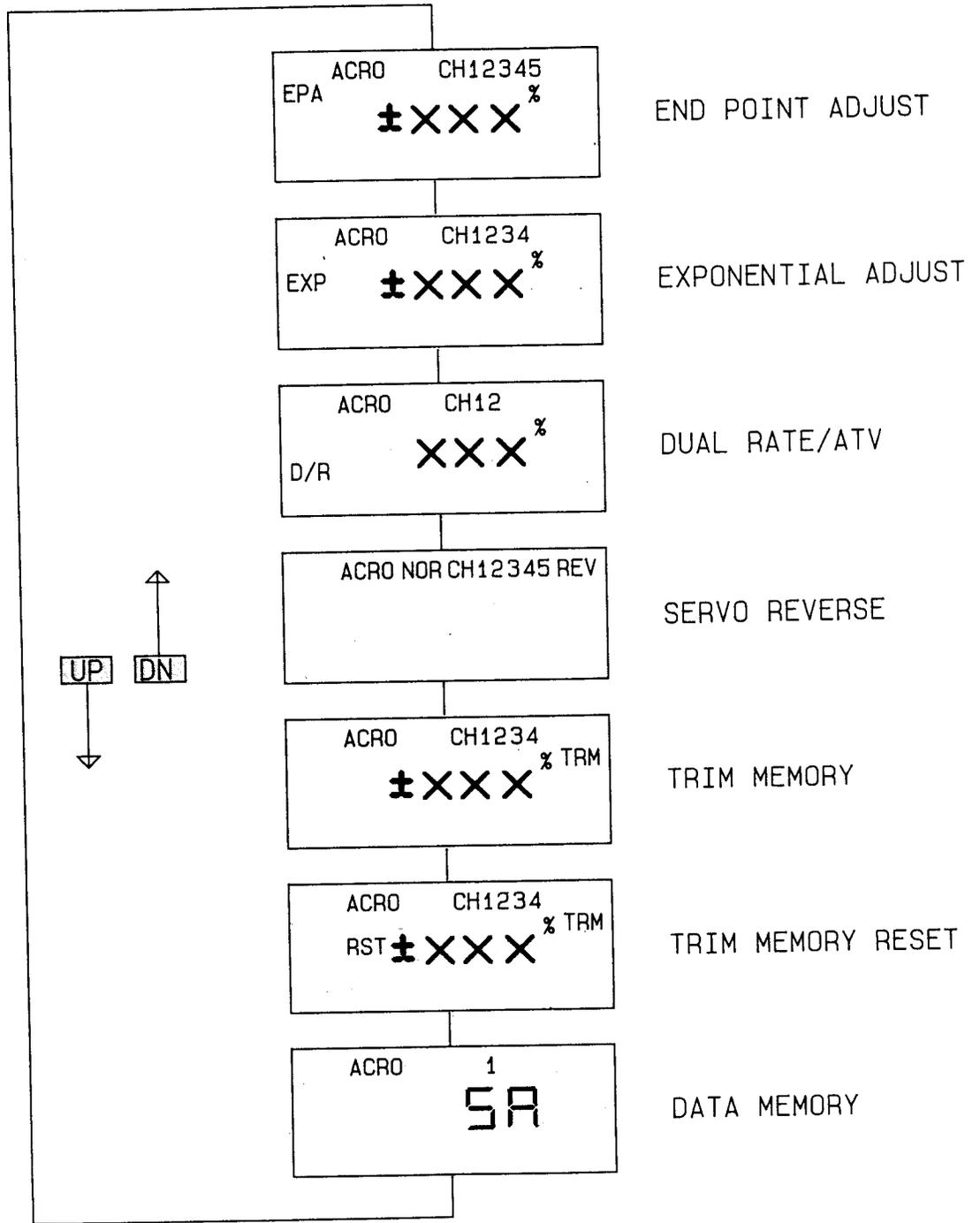
Now that you are in the EPA menu, select the channel you wish to make adjustments to by pressing down on the right side of the rudder (ch. 4) trim switch until the channel number starts to flash on the display screen. Use the control stick to verify that the correct control surface is being affected. Since the aileron channel (ch. 1) is already flashing, we will start the EPA routine from there. Move the aileron control stick to the right as far as it will go and hold it there. The LCD screen should now show 100%. Using the aileron (ch. 1) trim switch, you may now increase this number to as much as 125% for maximum servo travel (press the right side of the aileron trim switch) or decrease this number to 0% for no servo travel in this position (press the left side of the aileron trim switch). Now move the aileron stick all the way to the left side, hold and repeat the process until you are satisfied with aileron movement.

Proceed to the next control surface by pressing the right side of the rudder (ch. 4) trim switch one time to bring up the elevator (ch 2) control surface and repeat the process as you did for the ailerons except that you will now be going up and down with the control stick instead of left and right. **Reminder: You will still use the aileron trim switch to determine the percentage of servo travel.**
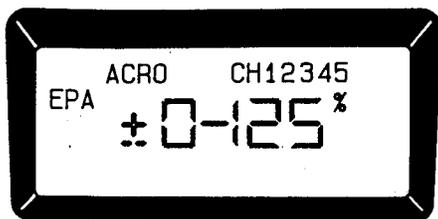
Continue this process with each of the remaining control surfaces. when you get to channel 5 on the Flash 5 version, please be advised that the End Point Adjustment will have no effect on a retract servo which is not proportional. It will have an affect on any other type of proportional servo and you can program EPA's to this channel. For owners of the Flash 4, channel 5 will show up on the LCD screen and is programmable. However, since the Flash 4 does not have a channel 5 gear switch, it will not have any effect. Once you have finished all of the control surfaces to your satisfaction, remember to scroll (using the UP or DN/TIMER key) to the SA (save) screen and press the CUT/SAVE key to save all the data. Two beeps will sound to confirm this was saved in memory.

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EDIT MODE FLOW CHART

Press both [UP] and [DN] keys with main power switch ON

```
        ACRO      CH12345
   EPA                    %
         ±XXX                    END POINT ADJUST


        ACRO      CH1234
                          %
   EXP   ±XXX                    EXPONENTIAL ADJUST


        ACRO      CH12
                          %
   D/R    XXX                    DUAL RATE/ATV


   ACRO NOR CH12345 REV          SERVO REVERSE


        ACRO      CH1234
                          % TRM
         ±XXX                    TRIM MEMORY


        ACRO      CH1234
                          % TRM
   RST   ±XXX                    TRIM MEMORY RESET


        ACRO       1
          5A                     DATA MEMORY
```

[UP] [DN]

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LCD DISPLAY

```
   ACRO    CH12345
EPA
   ± 0-125 %
```

a. Press both `UP` and `DN` keys down with main power switch "ON".
b. Press either `UP` or `DN` key until the display shows the end point adjustment menu.
c. Select desired channel by CH 4 trim.
d. Adjust end point travel by CH 1 trim while selecting direction of servo by control stick, knob or gear switch.
e. Go to the Main Edit Mode Save menu by using either `UP` or `DN` key and press CUT/SAVE key to save the input data.

SPECIAL NOTE: When making the end point adjustments for the throttle servo, keep in mind that you will want to keep the carburetor slightly open at the extreme low end of the throttle control stick to insure a reliable idle and to take best advantage of the Engine Cut feature which will be discussed in more detail in the trim memory section.
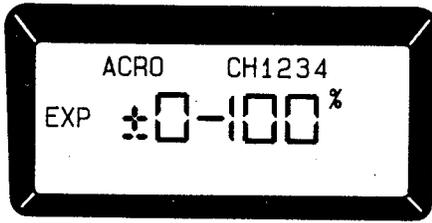
B. EXPONENTIAL RATE ADJUSTMENT

Exponential rate adjustment is the next routine on the menu and this function will allow you to change the control response of the control sticks from being a linear response to what is known as an increasing response curve or exponential. An example of how this feature is commonly used would be the pilot of an extremely responsive aerobatic aircraft utilizing full servo throws who does not need much servo input to control the plane in level flight but wants to take full advantage of its aerobatic capabilities. Therefore the exponentials are programmed such that very little servo response is transmitted when the control sticks are near the neutral point. As the sticks are moved farther from the neutral point, more servo response is generated at a rate greater than a straight linear response allowing for quick and precise maneuvers.

Use the UP key to select the EXP or exponential rate adjust menu. You will notice that this screen looks similar to the EPA screen you just left.(Note: Channel 5 on the Flash 5 is not included in the EXP menu screen) The input keys are the same but you will not have to hold down a control stick to determine servo travel. Let's start with channel 1, ailerons. The LCD screen will display a value of 0% with the channel 1 indicator flashing. You can make adjustments either to the PLUS (+) side by pressing the right side of the aileron trim or to the MINUS (-) side by pressing the left side of the aileron trim. By making adjustments on the + (plus) side (from 0% to 100%), you increase the response rate around the neutral point of the control stick while, at the same time, decreasing the amount of servo throw at the extreme end of the control stick. By making adjustments to the - (minus) side (from 0% to 100%), you decrease the servo response around the neutral point while at the same time, increase servo response at the extreme end of the control stick.

Repeat this process for all remaining channels that you wish to operate in the same manner. As the feel for exponential response rates is a matter of personal preference, only you will be able to determine how much, if any, exponential effect you wish to program in for your particular model. Remember to save the values you have now programmed by scrolling to the save screen and pressing the CUT/SAVE key. As always, two beeps will signal that the information has been entered and saved in the memory.

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LCD DISPLAY

```
    ACRO     CH1234
                        %
 EXP  ±0-100
```

a. Press both UP and DN keys down with main power switch "ON".
b. Press either UP or DN key until the display shows the exponential menu.
c. Select desired channel by CH 4 trim.
d. Adjust exponential rate by CH 1 trim.
e. Go to the Main Edit Mode Save menu by using either UP or DN key and press CUT/SAVE key to save the input data.
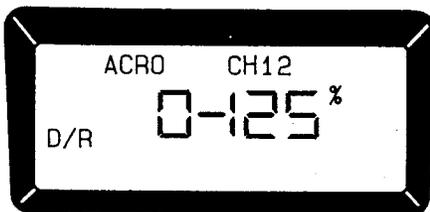
C. DUAL RATES

The Flash 5 comes equipped with two dual rate switches. The aileron (ch. 1) switch is located in the upper right hand corner of the transmitter box and the elevator (ch. 2) switch is located in the upper left hand corner. These are the only two channels available for dual rates on this radio.

By programming a second set of servo throw values for each of these channels (from 0% to 125% of normal servo movement), you can increase or decrease aircraft response when you move the sticks simply by changing switch positions. Use of dual rates is especially helpful when becoming accustomed to flying a highly responsive aerobatic aircraft. By programming your second set of servo travel volumes at a rate considerably lower than normal, you can get the feel for the aircraft, set the trims and make other minor adjustments in a more controlled manner than if you had full throws on these servos. With a little experimentation, you will find the dual rate feature very useful as your flying skills improve.

To program the Dual Rates, use the UP key to locate the D/R menu screen in the Main Edit menu. The screen will show D/R at the far left with channels 1 and 2 at the top of the screen. Channel 1 should be blinking and a value of 100% shown in the middle of the screen. This is the factory default value and means that there is no change in servo response rates when the dual rate switch is activated. To select either of the two channels available, push the right side of the rudder trim switch once and the other channel indicator will begin flashing. Next, using the aileron trim switch, you can now increase servo movement (up to 125%) or decrease servo movement (as low as 0% or no movement).

You can leave the transmitter on during this operation to observe the effects on the servos as you change the percentages. (During this procedure, data entry is not affected by the position of the dual rate switch. However, in order to observe the changes you are inputting, the switch needs to be in the up or "on" position. By toggling the switch back and forth and moving the aileron and elevator stick after each position, you can verify the changes between the dual rates.

LCD DISPLAY

```
    ACRO     CH12
                       %
          0-125
 D/R
```

a. Press both UP and DN keys down with main power switch "ON".
b. Press either UP or DN key until the display shows the dual rate adjustment menu.
c. Select desired channel by CH 4 trim.
d. Adjust servo throw by CH 1 trim.
e. Go to the Main Edit Mode Save menu by using either UP or DN key and press CUT/SAVE key to save the input data.

Special Note for Flash 4 Owners: Because the programming routines are identical between the Flash 4 and 5, the Dual Rate sub-routine will appear in the Main Edit Mode menu of the Flash 4. However, since there are no dual rate switches, this programming will act as Adjustable Traveling Volume for aileron and elevator servos. Simply program the percentage of total servo movement using the same procedure as above. One note of caution should be mentioned. It is possible to program 0% servo movement while in this program. To maintain a suitable safety margin, it is advised that you not program anything less than 30% total servo movement.

D. SERVO REVERSING

Servo reversing is an important function of your Flash radio system. It allows you to place your servos in the aircraft without regard to the normal direction of rotation. In other words, if you find that you have installed your elevator servo in such a manner that it moves the opposite direction from what you thought it would, all you need to do is program the transmitter to reverse servo direction and everything will be back to normal without physically changing the mechanical linkage.

To access the Servo Reversing routine, press the UP key until you reach the following screen: ACRO NOR CH 1234(5). As in prior routines, the flashing channel is the one on which you will be changing from normal (NOR) rotation to reverse (REV) rotation. Use the rudder trim switch to select the channel you wish to reverse. Then press the CUT/SAVE key and the screen will now show an REV on the right side of the channel numbers and the NOR symbol will not appear on the screen. Once you have made the program changes, remember to scroll to the SA screen and save the data input.
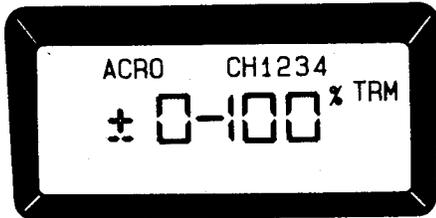
LCD DISPLAY
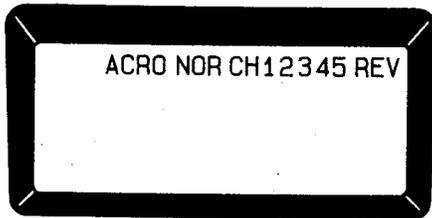
```
ACRO NOR CH12345 REV
```

a. Press both UP and DN keys down with main power switch "ON".
b. Press either UP or DN key until the display shows the servo reversing menu.
c. Select desired channel by CH 4 trim.
d. Determine servo direction by CUT/SAVE key.
e. Go to the Main Edit Mode Save menu by using either UP or DN key and press CUT/SAVE key to save the input data.

E. TRIM MEMORY

In this routine we can set all the control surfaces to a neutral setting prior to the first flight of the aircraft and we can then save all the trim input that was made during an actual flight. Because the Flash utilizes digital trims as opposed to mechanical trims, you cannot see where the trims are set after a flight. You can, however, save all this data by simply accessing the main edit mode menu after a flight, scroll to the SA (save) screen and press CUT/SAVE to save all the trim settings. Therefore, it is imperative that you do NOT turn off your transmitter after the initial trim out flight until AFTER you have saved the trim settings in the main edit mode menu.

To access this routine, use the UP key to scroll through to the TRM (trim memory) screen. The screen will display channels 1 through 4 along the top with a percentage figure below that and TRM to the right of that figure. You can now set all your control surfaces to the neutral position prior to the initial flight of your aircraft. As before, the rudder trim switch will be used to select the channel and the aileron trim switch will be used to set the control surface. If your displayed trim percentages end up near the 100% mark(+or -), you may wish to adjust your mechanical linkages to obtain trim percentage figures closer to 0%. This will help maximize your total trim capability. Scroll to the SA screen and save these settings. Once you get to the flying field, trim out the aircraft as you normally would, land the aircraft and access the main edit mode menu. Scroll immediately to the SA screen and press the CUT/SAVE key to save your new trim settings. Your model should now be ready for its next flight.

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hitec

LCD DISPLAY

```
  ACRO      CH1234
 ± 0-100 % TRM
```

a. Press both ⬜UP⬜ and ⬜DN⬜ keys down with main power switch "ON".
b. Press either ⬜UP⬜ or ⬜DN⬜ key until the display shows the trim memory menu.
c. Select desired channel by CH 4 trim.
d. Adjust neutral position by CH 1 trim.
e. Press CUT/SAVE key to memorize the neutral point of trim.
f. Go to the Main Edit Mode Save menu by using either ⬜UP⬜ or ⬜DN⬜ key and press CUT/SAVE key to save the input data.

SPECIAL NOTE: To utilize the Engine Cut feature of this radio, start the motor (preferably at the flying field) and then locate the idle point, as suggested by the engine manufacturer, using the throttle trim with the throttle stick all the way down. Once you have located this point, scroll to the SA screen and immediately save this setting prior to making your first flight. Now, with the engine still running at idle, press the CUT/SAVE key and hold it down. The carburetor drum should be fully closed and the engine should shut down.

F. TRIM MEMORY RESET

To make it easier to return trim settings back to the factory default, a TRIM RESET routine makes it possible to return trim values back to zero without having to manually scroll every setting on every channel. This feature is especially useful when you wish to assign a different model to the model number currently in use.

To utilize the trim memory reset feature, use the UP key to scroll to the RST TRM screen. Use the rudder trim switch to select each of the channels to be reset (one at a time) and press the CUT/SAVE key. The value will now return to zero. Reset each of the channels and then proceed to the SA screen to save the changes.

LCD DISPLAY
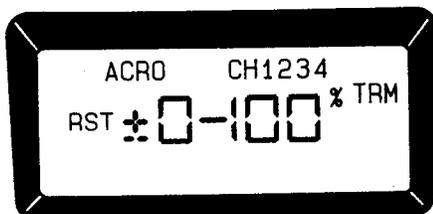
```
  ACRO      CH1234
RST ± 0-100 % TRM
```

a. Press both ⬜UP⬜ and ⬜DN⬜ keys down with main power switch "ON".
b. Press either ⬜UP⬜ or ⬜DN⬜ key until the display shows the trim memory reset menu.
c. Select desired channel by CH 4 trim.
d. Reset the trim memory by CUT/SAVE key.
e. Go to the Main Edit Mode Save menu by using either ⬜UP⬜ or ⬜DN⬜ key and press CUT/SAVE key to save the input data.

G. AILERON/RUDDER MIXING

In the Initial Mode menu, you were given the option of three electronic mixing functions: aileron/rudder, Elevon and V-tail. Of these three, only the aileron/rudder mix requires direct input from the modeller. Assuming that you have chosen this mix, let us proceed with this program.Note: if you have not chosen to engage the Aileron/Rudder mix program from the initial mode menu, it will not appear on the menu screen sequence.

Aileron to rudder mixing is commonly used to coordinate turns of large scale aircraft and sailplanes. Within this program, you may designate either of the two control channels as the "master" with the other as the "slave". What this means is that if you designate the aileron channel as the "master" then the rudder channel will perform as the slave. Whenever the aileron stick is moved, the rudder will move a preset

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amount in conjunction with the ailerons in order to eliminate adverse yaw or to present a more scale like turn for larger aircraft. However, it must be remembered that the rudder (slave) stick can override any input from the aileron (master) stick at any time.

To begin programming of the aileron/rudder mix, use the UP key to scroll to the AIL = RUD screen. The RUD message will be seen flashing in the lower left hand corner with an OFF message directly above it. Press the rudder (ch. 4) trim switch on the left side once and the OFF message will start to flash. Now, press the CUT/SAVE key and the message will now read "ON". Next, press the rudder trim switch to the right side once. The RUD message will now begin flashing with a value of 0% showing on the right side of the screen. If you intend to make the rudder the "slave" channel, you may proceed with the data input. If you wish to designate the aileron channel as the "slave", press the rudder trim switch to the right one more time and the AIL message will now begin to flash. **Remember: The channel which flashes on the LCD screen will be the "SLAVE" channel.**

After designating the "slave" channel, proceed as you did in setting up the EPA's. First, hold the "master" control stick all the way to the left and use the aileron (ch. 1) trim switch to change the percentage being shown on the LCD screen. Notice that the screen will display the NOR (normal) or the REV (reverse) symbol to tell you which way the "slaved" channel will move when the "master" channel is operated. Normal rudder movement in this case means that when you give a left aileron command, you will also get a left rudder command. It is possible to get right rudder (or aileron) when left aileron (or rudder) is applied so leave the receiver on and the servos plugged in to verify that the movement you desire is actually being input. When satisfied that you have obtained the proper amount of left rudder input, proceed with the right rudder input. Hold the master control stick all the way to the right and again use the aileron trim switch to change the percentage being shown on the screen. Check servo movement to ensure that the "slave" channel is moving in the proper direction.Once you have the proper mix percentage, scroll to the SA (save) screen and press CUT/SAVE to store the data.

LCD DISPLAY
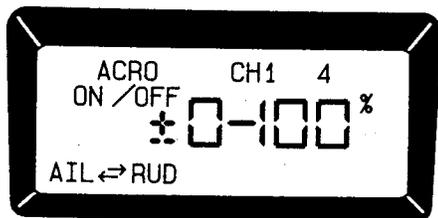
```
ACRO      CH1   4
ON /OFF
      ⁑ 0-100 %
AIL ⇌ RUD
```

a. Press both [UP] and [DN] keys down with main power switch "ON".
b. Press either [UP] or [DN] key until the display shows the aileron/rudder mixing menu.
c. Press CH 4 trim on the left side once, and the "OFF" message will start to flash. Then, press CUT/SAVE key to change the "OFF" to "ON".
d. Designate the slave channel by CH 4 trim. (The channel that flashes will be the Slave)
e. Set the servo throw of the slave channel aligned with the master channel by CH 1 trim while indicating the servo direction with master channel stick.
f. Go to the Main Edit Mode Save menu by using either [UP] or [DN] key and press CUT/SAVE key to save the input data.

NOTE : The other mixing options, V–Tail and Elevon, are considered linear mixes and the relationship between the channels remains constant. By eliminating the need for mechanical mixing devices, it is not necessary to program individual servo movement. Simply activate the mixing options from the INITIAL MODE menu and you're ready to go.

H. SAVE ROUTINE

The final routine available to you under the MAIN EDIT menu is the SA or save routine. We hope that by this time you are quite familiar with this screen and that further explanation is unnecessary.

GENERAL INSTRUCTIONS

Your Flash radio system comes complete with servos, hardware, batteries and charger. Please read the next few paragraphs of instructions carefully to ensure that you receive the best results from your radio system.

CHARGING: The FLASH radio comes equipped with nickel cadmium batteries for long life and consistent service. The wall type charger supplied with the system has separate LED lights which allows the user to confirm that charging is taking place in both the transmitter (a red LED) and the receiver (a green LED) battery packs. When charging the transmitter, make sure that the radio is turned off. Otherwise charging will not start.

Use of other chargers in conjunction with the Flash transmitter should be avoided as they may cause irreparable damage to the system. If you wish to use a peak charger such as the CG-325 from Hitec, remove the battery from the transmitter and follow the instructions for the peak charger. Do not leave the wall charger connected to the transmitter and receiver batteries for more than 10 - 12 hours. Overcharging may result in severe damage to the battery as well as the electrical components of the receiver and transmitter. Ideally, you should place the batteries on charge overnight prior to flying the next day.

SYSTEM CARE AND USE GUIDELINES: The Flash radio system is a highly advanced, solid state electronic device. As such, it can be easily damaged when abused. Never drop or throw system components since this can severely damage them. As for the servos, there is very little in the way of maintenance that needs to be performed. They already have sufficient lubrication on the gear train and do not need any further lubrication until you change the gears. At that time a small amount of servo grease needs to be added to keep the gears well lubricated. We recommend that all damaged components be returned to an authorized Hitec service center for all repair services.

Because this system is prone to the effects of vibration and mechanical wear and tear, we recommend having the entire system checked and tuned at least once a year by an authorized Hitec service center. This will ensure that your system operates at peak efficiency and high reliability.

Warning: Do not expose the transmitter and the components to direct sunlight or sources of heat for any extended period of time.

The Flash transmitter utilizes an LCD display which may darken with prolonged exposure to direct sunlight. Should this occur, promptly remove the transmitter to a cool, shaded area. The LCD screen should return to normal in a short period of time.

REMEMBER: Always operate your radio controlled model in a safe and responsible manner. Never fly in areas of known radio interference or where other pilots may be in close proximity without their knowledge. Follow the safety guidelines as provided by any of the governing bodies over model aeronautics in the country in which you reside. These may vary slightly from country to country but they are all fairly similar and all use a common sense approach to safe flying. Never fly alone. This is risky at best. Besides, it's more fun to fly with a friend and share the experience.
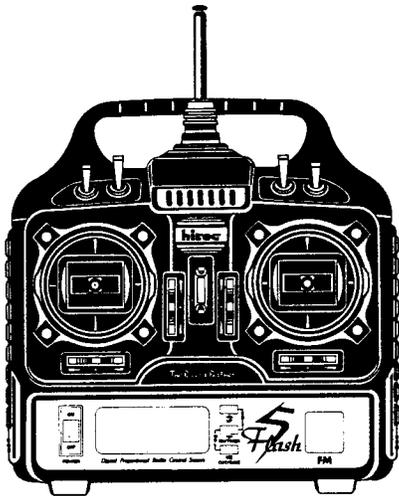
Always range check your radio before sending the aircraft up to fly. A proper range check with the Flash system installed should allow you to operate the servos from a distance of at least 125 feet with the antenna collapsed (down). If you cannot achieve this range, do not attempt to fly. Have the system thoroughly checked and live to fly another day.

We at Hitec wish you the best and hope that you enjoy the features and benefits your new Flash system provides. If you have any questions concerning this or any other Hitec product, please contact the Hitec dealer in your area. They will be glad to answer your questions.
GOOD LUCK AND GREAT FLYING!

The R/Cer's Partner

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