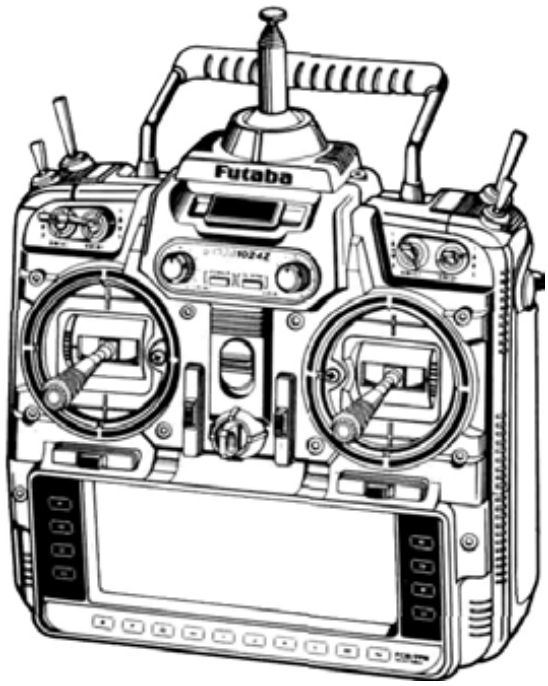

Futaba

DIGITAL PROPORTIONAL
RADIO CONTROL

PCM1024ZA
PCM1024ZH

PULSE CODE MODULATION SYSTEM

INSTRUCTION & OPERATION MANUAL

FP-9ZAP

for Airplanes & Sailplanes PCM 9 Channels 4 Servos

FP-9ZHP

for Helicopters PCM 9 Channels 5 Servos

AIRPLANE · HELICOPTER · SAILPLANE

FUTABA CORPORATION
FUTABA CORPORATION OF AMERICA

D-60497

Thank you for purchasing a Futaba digital proportional radio control set. Please read this manual carefully before using your set.

ATTENTION:

1. ***Application of Product***
This product is not intended for use in any application other than for the control of models for hobby and recreational purposes. This product is subject to regulations of the Ministry of Radio/Telecommunications and is restricted under Japanese low to such purposes. The laws of other countries may similarly restrict the use of this product. Futaba is not responsible for any use that is not in compliance with applicable law.

2. ***Exportation of Product***
If the product is exported from Japan, the prior approval of the Ministry **of** Radio/Telecommunications is required regarding the country of destination. If this product is reexported from other countries, it may be subject to restrictions on such reexport and prior approval of government authorities may be required.

3. ***Modification, Adjustment & Replacement of Parts***
Futaba is not responsible for any use of this product that is not in compliance with applicable law and disclaims all responsibility for any modification or alteration of the product, including the incorporation of the product into other products by third parties, that is not in compliance with applicable law.

Ni-Cd

ATTENTION:
The product that you have purchased contains a rechargeable battery. The battery is recyclable. At the end of its useful life, under various state and local laws, it may be illegal to dispose of this battery into the municipal waste stream. Check with your local solid waste officials for details in your area for recycling options or proper disposal. (For U.S.A.)

THE FOLLOWING STATEMENT APPLIES TO THE RECEIVER

This device complies with part 15 of the FCC Rules.
Operation is subject to the following two conditions:
(1) This device may not cause harmful interference, and
(2) This device must accept any interference received,
including interference that may cause undesired operation. (For U.S.A.)

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COMMAND LIST 151

Futaba's PCM 1024Z series of radio control systems is the most sophisticated available for aircraft, helicopters, and sailplanes. Inside this radio is the logic necessary to control virtually any aircraft imaginable (both transmitter types are programmed for all three aircraft).

Built into the system are a number of menus designed to make it simple to tailor the system's programs for YOUR aircraft. Multiple menus provide unparalleled control of every aspect of the model's setup, even some that you probably never thought of before!

System Features:

- 1024 High resolution system
- 9 Channels (select channel order)
- 10-Model Memory
- 8-Character Model names
- 16 added memories with CAMPac Module
- Up to 8 flight conditions for each model
- 5 programmable mixers with special advanced functions for each model setup
- Each flight condition separately programmable
- Flight condition & channel delay setting
- Ready for aircraft, helicopters, and sailplanes
- Deluxe carrying case included
- Carrying handle
- Ergonomic shape easy to hold and operate
- Attractive neckstrap and mount
- Ball bearing control sticks
- Adjustable tension control sticks
- Adjustable length control sticks
- Adjustable angle control sticks
- Programmable transmitter switches
- Large liquid-crystal display
- Contrast adjustment
- Soft keys make programming simple
- Switchable FM/PCM
- Optional synthesized frequency module & receiver
- Unique Digital Trim function (2 rates)
- Electronic servo centering, reversing, throw volume, exponential
- Failsafe/Hold setting
- Powerful data copy functions
- Swiveling antenna stores in transmitter
- Detachable battery pack
- Two separate timers & elapsed time counter
- Automatic system power-off
- Low-voltage alarm
- Special Mixer alarm
- Voltmeter with adjustable load for transmitter and receiver batteries
- Built-in tachometer
- DSC System
- Trainer system

Airplanes

- Aileron Differential [ADF]
- Rudder Coupling [AS-R]
- V-tail [VTL]
- Rudders-Aileron [R-A]
- Elevons [EVN]
- Elevators-Flap [E-F]
- Flaps-Elevator [F-E]
- Collective pitch [CPT]
- Differential elevators [ELV]
- Flaperons [FLP]
- Airbrake [ABK]
- Snap Roll [SNP]
- Throttle Curve Adj. [TCV] (12 segment)

Helicopters

Pitch Mixing [PCV]
Hovering Pitch [PHV]
Pitch Trim [PTM]
Throttle Curve [TCV]
Hovering Throttle [THV]
Hovering Offset [HOF]
Throttle Hold [HLD]
Swashplate type [SWH]
Pitch-Rudder [P-R]
Rudder-Throttle [R-T]
Gyro Sensitivity [GYR]
Acceleration [ACC]
Inverted Pitch [INV]
Throttle curve adj. [THR]
Rotor Direction [RDR]

Sailplanes (Select from 2, 4, or 5-servos in wing)

- V-tail [VTL]
- Differential adjustment [ADF]
- Rudder coupling [A-R]
- Aileron-flap coupling [ASF]
- Airbrake/Spoiler/Gear trim compensation [ABE]
- Elevator-flap coupling [EBF, ESF]
- Flap trim setting [SFT]
- Butterfly (Spoileron or Crow) [BFY]
- Butterfly trim mix [BYE]
- Elevator trim sets [ETM]
- Flap-Elevator mix [F-E]
- Elevator-Flap mix [E-F]
- Flaperon mixing [FLP]

INTRODUCTION

Thank you *for selecting the Futaba® PCM1024Z Radio System. The design of this system has absolutely no compromises. You now possess a system that will allow you to fly your model — airplane, helicopter, or sailplane — with the highest performance possible. With all the power in this system, setting up and adjusting is very simple. We recommend that you read the manual carefully to learn about the programming features, but if you are in a hurry, follow the example set-up instructions in the beginning of the model setup procedures sections. We have provided detailed examples for power aircraft, helicopters, and sailplanes (with two, four, and five wing servos).*

The transmitter can be used with any model type by using the desired special mixing menus for the model you are interested in — all menus are contained in both types of transmitters. The transmitters for airplanes and sailplanes (PCM 1024ZA) contain snap roll direction switches and a different throttle stick feel than the helicopter system (PCM 1024ZH).

The PCM 1024ZA System Transmitter uses a unique menu system, which allows the utmost in versatility. Instead of a single, complicated loop that forces the user to "step through" each menu on the way to the desired setting, the PCM 1024ZA allows you to proceed directly to the menu that you need, bypassing those that do not need any inputs. This system makes setting up models both rapid and simple.

You may define different groups of settings that may be called up by the setting of a single FLIGHT CONDITION switch. You may program up to eight different flight conditions for each model in the main memory area.

The exclusive optional synthesized transmitter module and receiver allow you to choose any frequency available without switching crystals or modules, or changing receivers. Electronically-activated trims are memorized for each model in memory, and can't be accidentally moved while the transmitter is off. The optional CAMPac Memory Module can store additional model setups and easily transfer them to other PCM1024Z transmitters.

All in all, the Futaba PCM1024Z is the most advanced radio control system in the world — we know that you enjoy using it for pleasurable flying!

SYSTEM USAGE

The PCM 1024Z system that you have just purchased has been designed to be the most versatile radio system possible. Because of this, a few words about the layout of the radio are called for. You are already aware that the PCM 1024Z transmitter has numerous model memories, but it is important to understand that each model memory may have several *flight condition* setups that may be switched during flight! This means that you may really call up different trim settings, mixing, and control feel as you fly the model. For example, an aircraft could have different takeoff and acrobatic settings; a helicopter could have different settings for hovering, aerobatics, and autorotation; a sailplane might be set up with independent settings for launching, thermal l ing, speed, and landing. Switching between these different settings is as easy as flipping a switch.

To accommodate this power, the PCM 1024Z system has four levels of operation: the Home Menu, the System Menu, the Model Menu, and the Condition Menu. The Home Menu appears when the system is first turned on, and displays such items as battery voltage, trim positions, one or more timers, and other functions. The top level display is what is normally displayed during operation.

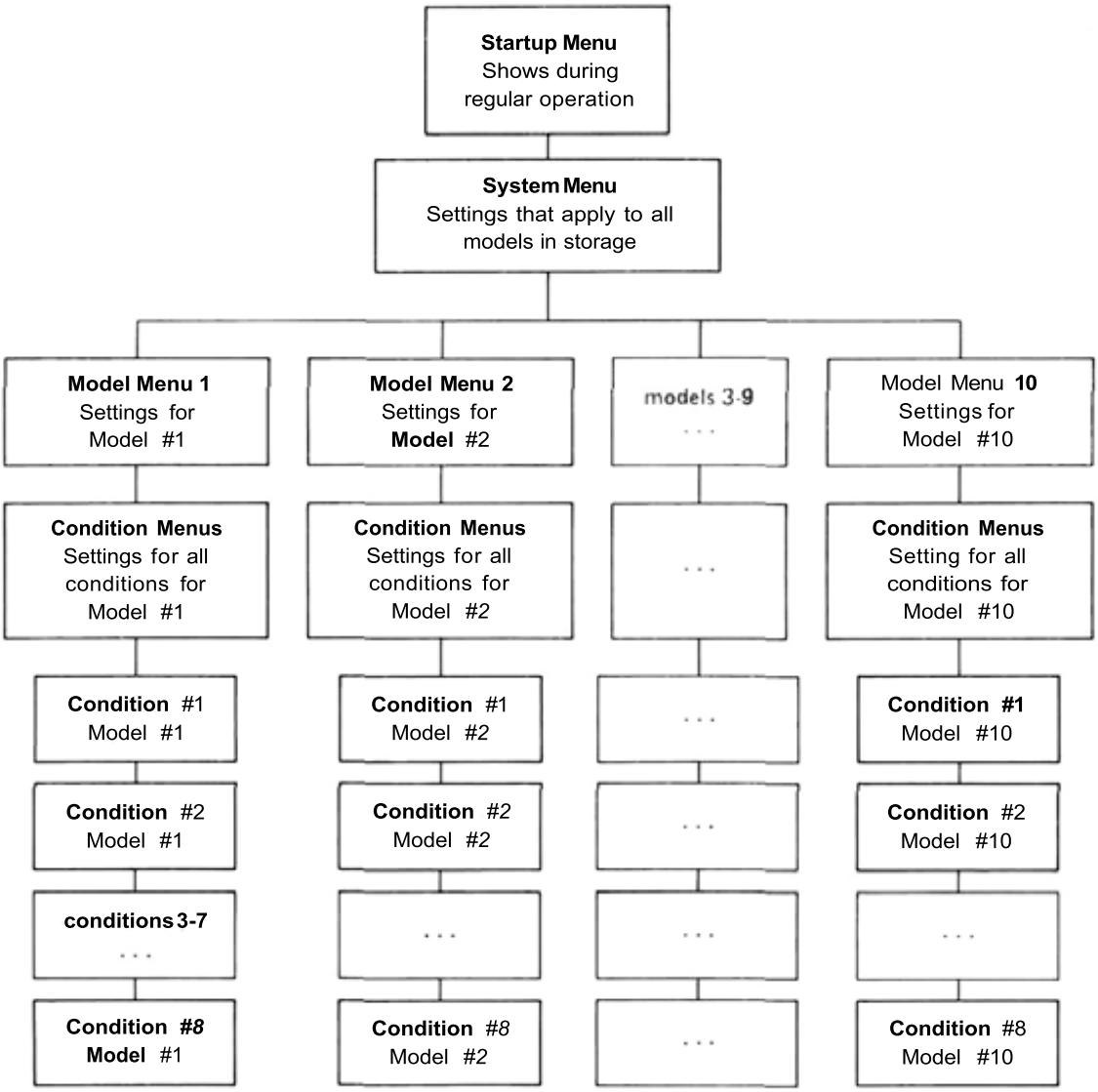
The next level down is the System Menu. The System Menu is used to choose and call up the items that apply to all model setups stored within the PCM 1024Z transmitter. This menu includes such items as Model Select (which chooses which model setup to use), Copy Model and Copy Condition, User Name inputting. Switch Setting, and other items.

Next comes the Model Menu, which contains unique information about each model stored within the PCM 1024Z's memory. Within this menu are settings that pertain to a particular model. Of course, these settings can vary for each different model. As an example, the Model Menu contains the Servo Reversing function, which may be different for each model stored.

Finally, you will find the Condition Menus. These menus are customized to the different types of models the PCM 1024Z system will accommodate: Airplane, Helicopter, and Sailplane (the three sailplane menus are further broken into the categories of 5 wing servos, 4 wing servos, and 2 wing servos). In the Condition Menus, you may set up throws, mixing functions, and other items that vary with flight conditions but are associated with one model setup.

As mentioned earlier, the PCM 1024ZA System Transmitter uses a unique menu system, which allows the utmost in versatility. The PCM 1024ZA allows you to proceed directly to the menu that you need, bypassing those that do not need any inputs, instead of forcing the owner to proceed through a single, complicated loop one menu at a time on the way to the desired setting. This system makes setting up models both rapid and simple.

This menu configuration is illustrated below.


Startup Menu
Shows during regular operation
System Menu
Settings that apply to all models in storage
Model Menu 1
Settings for Model #1
Model Menu 2
Settings for Model #2
models 3-9
Model Menu 10
Settings for Model #10
Condition Menus
Settings for all conditions for Model #1
Condition Menus
Settings for all conditions for Model #2
Condition Menus
Setting for all conditions for Model #10
Condition #1 Model #1
Condition #2 Model #1
conditions 3-7
Condition #8 Model #1
Condition #1 Model #2
Condition #2 Model #2
Condition #8 Model #2
Condition #1 Model #10
Condition #2 Model #10
Condition #8 Model #10

MANUAL LAYOUT

The instructions contained in this book are written in great detail so that you may easily understand the capabilities of your PCM 1024Z system. We recommend that you spend some time reading these instructions so that you can have a good feel of what the system can do.

After this introduction are some words about safety and proper operation of your Futaba system. Next is a section on general operational principles, including adjustments that you can make on the transmitter to make it 'fit'your flying style.

Next are instructions for system-level programming. This system-level programming is important because it is used with all three types of models that the PCM 1024Z system can be set up for. This includes model menu selection, system voltmeter operation, tachometer usage, servo bar graph display, trainer setup, and model data transmission and copying.

A section on general model settings follows. This section covers the topics of model setup that are common to all model types, such as setting throws, servo reversing, type selection, model naming, and others. The remainder of the menus are specific to the particular type of model.

After the general section is a list of the common condition menus that apply to all three types of aircraft that the 1024A system can accommodate. This is followed by three sections which describe the setup procedures for aircraft, helicopters, and sailplanes. At the beginning of each model setup section is an example setup procedure that describes all the steps needed to set up all the desired flight conditions for a model. Each of these sections assume that you are familiar with the general system-level operations sections.

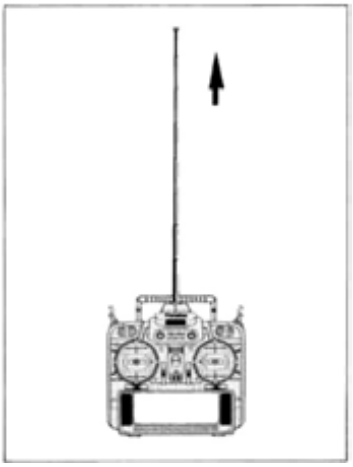
The rear of the manual contains blank data tables that may be used to record the data that you have programmed into your system, and contains technical details of this system. Be sure to make a photocopy of the blank data tables before you write in them.

We hope that you find the PCM 1024Z System Manual very hopeful. Please feel free to write to Futaba if you feel that any corrections or clarifications should be made.

FLYING SAFETY

Safety is very important when you are flying radio-controlled models. If you fail to follow the installation, setup, and operation instructions in this manual, or if you ignore warnings or rules set by others, you may cause the partial or total destruction of your radio control system, aircraft, and endanger yourself or other persons or property. You are responsible for safe operation of your model, and may be held liable for any damages your activities cause.

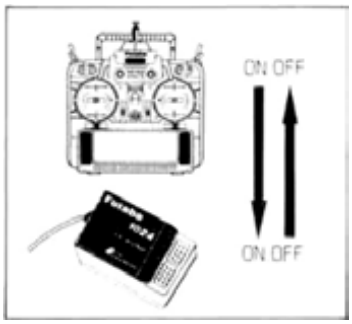
Please maintain your system properly. Install it in your aircraft using the proper procedures, inspect the model frequently for correct operation and structural and control authority, and be certain that you are capable of handling the model in unusual situations. Do not fly over or near spectators or where your model could injure any person or property. Do not fly unless you are sure of your flying skills, radio installation, and model integrity. Please ask for assistance from an experienced pilot if you are not sure about your qualifications.



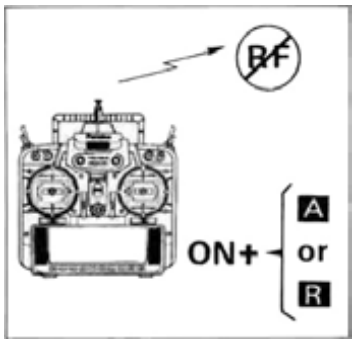
Before flying, carry out a range check on the ground with the transmitter antenna extended only one step. Note the distance you can achieve without loss of control — it should be at least 30 paces. We recommend a range check before each flying session to verify that your system is working properly.

When flying, be sure the antenna is fully extended. If the antenna is not fully extended, your model's effective range is reduced, and interference can cause difficulties even at short range.

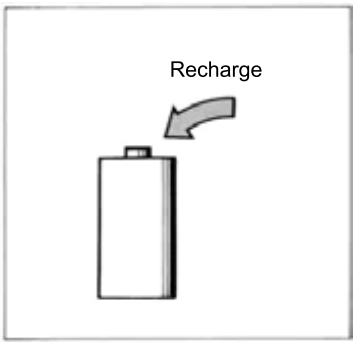
Be sure that you do not shorten the receiver antenna, either by cutting some off, or by coiling the excess up. Instead, let the excess length trail behind or below the aircraft. Cutting the antenna will reduce the effective range of the system and increase the chance of interference.



When turning on your radio system, first turn on the transmitter, then turn on the receiver. When turning off the power, turn off the receiver first, then the transmitter. If these turn-on sequences are performed in reverse order, the receiver may pick up spurious signals and cause the servos to drive hard over, causing possible damage to the radio system and the control linkages.

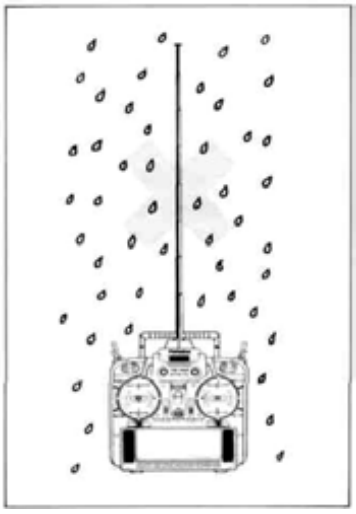


If you are using the Synthesized transmitter module FP-TK-FSS, be sure that you know the transmitting frequency before switching on. If you don't know the frequency, hold the [A] or [R] key down as you switch on power. The transmitting frequency will be displayed but radio transmission is deactivated. Once you have determined the frequency, secure the appropriate frequency control device and turn on power to operate normally.



Be sure to charge the transmitter and receiver batteries fully. If the system has not been used for a long time, be sure to charge at least 24 hours before using the system, and check both batteries with the system voltmeter at high load (500 mA). The transmitter battery should remain above 9.4 volts, and the receiver should be above 4.7 volts. IF EITHER BATTERY INDICATES LOWER THAN THIS, DO NOT FLY. Recharge the batteries first.

Do not quick charge the battery. Overcharging the battery will cause the battery to overheat and creates a very dangerous situation.



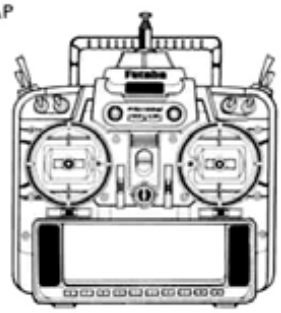
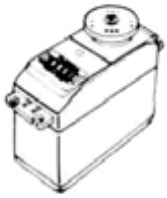
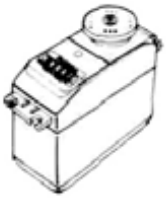
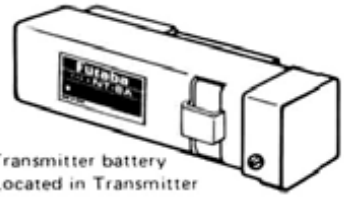
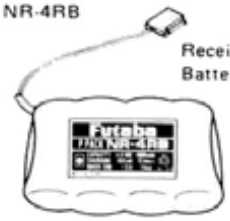
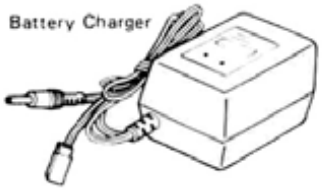
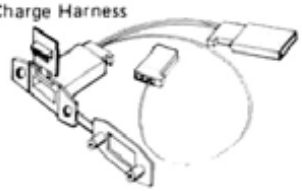
Do not expose your system to rain or allow water to get inside the case. If water does penetrate the case, control of the model could be lost, resulting in a crash and danger to others. Use a waterproof cover or wait until the conditions are dry before attempting to fly.

PCM 1024Z NOTABLE SYSTEM FEATURES

- The optional **CAMPac** memory module stores up to 10 model setups, and may be exchanged between different PCM 1024Z transmitters so that model data may be rapidly transferred, or backed up.
- The **telescoping antenna** is stored within the transmitter, but when it is extended, it may be easily rotated in any direction using the spherical joint on the top of the transmitter case.
- **Flight Condition Switching** allows preset mixing, trims, and other data to be matched to existing flight conditions immediately upon movement of a user-defined switch. A programmable Delay circuit makes smooth transitions between flight conditions. Each flight condition may have independent values for trims, mixing authorities, and presets.
- Switch **Function Position Modification** function allows the owner to set the position and function of all sticks, knobs, sliders, and switches as he desires.
- The **Type Selection Function** allows any PCM 1024Z transmitter to be used for airplanes, helicopters, or sailplanes. The model type may be selected from a menu screen.
- Exclusive **Digital Trim** function makes trim changes easy to do, remembers the trim status for each model in memory, and prevents unintentional trim changes. Trim functions may be assigned to any stick or control.
- **Large Liquid Crystal Display and Soft Keys** make model programming and data input easy. Inputs change memory instantly, so immediate verification of inputs is possible.
- The optional **Frequency Synthesized Receiver (R309DPS)** allows rapid frequency changes to eliminate frequency conflicts on crowded flying fields.
- Programmable **Trainer Function** allows the instructor to choose which functions are used for training, and a special feature allows simple correction by the instructor without disconnecting the student.
- Detachable **Transmitter Battery Pack** may be easily removed from the transmitter and charged separately, or used as an independent spare.

These are fust a few of the outstanding PCM 1024Z features. You can read about many more of the features in the manual. Please do so — or you'll never know what you've missed!

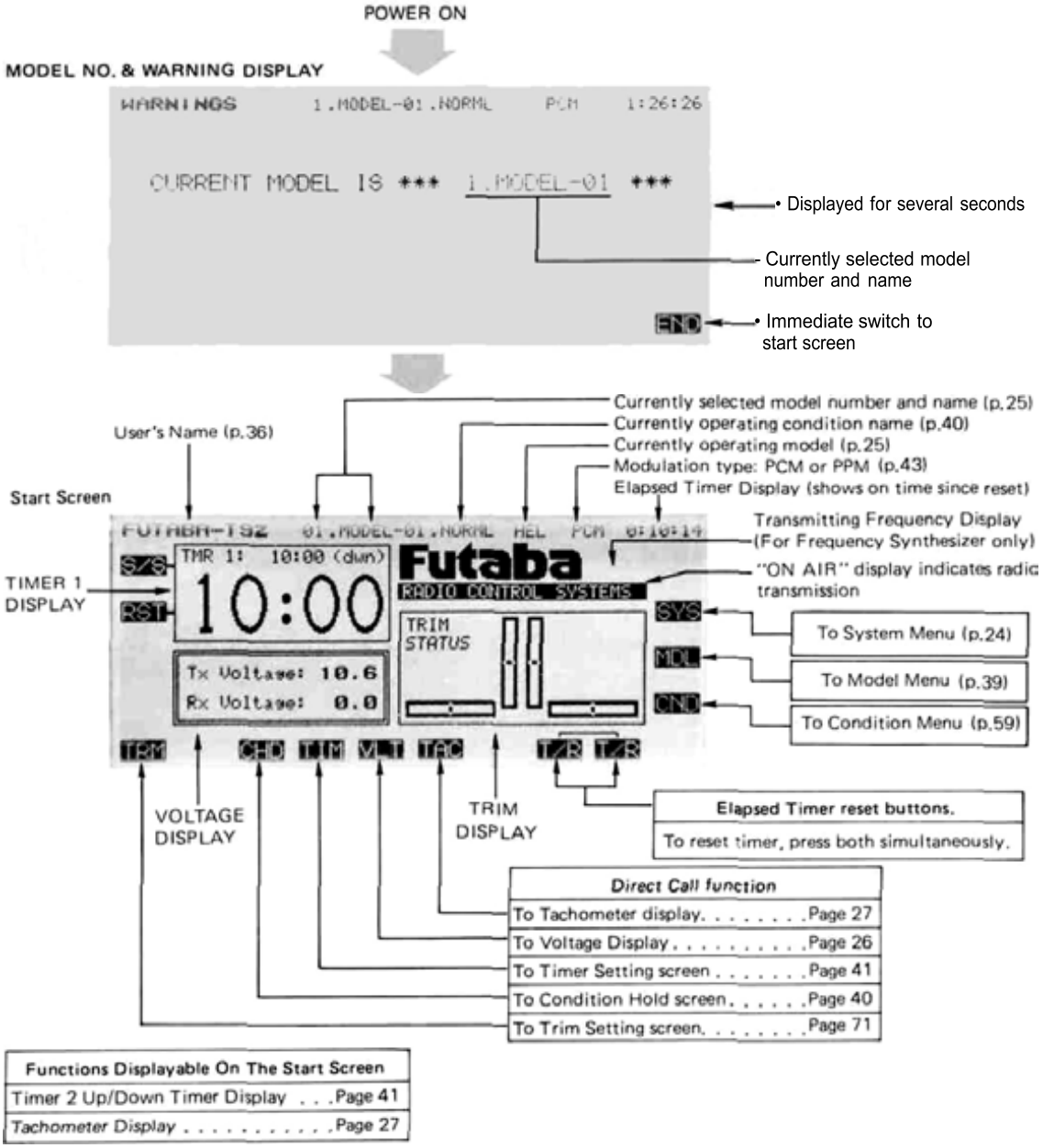
PCM 1024Z SYSTEM CONTENTS

	PCM1024ZA (For Airplanes & Sailplanes)	PCM1024ZH (For Helicopters)
Transmitter & RF module	FP-T9ZAP 	FP-T9ZHP 
	RF Module: FP-TK-FM or FP-TK-FSS (Synthesized)	
Receiver	FP-R129DP 	or FP-R309DPS 
Servo	FP-S9101x4 	FP-S9201x5 
Battery & Charger	NT-8A  Transmitter battery Located in Transmitter	NR-4RB  Receiver Battery
		FBC-19B(4) Battery Charger 
Other Accessories	Receiver Switch  Servo Extension Cord  DSC Cord  DSC/Charge Harness 	
	Also included: Frequency Flag, Servo Arms, Protection Pads, Hex Wrench, Instruction Manual, Warranty Card, Carrying Case	

POWER ON SCREEN DISPLAYS

After the transmitter's power switch is turned on, the current model number and name is displayed (see next page for what happens on the initial turn-on). Check to verify it is the desired model, otherwise you will have to change it in the System menu. There may also be a caution message displayed for any special mix functions and/or non-default flight condition switches that are turned on. This caution message will be accompanied by a warning sound of six beeps repeated every two seconds, and will continue until the offending switch is deactivated. You may hit the END key, or wait a few moments to display the starting screen.

The Home screen displays the user's name, the active model memory and flight condition, the Timer #1 display, the system voltages, and the trim status. The selection keys to the various menus are also displayed. To switch to these different screens, press the desired key A to R . BE SURE TO CHECK THE MODEL NAME AND CONDITION BEFORE FLIGHT. One of the most common crash causes is taking off with the wrong model setup loaded in the transmitter.

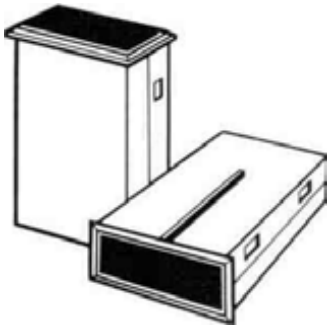


WORKING WITH THE CAMPAC MEMORY MODULE

The optional CAMPac Memory Module can be used to store model setup data separately from the transmitter. Its advanced electronic design needs no battery back-up power, so the CAMPac may be used to transfer data directly into another PCM 1024Z system.

When the transmitter power switch is turned on for the first time after the set is purchased, or when the power switch is turned on after the memory module has been changed, the "INITIALIZE EXT MEM?" message will appear at the center of the screen. Press the YES key to initialize the memory module so it is ready to store data.

The CAMPac can store and memorize as many as 16 sets of model data, depending on the number of flight conditions. When used in conjunction with the transmitter's 10-model memory, as many as 26 different model setups may be permanently stored. The table below gives the numbers of model data that the CAMPac can store, which depends on the number of flight conditions. When power is turned on, it may take some time to copy complicated model and flight condition data into the transmitter's memory. This normally takes just two or three seconds.

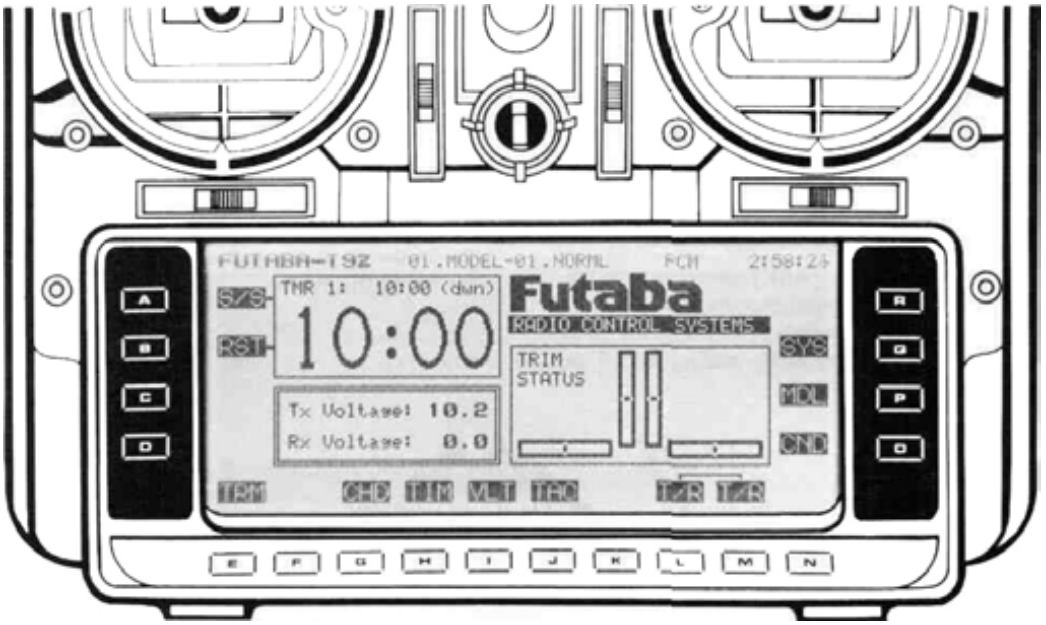


Number of flight conditions	Memorizable model data
1	16
2	9
3	6
4	5
5	4
6	3
7	3
8	2

Moving the CAMPac from one PCM 1024Z transmitter to another is one way of transferring model setups from the first to the second. Another way may be used with transmitters that do not have the CAMPac installed. This method requires an optional data transfer cord.

USING THE SOFT KEYS

The soft keys are used to call up the different menus during operation and programming. For example, to call up the System Menu from the home screen shown above, press the Q key (next to the SYS label). Press the A to R keys that correspond with the function names to get to that particular function. Whenever a key is pressed, you will hear a confirmation beep.



OPERATION WITHOUT RADIO TRAMSMISSION

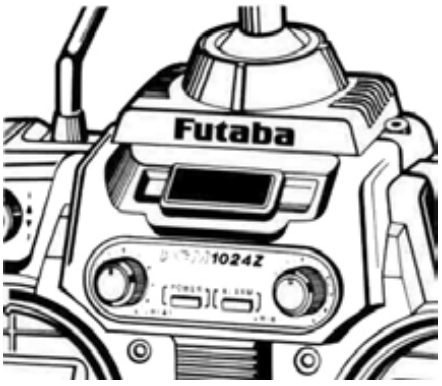
If you'd like to make some small corrections to a setup OR find out what frequency the Synthesizer module is set for without radiating AND without removing the transmitter RF module or using the DSC cable, you can do this by turning on the power switch while simultaneously holding the A or R keys. This may also be used to find out what frequency the synthesizer transmitter module will be using. When you power up the system this way, check to be sure that the "ON AIR" display is not on. You can now set the data or check whatever you need to. When you are done, you may reset the transmitter by turning off the power switch. The transmitter will radiate normally on the next turn-on.

SYSTEM MONITOR LIGHTS & WARNINGS

There are two indicator lights above the power switch on either side. The right-hand light flashes when the transmitter is transmitting, or if a flight condition or mixing switch is activated. The left-hand indicator lights when the system power is on, and blinks during automatic data transfer.

In the airplane mode, either the Snap Roll [SNP] or the Airbrake [ABK] switches will light the indicator lights. For helicopters, Throttle Hold [HLD] or Inverted switches [INV] will cause flashing. In sailplanes, Butterfly mixing [BFY] will activate the light.

You should also be aware that a beep sounds every four seconds when Condition Hold [CHD] is operating to remind you to turn it off. For your convenience, the left and right sliders on the sides of the transmitters emit a beep whenever they are set at their center positions. This feature allows you to center them without having to take your eyes off of the model.

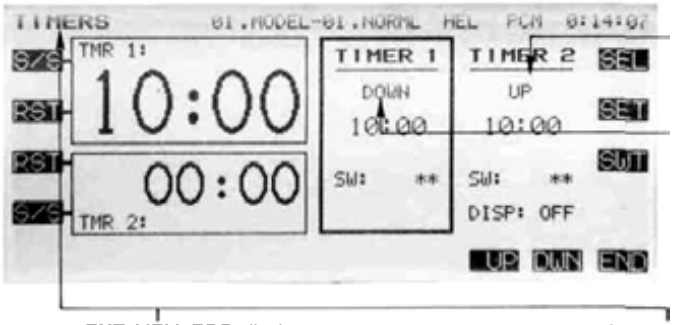


CAUTION!

If you are using the Synthesized transmitter module FP-TK-FSS, be sure that you know the transmitting frequency before switching on. If you don't know the frequency, hold the A or R key down as you switch on power. The transmitting frequency will be displayed but radio transmission is deactivated. Once you have determined the frequency, secure the appropriate frequency control device and turn on power to operate normally.

SYSTEM STATUS AND ALARM DISPLAYS

The PCM 1024Z System provides you with a number of indicators and displays to show you that your system is operating correctly. This **section will explain each display's function**



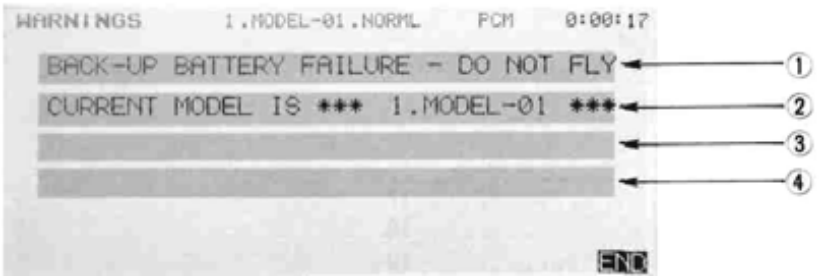
ON AIR display and beep
This display is turned **on when radio waves are** being transmitted.

Enter ID No. display
This display indicates when the security mode is set. In this case, model data cannot be changed. See the section on data protection to reset this display.

EXT MEM ERR display
This display blinks when a data error occurred during transmission of data between the transmitter memory and the memory module. Turn off the power. DO NOT REMOVE OR INSERT THE MEMORY MODULE WITH THE POWER TURNED ON. THIS ACTION COULD DESTROY THE MODULE.

LOW BATTERY display and beep
This display and warning beep **are to notify the operator** that the transmitter battery is low.
TO PREVENT PROBLEMS, LAND THE MODEL AS SOON AS POSSIBLE.

PLL ERROR and beep
This display blinks and sounds when the synthesized frequency module is removed during operation.
Be sure to turn off power before installing the module. Do not remove or insert the module with power on.



(D BACK-UP BATTERY FAILURE - DO NOT FLY
This warning is displayed when the data stored has been lost for some reason. A beep will sound simultaneously. When the power switch is turned on again, the error display goes off and the data returns to the factory default state. The lithium data backup battery needs to be replaced, or there is a fault in the system. Return the system to the Futaba service center for assistance. The life of the lithium battery varies, but is usually at least five years.

2 CURRENT MODEL IS*** ##.NAME ***
This display shows the model number and model name currently stored in the active area of the transmitter. It will disappear a few seconds after the system is turned on.

DATA PAC IS MISSING - LOADED MODEL1
This message is displayed whenever the transmitter is turned on with the memory module removed and the active model data was stored on the module. Without the desired model data, the system loads the Model 1 data instead.

3 CAUTION: NON-DEFAULT COND IS ACTIVE
This warning message is displayed, and a beep sounds, whenever the transmitter is turned on with a flight condition switch activated. This display and alarm will turn off as soon as the flight condition switch is turned off.

4 CAUTION: SPECIAL MIX FNCT IS ACTIVE
This message and alarm are activated when the transmitter is turned on with a mixing switch activated. The alarm monitor above the power switch also blinks. All of these will stop as soon as the mix switch is changed to its OFF position.

CAUTION: ENGINE CUT FNCT IS ACTIVE
If the power is turned on with the engine cut switch on, this message is displayed and a beep sounds. When the engine cut switch is turned off, the display and alarm stop.

USING YOUR FUTABA SYSTEM

This section contains information on charging the batteries in your system, and installing the airborne components in your model. We will also tell you all the ways that you may customize your PCM 1024Z System mechanically, so it "feels right" in your hands.

Then, we will show you all the features that are used by all the model types that may be controlled by the PCM 1024Z system. This will include all the exclusive PCM 1024Z features, including timers, trim settings, voltmeter with load, direct-servo connect, and trainer systems.

Using Your Futaba System: Contents

Radio Installation 17
Charging & Direct Servo Connect Operation 18
Stick Length Adjustment 19
Stick Tension Adjustment 19
Stick angle adjustment 20
Antenna Angle Adjustment 20
Rubber Protective Pad Installation 21
Transmitter Battery Replacement 21
Transmitter RF Module 22
Optional Synthesized Frequency Module & Receiver
(see caution message) 22
Flight Condition Switching 23

RADIO INSTALLATION

Please observe the following precautions during the installation of the radio into your model and subsequent flying activities:

Servo Installation

Mount each servo snugly to a sturdy plywood servo tray or use the provided mounting trays. Use the supplied rubber grommets on the mounting ears, and tighten the screws to hold things snugly but try not to crush the grommets completely. If you squeeze them too much, their vibration dampening characteristics will be reduced.

Receiver connections

Connect the receiver, servos, switch, battery, and gyro (if used) in accordance with the model setup directions given in the appropriate model sections. For aircraft, see page 80. For helicopters, refer to page 104. For sailplanes and electrics, use page **130.**

Receiver Installation

Wrap the receiver in cushioning foam rubber, and place it in a sealed plastic bag to prevent it from fuel leaks or inadvertent water landings. Use rubber bands wrapped around the receiver to provide strain relief for the antenna, switch, and servo wiring. Secure with foam pieces on all sides.

Run the antenna down the inside of the fuselage, or secure it to the top of the vertical fin with a small rubber band. Do not shorten excess antenna wire, or tie it into a bundle. Reduced range could result. If you experience problems with an internal antenna, try routing it differently, or move it outside of the model fuselage.

Switch Harness Installation

When you install the switch harness, be sure that the rectangular hole is slightly longer than the full switch stroke, so that it moves smoothly from On to Off and vice versa. Try to install the switch on the opposite side from the engine exhaust, and away from dust or dirt.

System and Servo Operation Check

Turn on the transmitter power first, then the receiver power. Be sure that the transmitter antenna is fully extended. All servos will travel to their neutral positions. Operate the transmitter sticks, knobs, and levers individually and be sure that the appropriate servo follows the control movement. If a servo does not move as it should, first check to see that it is plugged into the correct receiver output. If it is not, move it to the correct output. If it is in the correct location, verify that you have activated the appropriate mixing functions.

Now, connect each servo with its pushrod. Again move each transmitter control in succession, verifying that control movement is the proper direction. If a servo does not move in the proper direction, use the reversing function [REV] in the Model menu.

Servo Throw Adjustment

Operate each control over its full travel, and check that the servos don't bind and that there are no loose connections. If the servo does bind, the current drain will be very high, and your battery will not last for much time. This exposes a risk of crashing due to a low receiver battery.

Make sure that the servo can move its entire throw amounts (including trim) without binding anywhere. If necessary, use the Adjustable Throw Volume [ATV] menu to reduce servo travel so it does not bind.

Range Check

After installation is complete, perform a ground range check by extending the transmitter antenna only one step. With the receiver antenna full length, step 25-50 paces from the model. The servos should operate normally at this distance. Continue walking away until control is lost, and note the approximate distance. This is your ground range, and should be repeated before each flying session.

Electrical Noise

Electrical noise is created by the touching of two metal parts, and creates "static" similar to that heard on an AM radio during a thunderstorm. Your Futaba radio set is resistant to electrical noise, but no set may be made completely immune. For best flying range, avoid metal-to-metal contact wherever possible.

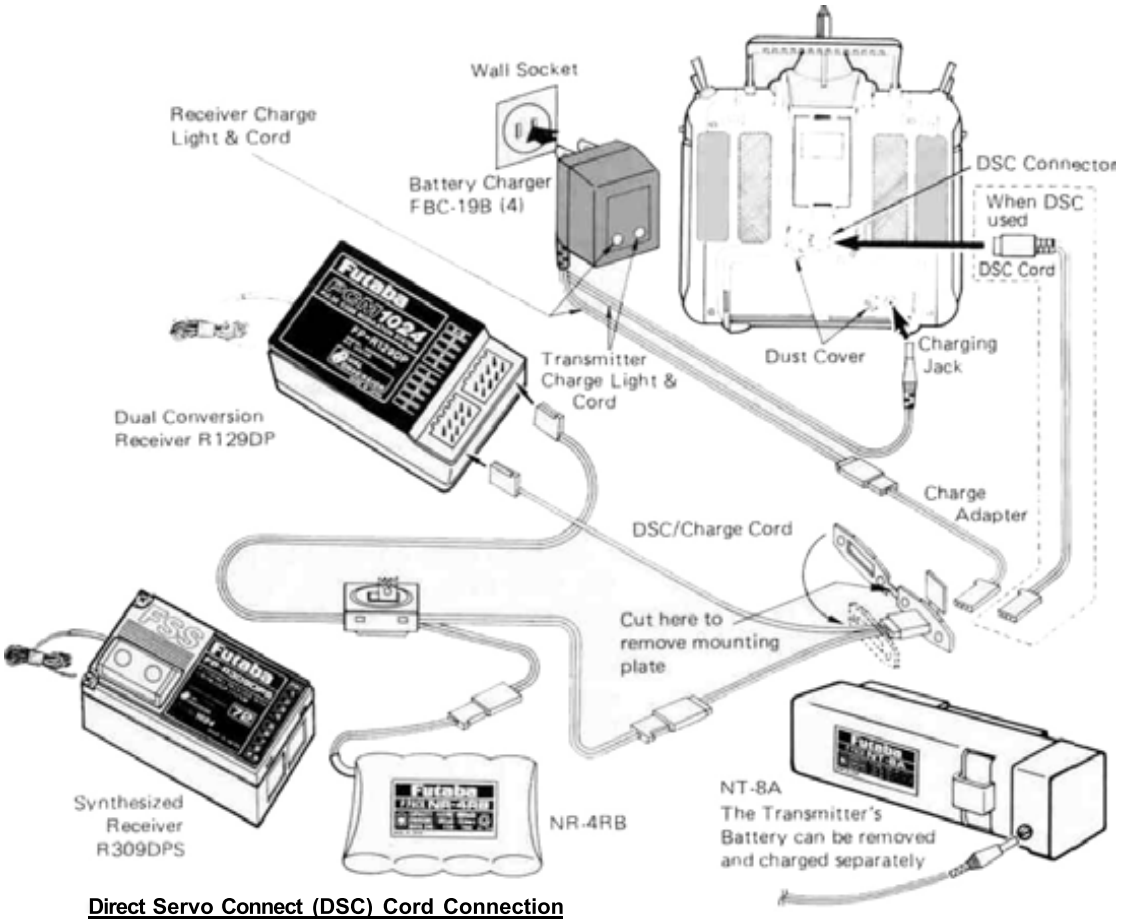
CHARGING & DIRECT SERVO CONNECT OPERATION

Battery Charging

Your Futaba FP-9ZAP and -9ZAH system is equipped with rechargeable Nickel-Cadmium batteries. The figure shows the necessary connections for charging the transmitter and receiver battery packs. Both packs may be charged at the same time or they may be charged individually. The charging connections bypass the power switches, so the set will not operate even if switched on.

The minimum recommended charge time for a spent battery is 15 hours, but it will not damage the batteries to charge them longer. However, if the battery has not been used for some time, it may take several charge/discharge cycles before the battery resumes its full-capacity flight duration.

When fully charged, the system will provide approximately 60-80 minutes of flying time, providing there is no stalling of the servos. Be sure to check the state of the receiver battery frequently with the built-in voltmeter function [VLT] in the System menu. If the receiver battery drops below 4.4 volts under load, do not attempt to fly.



Direct Servo Connect (DSC) Cord Connection

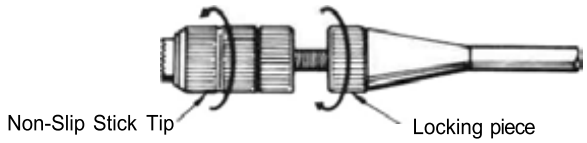
Using the DSC system, you may directly connect the transmitter to the receiver without having to transmit radio waves. This feature can be extremely useful for adjusting any settings on the model without worrying about frequency clearance. Additionally, with the receiver off, the DSC cord may be used to measure the receiver battery voltage (for this display, see VLT in the System menu).

When you wish to use the DSC system, you will need to install the accessory DSC/Charge Cord into the side of the model fuselage (this cord may also be used for charging). To operate, plug the DSC cable into the receiver jack, then plug the round DIN connector into the back of the transmitter. Switch on the receiver ONLY — not the transmitter.

To check the receiver battery voltage, switch off the receiver and move to the VLT menu in the System area. You may apply different current loads to assess the condition of the receiver battery. When you are through with DSC and/or Receiver battery monitoring, remove the DIN connector from the rear of the transmitter.

STICK LENGTH ADJUSTMENT

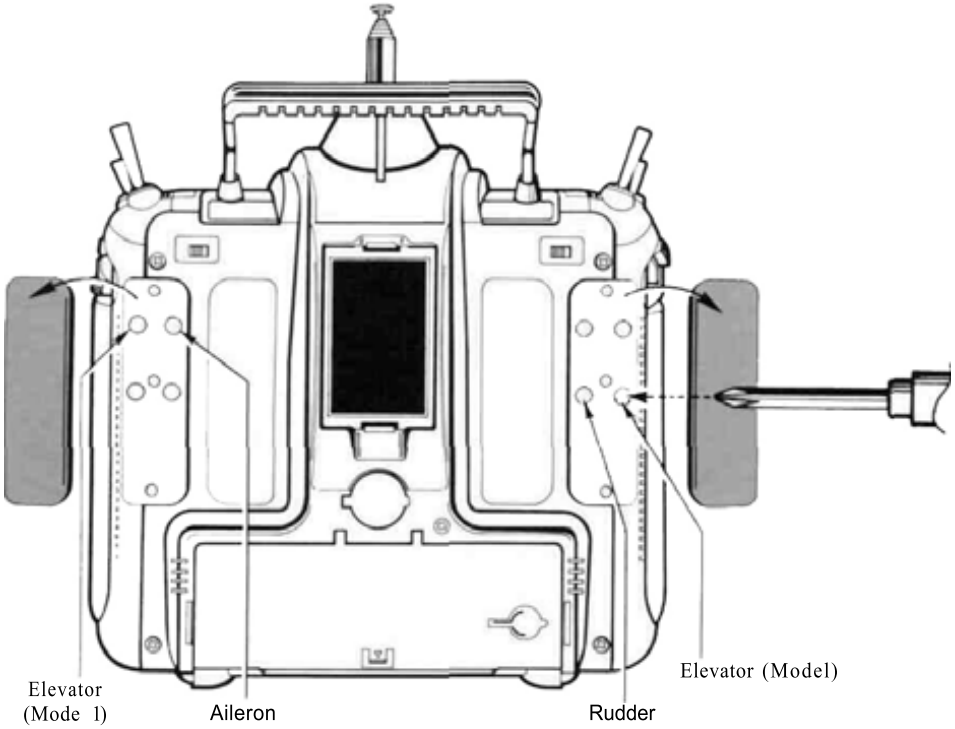
The sticks on your PCM 1024Z System feature non-slip ends, and the length may be adjusted to be most comfortable for the pilot. To change stick length, unlock the stick tip by turning counter-clockwise. Move the tip to the desired position, and then lock to length by moving the locking piece upwards counterclockwise.



STICK TENSION ADJUSTMENT

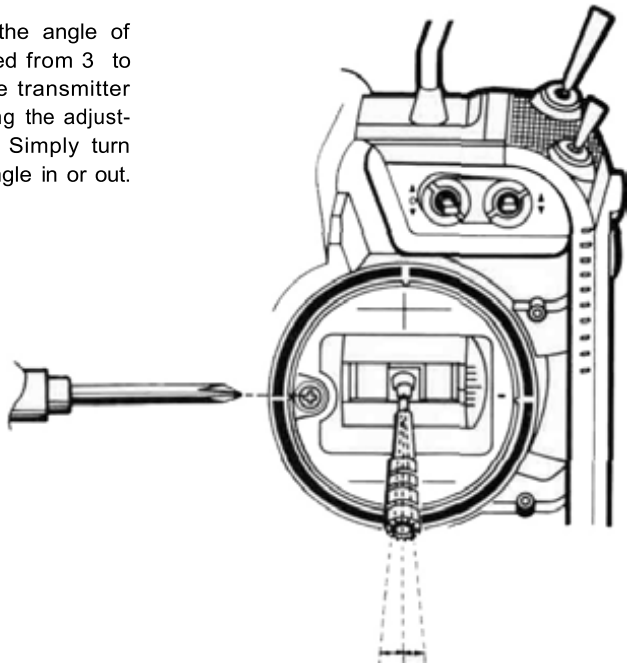
You may easily adjust the tension in the PCM 1024Z sticks to suit your personal preferences. To adjust, you will need to get access to the adjustment screws in the back of the transmitter.

Gently pull up on the rubber grip and remove it from the rear of the transmitter. Then, use a small cross-point screwdriver to change the length of the springs which tightens or loosens them. Be careful not to push too hard, as it is possible to damage the inside of the transmitter. Always turn off transmitter power before adjusting stick tension.



STICK ANGLE ADJUSTMENT

For the comfort of the operator, the angle of the open gimbal sticks may be adjusted from 3 to the inside to 4.5° to the outside of the transmitter case. This angle is adjusted by rotating the adjustable screw as shown in the figure. Simply turn adjusting screw to change the stick angle in or out.

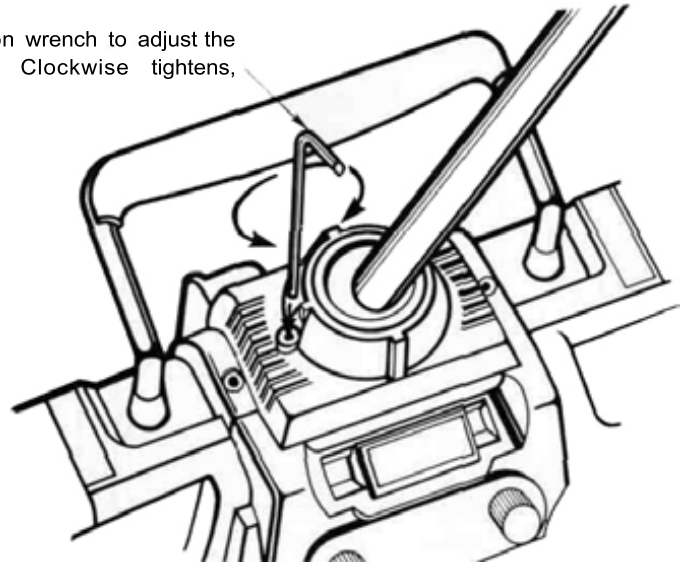


ANTENNA ANGLE ADJUSTMENT

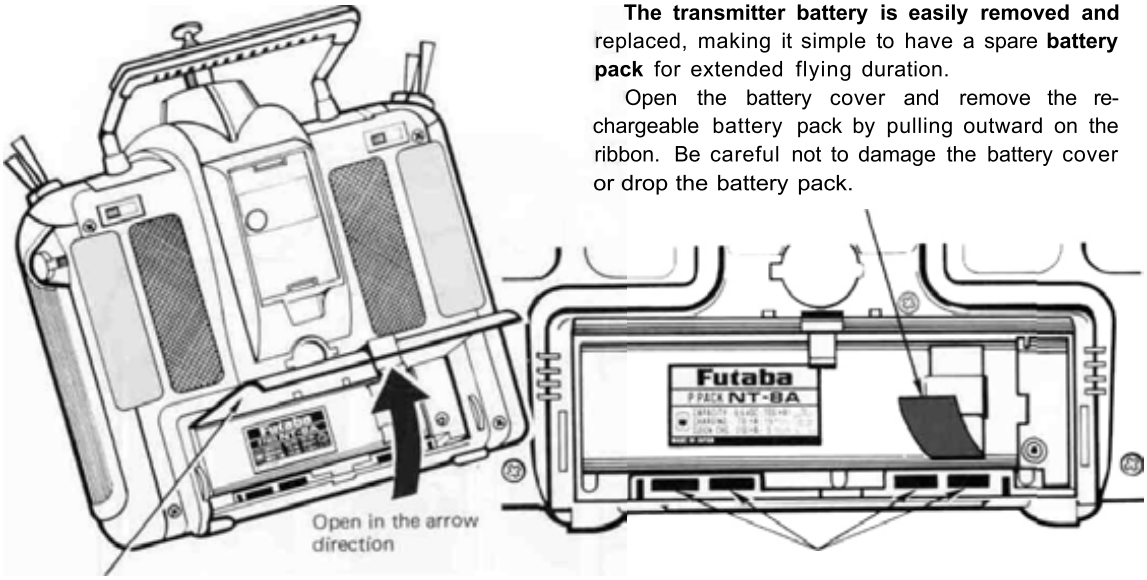
Your PCM 1024Z system features an antenna that may easily be pivoted to a direction that you like. Simply move it to the desired pointing angle. Before collapsing the base of the antenna into the transmitter, return it to the straight-up position. If the antenna is tilted, it will not fit into its housing.

The force required to pivot the antenna may be easily adjusted. If the antenna movement is too tight, collapsing into the case will be difficult.

Use the supplied hexagon wrench to adjust the resistance to movement. Clockwise tightens, counterclockwise loosens.



TRANSMITTER BATTERY REPLACEMENT

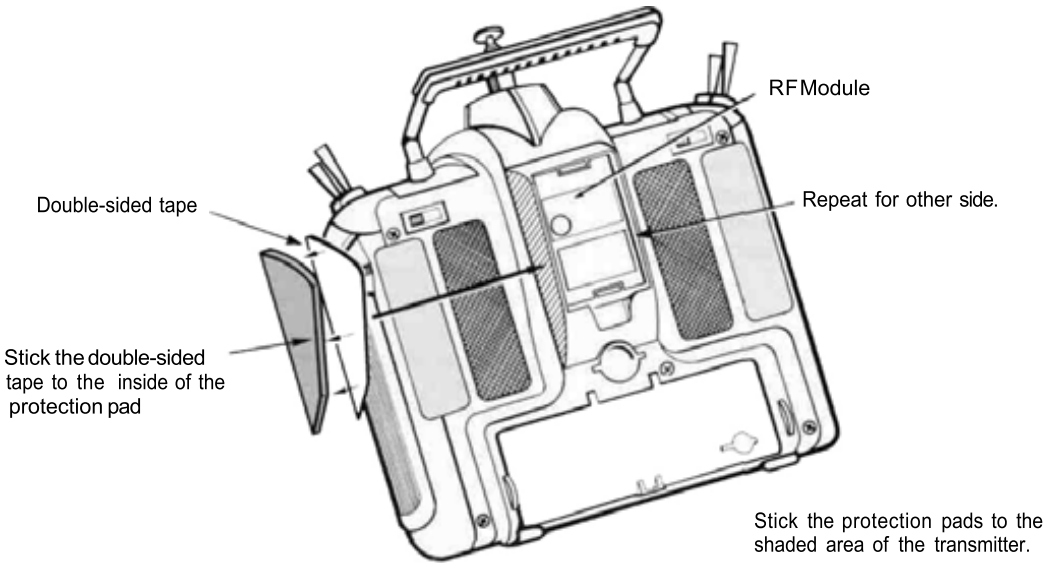


The transmitter battery is easily removed and replaced, making it simple to have a spare **battery pack** for extended flying duration.

Open the battery cover and remove the re-chargeable battery pack by pulling outward on the ribbon. Be careful not to damage the battery cover or drop the battery pack.

RUBBER PROTECTIVE PAD INSTALLATION

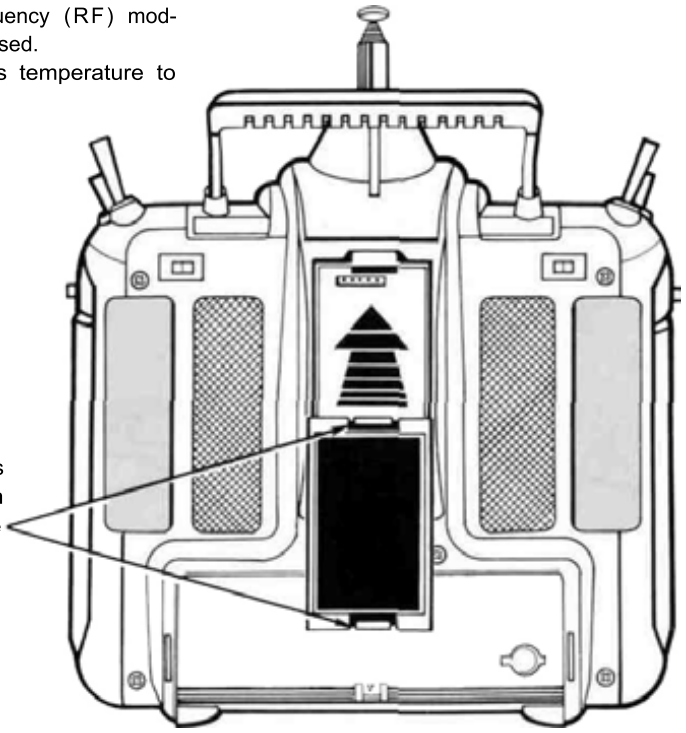
We recommend that rubber protection pads **be** installed in case the transmitter is ever rested on its back.



TRANSMITTER **RF** MODULE

The PCM 1024Z transmitter is designed to work with either the FP-TK-FM or the FP-TK-FSS frequency-synthesized Radio Frequency (RF) modules. Other modules may not be used.

It is normal for the module's temperature to rise during operation.



To remove the module, press inwards on the top and bottom tabs and simultaneously pull the module away from the rear of the transmitter.

OPTIONAL SYNTHESIZED FREQUENCY MODULE & RECEIVER

The R309DPS synthesized-frequency receiver and matching transmitter frequency module are supplied with the PCM1024ZAPS and PCM 1024ZHPS systems. The transmitting and receiving frequency may be easily changed without removing any crystals or exchanging frequency modules. The ability to rapidly change frequency is a great advantage on a crowded flying field or in contest entry.

The receiver will also work with any other Futaba 1024 systems. For more information on the synthesized system, refer to page 37.

CAUTION

If you are using the Synthesized transmitter module FP-TK-FSS, be sure that you know the transmitting frequency before switching on. If you don't know the frequency, hold the A or R key down as you switch on power. The transmitting frequency will be displayed but radio transmission is deactivated. Once you have determined the frequency, secure the appropriate frequency control device and turn on power to operate normally.

FLIGHT CONDITION SWITCHING

Flight control switching is among the most powerful features available in your PCM 1024Z system. It is a function that allows you to change virtually all the models' trims, mix settings, and responses with the flick of a switch — while your model is airborne! You can think of this as a means of switching between as many as eight different model setups as you desire.

All the mixing and deflection angles can be changed during flight condition switching. You may pick and choose those settings that result in the best flight characteristics for your model, and leave the rest alone.

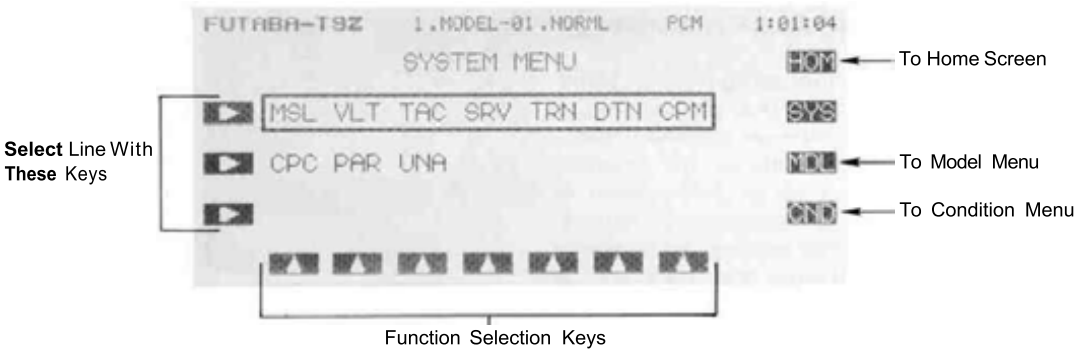
As an example, you may set up different conditions corresponding to varying crosswind situations, or you can have different response "feels", like a reduced control authority for smoother landings. You may call up an entire group of settings for a snap roll on a single switch. Helicopters may be set up for best response for aerobatics and autorotation. Sailplanes may have settings matched to the very different flight conditions for launching, normal cruise, speed, distance, and landing.

You may think of the different condition settings as sheets of paper in a folder, and the transmitter as an envelope with a clear window. As you select each flight condition, you see its parameters through the window, and not those of the others. Each "sheet" can have completely different settings on it.

SYSTEM MENU

The following controls and menus are used for system-wide settings. These are settings that are stored for, or may be used for any and all of the different model setups stored in the PCM 1024Z's memory.

To select any of these keys, first select the horizontal line containing the item you wish to select, using the B or C keys adjacent to the left-hand side of the screen. Then, select the desired item with the F to L keys underneath the display.



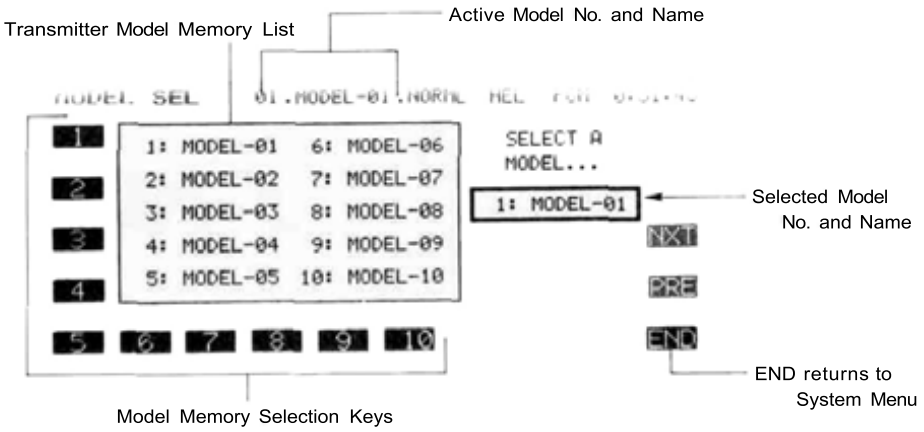
Listed below are the contents of the System Settings Menu:

System Menu Contents

Item	Definition	Function	Page
MSL	Model Selection	Use to load desired model's settings	25
VLT.	Voltmeter	Use adjustable load to check batteries	26
TAC.	Tachometer	Measures propeller rotational speed	27
SRV	Servo Test & Bar Graph Display	Displays servo positions and cycles	28
TRN	Trainer System	Sets desired instructional. channels	29
DTN	Data Transfer Function	Copies model data to another 1024Z	30
CPM	Copy Model Function	Copies a setup into a second. memory	31
CPC.	Copy Condition Function	Copies a single condition to another	32
PAR.	Parameters.	Sets Auto-Off and Screen Contrast	33
UNA	User Name Registration	Set up your name & security code	34
FRQ	Transmitter Frequency. Setting	1024ZAPS/HPS Synthesized systems only (See CAUTION message)	35
Setting The Frequency Synthesizer. Receiver		Choosing the desired frequency	36
SWT	Switch Setting.	Use to define switch to. activate functions	37

MS L—MODEL SELECTION

This function is used to load the settings of the desired model into the PCM 1024Z's memory. The settings may be selected from either the transmitter's built-in memories, or from an optional CAMPac. Remember that up to 10 memories are available in the transmitter, and as many as 16 may be stored in the CAMPac. The CAMPac is not loaded with default models initially; they must be loaded with the Copy Model [CPM] function.



To load a desired model from internal transmitter memory to the active area:

1. Select the desired model number with the A to J (1 to 1 0) keys
2. Press the **L** (***YES***) key if correct, otherwise use the **M** (NO) key to start over. Verify that the chosen model number and name is now shown in the display's top center.
3. Finish by pressing the **N** (***END***) key.

To load a desired model from CAMPac memory module to the active area:

1. Press the **P** (NXT) key to display the first ten models in the memory module's contents. Press it again to get the remaining models. To return to the previous model list, press (PRE). Select the desired model number with the A to J (11 to **20** or 21 to 26) keys.
2. Press the **L** (***YES***) key if correct, otherwise use the M (*NO*) key to start over. Verify that the chosen model number and name is now shown in the display's top center.
3. Finish by pressing the N (**END**) key.

To DELETE a desired model from CAMPac memory module:

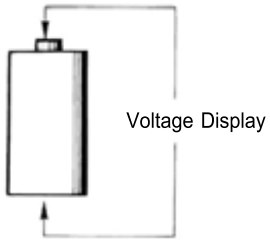
1. Press the P (NXT) key to display the first ten models in the memory module's contents. Press it again to get the remaining models. To return to the previous model list, press (PRE). Select the desired model number with the A to J (11 to 20 or 21to 26) keys.
2. Press the **L** (YES) key if correct, otherwise use the **R**(DEL) key to start over. Verify that the chosen model number and name is now shown in the display's top center.
3. Press the **R** (DEL) key.
4. If this is the correct model to delete, press the L (YES) key. To choose another, press the M (NO) key.
5. Verify the deletion from the model list. Then, exit by pressing the N (END) key.

VLT—BATTERY VOLTAGE DISPLAY

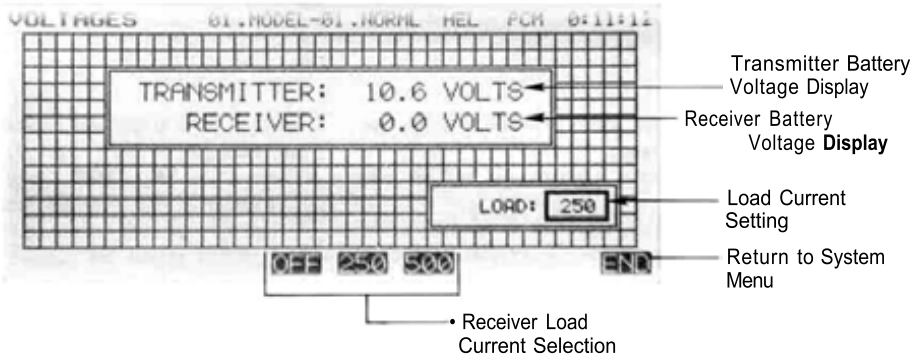
This function may be used to check the voltage of both the transmitter and receiver batteries with a high-accuracy digital voltmeter, which continuously displays the measured results. The table below indicates the measurement range of the voltmeter.

The receiver battery may be tested with either no load, or a load of 250 or 500 mA current flow. Testing of the receiver battery requires a DSC cord (the transmitter is always connected internally). Be sure that the polarity of the receiver battery is correct, or damage to the transmitter may result.

An alarm in the PCM 1024Z transmitter will go off when the transmitter battery voltage becomes too low. If you happen to be flying when this alarm goes off, be sure to land as soon as possible before control is lost.



Item	Voltage Range	Remarks
No Load	0-18V	OFF
Load (Choose)	3- 7V	Approx. 250 or 500 mA



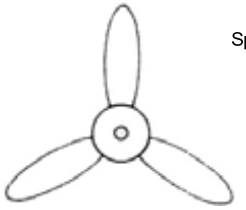
To switch loads on the receiver battery:

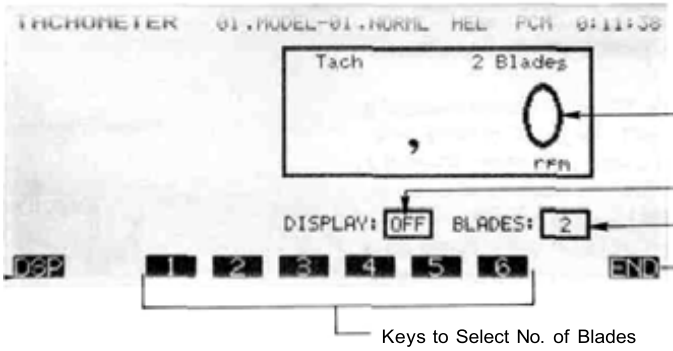
1. For no load, press the 0 (OFF) key
2. For the 250 mA load, press the J (250) key
3. For the 500 mA load, press the K (500) key.
4. To leave the voltmeter function, press the N (END) key.

Note: if you do not activate the second timer, the voltmeter display appears on the regular screen.

TAC—TACHOMETER

The tachometer function in the PCM 1024Z transmitter may be conveniently used to measure the rotational speed of any propeller or rotor blade, up to a maximum of 50,000 RPM. This is very useful for testing engine performance, rotor settings, etc. If you like, you may have the TAC display always appear on the Home screen.





To choose the number of blades on the propeller, use the G to L (1 to 6) keys. To display the TAC display on the Home screen, press the E (DSP) key. This key toggles the display on or off. Use the N (END) key to exit the TAC display.

Propeller Speed Measurement

1. BE VERY CAREFUL IN THE VICINITY OF THE PROPELLER. KEEP YOUR HANDS AND ALL EQUIPMENT AWAY FROM THE TURNING PROP.
2. Point the sensor, which is located in the left-hand side of the PCM 1024Z transmitter, towards the propeller. Read the measured rotational speed. You may have to change the relative orientation to get a steady reading.

NOTE: Fluorescent lights in the vicinity of the propeller can produce erroneous readings. If you can't make your measurements outdoors, use an incandescent light or flashlight to get a true reading.

SRV—SERVO CYCLE & BAR GRAPH DISPLAY

This key has two different functions: a servo cycling mode, which slowly moves each servo to its extreme positions, and a servo bar graph indication, which pictorially shows the position to which each servo is being commanded. The servo test function is useful for finding unevenness in servos, and the bar graph function may be used for roughly setting up models without using a receiver or servos. This can be particularly handy in setting up models with complicated mixing functions, because the results of each stick, lever, knob, switch input and delay circuit may be immediately seen.

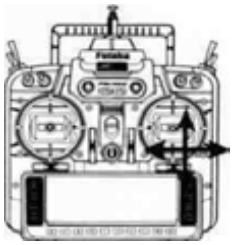
The servo bar graph display is always operating in this mode. To activate the servo cycling function, first turn on the airborne system. Press the E (ON) key to start the servo cycling mode, and use the F (OFF) key to stop the cycling.

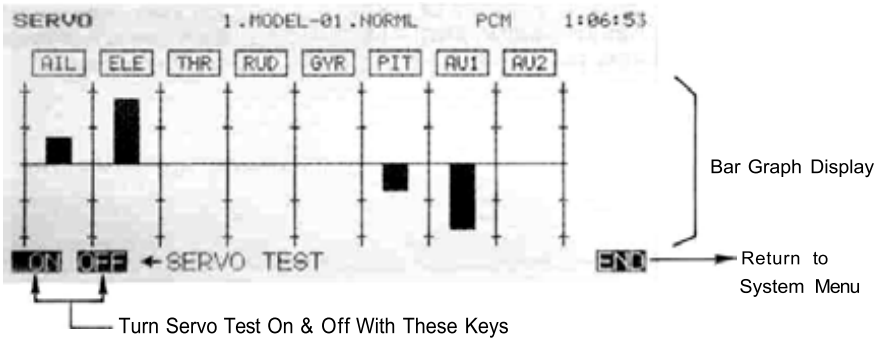
When using the Bar Graph display to set up a model or mix, be sure to verify that all controls move the proper directions when actuated. Depending on servo orientation, it is possible that the bar graph may indicate what appears to be the correct directions of throw when one or more servos actually need reversing.

Use the END key N to leave this function and return to the System Menu.

Check Servos By Cycling

Check Functions and Mixing



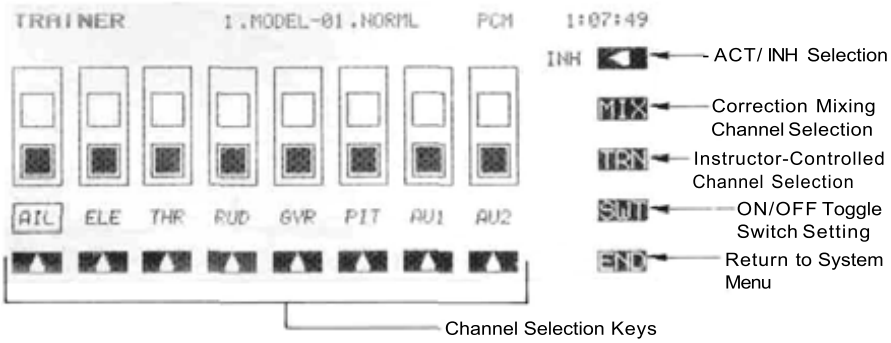


TRN—TRAINER SYSTEM

The Trainer function makes it possible for the instructor pilot to choose which functions and channels are to be used for instruction, making it possible to match the training difficulty to the student's skill level. A special function called Correction Control makes it possible for the instructor **to** make corrections without overriding the student's inputs. Two transmitters must be connected by an optional Trainer/Data Transfer cord, and the Instructor transmitter should be programmed for trainer operation, as described below.

Operation is simple: when the Instructor activates the trainer switch, the Student has control of the aircraft (if the mixing mode is turned on, the Instructor can make corrections while the student has control). When the Instructor releases the switch, control is regained. This is very useful when the Student gets the aircraft into an undesirable situation.

The training system will work with any PCM 1024Z series transmitter. Futaba's 5U and 7U series of transmitters may also be connected for a student's usage. Note that in some cases a low battery warning may appear on the 7U series, but operation is unaffected by this warning.



TRAINER MODE SETUP

To place the PCM 1024Z into the Trainer mode, press the TRN key from the System Menu. The Rkey successively toggles between ACTIVATE and INHIBIT, with the current mode displayed just to the left of the key. Once activated, the operation mode for each channel is selected. PLACE THE STUDENT TRANSMITTER IN PPM PULSE MODE. The instructor's transmitter may be in any transmission mode.

Controls and functions in both transmitters should be matched. With two PCM 1024Z transmitters, matching may be done easily using the Data Transfer DTN key described on page 30. When using 5U and 7U transmitters, be sure that EACH transmitter command works properly before flying. All channel assignments and throw directions must be identical.

The Instructor's power switch should be turned on, with its antenna fully extended. The student's transmitter switch must always be turned off. In addition, the student must not operate his trainer switch, or problems may occur.

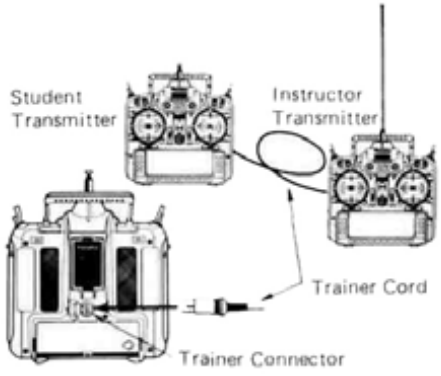
CHANNEL SELECTION

Select the desired channel using the E to L up-arrow keys. At this point, one can choose from student-only control and correction control. For Student-only control, press the P (TRN) key. This will cause the lower square in the chosen channel to become filled. For Correction control, press the (MIX) key. This action fills in the upper square in the active channel. If neither square is filled, only the instructor can control this particular function.

SETTING UP THE ON/OFF SWITCH

The default switch for the trainer ON/OFF function is the spring-loaded switch SW(H), with forward in the ON position. This switch must be held ON continuously for the student to have control. For convenience, the alternate switch function (ALT) may be used to set this switch so that it is alternately turned on and off successively each time the switch is operated.

The location of the activation switch, as well as its direction and operation, may changed using the switch setting screen available by pressing the O (*SWT)* key. For more details on the switch setting menu, see page 37.



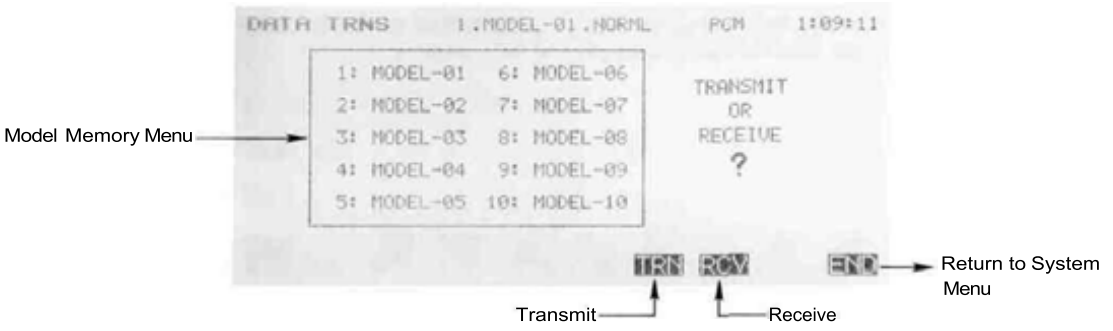
DTN—DATA TRANSFER FUNCTION

This function may be used to exchange model setup data between two PCM 1024Z transmitters. Identical model setups are needed for trainer operation, and it is also useful to transfer data to a friend's transmitter to speed the setup process for a model with complicated mixing and flight modes, to avoid doing the setup process from scratch.

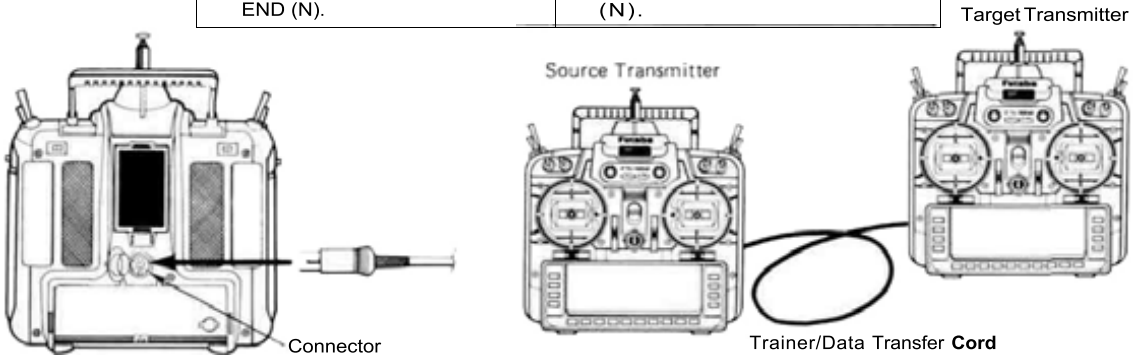
An optional Trainer/Data Transfer Cable is necessary for this operation. The time needed to transfer data depends on the number of flight conditions, and ranges from 1 to 18 seconds.

Data Transfer Mode Setup

First, connect the two PCM 1024Z transmitters with the data transfer cord. To place the PCM 1024Z into the Data Transfer mode, press the DTN key from the System Menu. Then, follow the following instructions (if you want to start over the beginning, press the abort ABT key L.



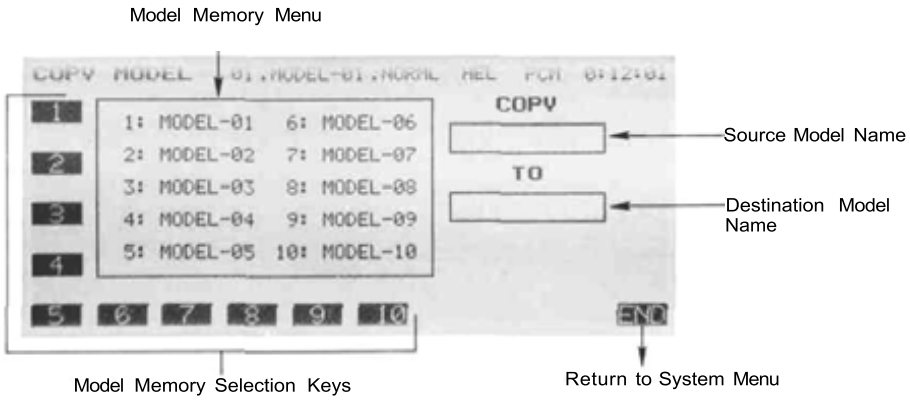
Source Transmitter (with the desired model setup stored in its memory)	Destination Transmitter (to be loaded with the setups from the Source transmitter)
1. Press the TRN (K) key. 2. Select the Source model (to be copied) with the A to J (1to 10) keys.	3. Press the *RCV* (L) key. 4. Use the A to J keys (1 to *10*) to select the memory in which the source model is to be stored. 5. Press the *RCV* (K) key to place the Destination transmitter into the receive mode.
6. Press the *TNS* (K) key to have the Source transmitter send the desired data.	
7a A successful transfer displays the message "TRANSMITTING . . . COMPLETED". If an error is generated, the display will read "ERROR:DATAFAULT PLEASE RETRY".	7b When the data transfer is successful, the message "RECEIVING . . . COMPLETED" is displayed. If an error is generated, the display will read "ERROR:DATA FAULT PLEASE RETRY".
8. To continue data transfer, press the CNT (L) key. To end, press END (N).	8. To continue data transfer, press the CNT (L) key. To end, press END (N).



CPM—COPY MODEL FUNCTION

This function is used to copy one set of model data into a second memory within the same transmitter. This function is very handy because it may be used for getting a head-start on setting up models with almost the same settings (only differences need to be modified, instead of entering the whole thing from scratch). Also, this function may be used to make a backup copy of a model setup before making changes.

The CPM function may be used to copy to and from the optional CAMPac as well. The number of models that may be stored in the CAMPac depends on the number of flight conditions each contains. This relationship is shown in detail on page 12.



Usage of the Copy Model Function

(Note: source and destination may be both in transmitter, both in CAMPac, or one in each)

Transmitter	Optional CAMPac Memory Module
1a Select the Source model with the A to J (1 to 10) keys.	1b Press the NXT (P) key to get to the CAMPac (model nos. 11 to 20); press the NXT (P) key again to get to models 21-26. Select the desired Source model with the A to J(11 to20 or21 to26) keys.
2a Select the Destination model with the A to J (1 to 10) keys.	2b Press the NXT (P) key to get to the CAMPac (model nos. 11 to 20); press the NXT (P) key again to get to models 21—26. Select the desired Destination model with the AtoJ(11to20or21to26) keys.
3. To copy all the flight conditions, press the ALL (M) key. To copy just the default flight condition, press the DEF (L) key.	
4. • If you are satisfied with your choices, press the YES (L) key. This executes the copy function, which may take anywhere from 2 to 18 seconds. A beep indicates completion. Verify that the data were copied under the destination model name. • If you wish to repeat the select on process, press the NO (M) key.	
5. To continue copying, press the YES (L) key and repeat beginning at step 1. To end the process and return to the System Menu. press the END (N) key.	

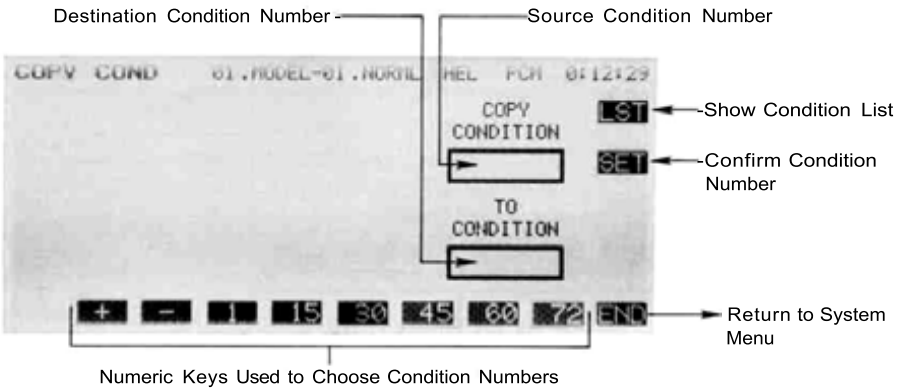
C PC—COPY Condition Function

This function may be used to copy individual flight conditions. One use would be to copy the default flight condition, with all its subtrims, mixing, etc. to another flight condition, and changing only the necessary parts. This procedure can save a lot of time and unnecessary effort.

This function may also be used to delete flight conditions (other than default) from the CAMPac memory module. The MSL (Model Select) function may be used to delete the model data.

The entire model data may be copied under the following conditions:

1. If the destination type is different from the source, the set data are copied.
2. If the destination type is the same as the source, all the set data are copied except for the condition name.
3. If the source is not allocated to a model memory ("00"), all the set data, including the model name, is copied.



Reading the Condition List

To display the condition list, press the LST (R) key. This displays conditions 1—10. To view the next ten conditions, press the NXT (P) key. To view the preceding ten conditions, press the PRE (O) key. Conditions nos. 01-50 are stored in the transmitter, and nos. 51-70 are stored in the optional CAMPac memory module.

Flight Condition Copying

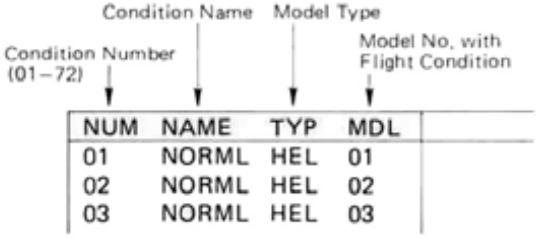
Follow the following instructions to copy one flight condition to another:

1. Use the numeric keys on the display bottom to input the Source condition number. The 1,15,30,45,60, and 72 keys input the key's value directly. The (+) and (-) keys may be used to increase or decrease the displayed value by one for each key press. When you are satisfied with the source number, press the SET (O) key.
2. Now use the numeric keys to enter the Destination condition number. Once again, enter the condition number with the numeric keys at the display bottom, and press the SET (O) key.
3. If you are happy with both condition numbers, press the YES (L) key to execute the copy. If not, press the NO (M) key to stop copying.
4. To continue copying further sets of conditions, press the CNT (L) key and repeat the instructions beginning from step 1.
   To end copying, press the END (N) key.

Flight Condition Deletion

To delete conditions from the CAMPac memory module, follow the following instructions:

1. Press the DEL (A) key to enter the deletion mode.
2. Press the + or - (F or G) keys to select the condition to be deleted.
3. If the condition is correct, press the *DEL* (*Q*) key, then confirm using the YES (L) key.
4. To continue deleting, press the CNT (L) key and repeat the instructions beginning from step 1.
   To end copying, press the END (N) key.



Condition No. (01~50: Transmitter
51~72: Memory Module

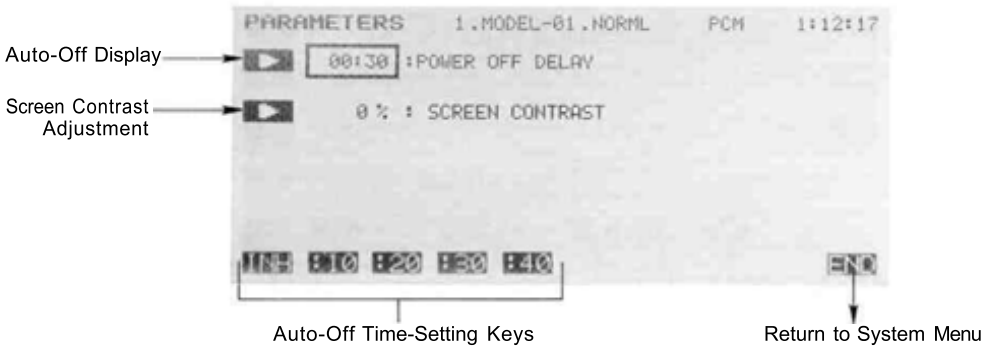
PAR—PARAMETERS

(SETS AUTO-OFF AND SCREEN CONTRAST)

This menu has two functions: the first automatically turns off transmitter power after a certain (settable) period of transmitter inactivity, and the second may be used to adjust the contrast of the liquid crystal display.

The Auto-Off function is designed to keep the transmitter battery from becoming fully discharged if left on accidentally. The delay period until shutdown may be selected from 10 to 40 minutes in ten minute increments, or the power off function may be deactivated.

The Screen Contrast function may be adjusted within a ±10% range.



Parameter Adjustment

1. To set the delay for the Auto-Off function, press the upper arrow A key.
   Select the desired time by pressing the10,20,30, or 40 keys, or set the inhibit using the INH key (not recommended).
   Exit the Auto-Off function by pressing the END (N) key.

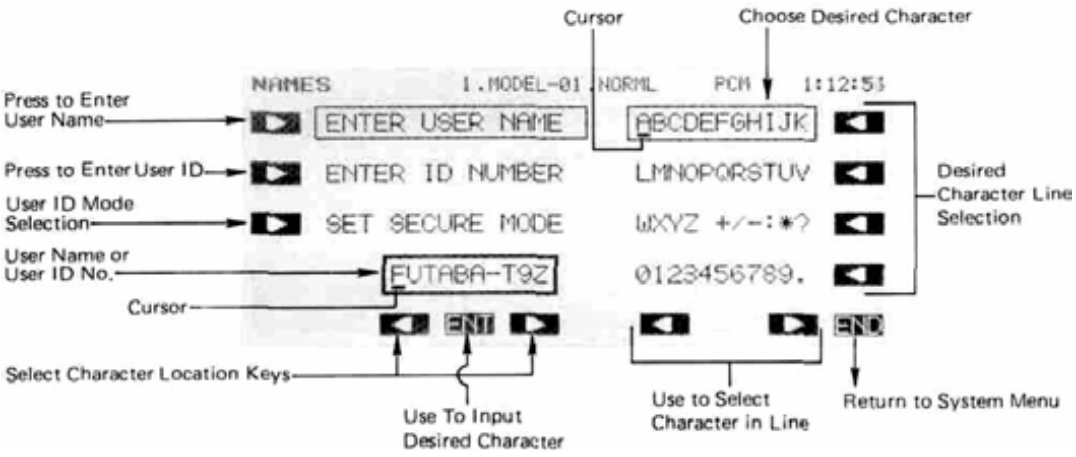
2. To set the Display contrast, press the lower arrow (B) key.
   Use the + and - keys (F or G) to select the desired level of contrast, -10% is bright, while+10% is dark.
   Exit the Contrast function by pressing the END (N) key.

UNA—USER NAME REGISTRATION

This function allows the user to enter his name, up to ten characters long, into a memory. The entered name is displayed on the top left corner of the Home and menu screens of the transmitter.

Additionally, a special password feature allows the user to define a four-digit password to protect the model memory contents. Without entering the correct password, model setups may not be changed or entered. A second password may be defined to protect the username entry only.

Unless you really need to, we recommend against using the passwords. If the password is forgotten, you will be unable to make any changes to your system, and you'll have to return the unit to Futaba to be reset.



Registering a User Name

To register the desired User Name, you must do the following: first, press the A arrow key to select the registration function. If necessary, move the cursor to the beginning of the username with the *G* and I keys (left- and right-arrow).

Select the line containing the desired character with the O to R keys. Now, use the K and M keys to move across the line until the cursor is underneath the desired character. To enter the character into the User Name line. press the ENT H key. Repeat this procedure for the remaining characters of the desired name. To make corections to entered characters, use the *G* and I keys to move to the character to be changed, and enter a new one.

When the name entry is completed, press the END N key.

Registering a User ID Number

Press the *C* key to begin the User ID Registration function. To enter a System Password, choose the SYSG key. To enter a Username password, press the NAME I key.

Select the User ID Registration function by pressing the B key. Then, move the cursor to the beginning of the User ID line with the left- and right-arrow keys (G) and I). Select the line containing the desired character with the O to R keys. Now, use the K and M keys to move across the line until the cursor is underneath the desired character. To enter the character into the User Name line, press the SET H key. Repeat this procedure for the remaining characters of the desired name. When the registration is complete, press the SET E key. then use the END (N) key to exit.

Operating a Transmitter With User ID Registered

Turn on the power switch, then press the CNT K key to get the user ID setting screen. Now you must enter the User ID. Select the line containing the correct ID character with the O to R keys. Next, use the K and El keys to move across the line until the cursor is underneath the desired character. Press the ENT H key to enter the character. Repeat this procedure for the remaining characters of the User ID. When the registration is complete, press the SET E key, then use the END (N) key to exit.

To Reset a System ID Number

First, you must use the procedure given in the previous paragraph to get in, except do not exit. You will instead reset the ID number to 0000 (four zeroes). Move the cursor to the zero (0, not 0) key, then press the ENT H key four times to enter "OOOO." Press the SET E-key, and exit with the **END** N key.

To Reset a Username ID Number

First, you must call the Username ID setting screen. Enter all the registered characters as described before, and press the END N key. Move the cursor to the zero (0. not *O*) key. then press the ENT H key four times to enter "0000." Press the SET E key.

FRQ—TRANSMITTER FREQUENCY SETTING (9ZAPS/HPS ONLY)

The exclusive Frequency Synthesizer System Module (FP-TK-FSS) allows you to switch your transmission frequency in software! No longer do you have to carry around a module and receiver for each frequency, or a carton of crystals! You may choose from any of the frequencies in the 72 MHz band, channel numbers 11 through 60 (72.010 to 72.990 MHz).

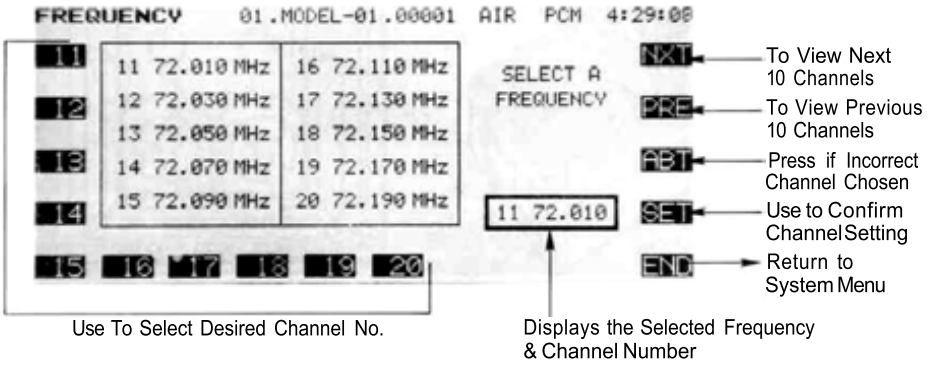
When you activate the FRQ function, the display shows the frequency list with channels 11 through 20 displayed. To display the next ten channels, press the NXT (R) key; to show the previous ten channels, press the PRE (Q) key.

To select the transmit frequency, first locate the desired frequency using the procedure above. Then, select the desired channel number with the channel selection keys A to J. It the selected channel is the correct one, verify by pressing the Set (O) key.

It is necessary to cycle the transmitter's power to broadcast on the selected frequency. When you do this, the channel number and frequency are displayed on the Home Screen. **READ THE WARNING BELOW BEFORE TURNING ON.**

WARNINGI

Be sure that you know the frequency your transmitter is set to broadcast on BEFORE you turn it on. If you are unsure what the frequency is, hold either the A or R keys and turn on the transmitter. The transmit frequency will be displayed on the Home Screen. Then, turn off the transmitter and turn it on again when you have the proper frequency control in your possession.



SETTING THE FREQUENCY SYNTHESIZER RECEIVER

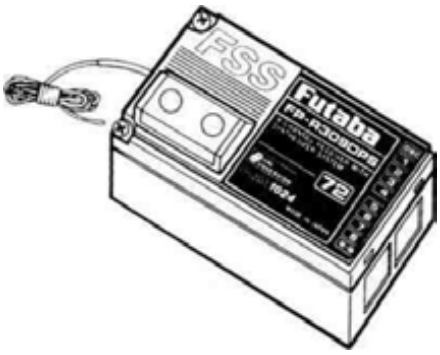
The following procedure should be followed in order to change the receiving frequency on a synthesized receiver.

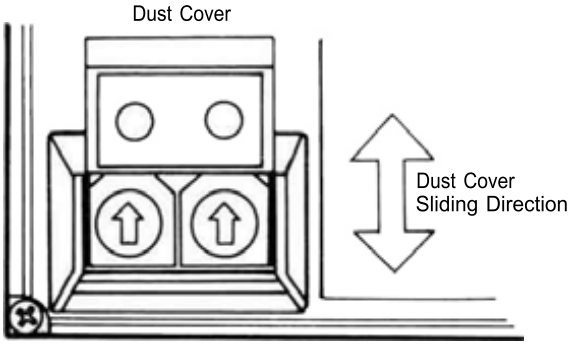
First, turn off receiver power. Next, open the receiver's dust cover by sliding in the direction shown by the arrow in the figure. Set the channel number by moving the two rotary switches to the desired frequency numbers. For example, to set channel 20, set the left switch to 2 and the right switch to 0. When setting is complete, close the dust cover.

When the receiver is turned on, the frequency set by the rotary switches is used by the receiver. If the switch is changed during operation, the changes will be ignored until the receiver is powered down and later turned on, at which time the new frequency will be used.

Fifty frequencies, from Channel 11 to 60 (72.010 to 72.990 MHz) can be set. If a channel outside this range is set, the receiver will default to Channel 11.

Frequency Synthesizer Receiver
FP-R309DPS



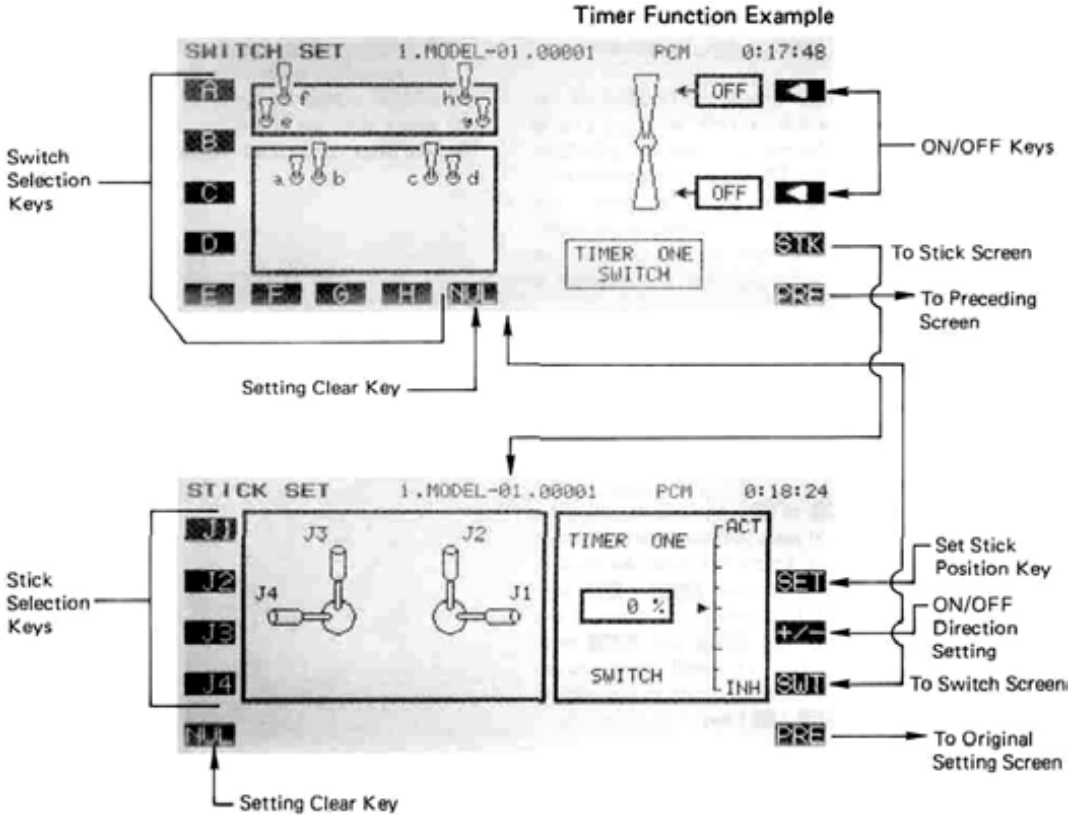


Channel No. Setting Switches

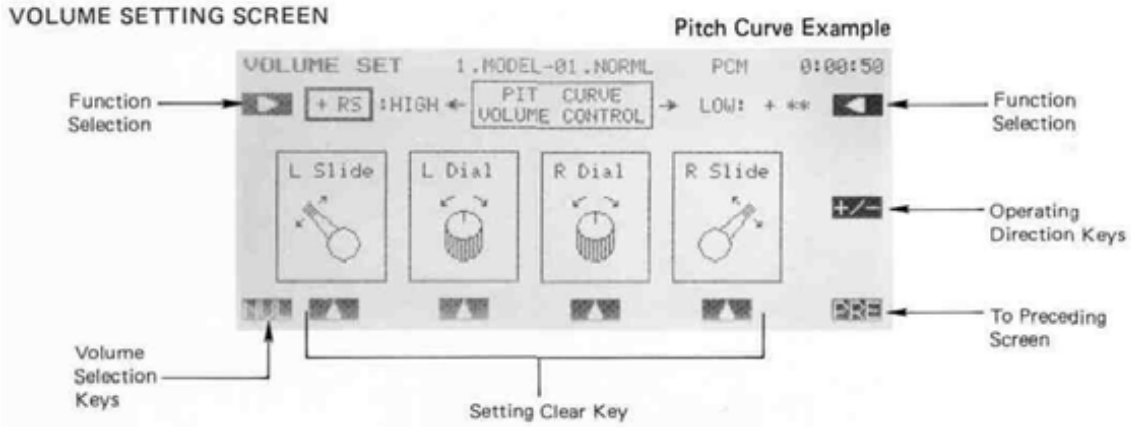
SWT—SWITCHING SETTING

This function may be used to define which switch activates a particular function. The versatility of the PCM 1024Z system allows you to define switches for the following purposes: special mixing, flight conditions, and timers. If you would rather have a control stick to have a switching function, this may be done also! You can make any motion of any switch or stick on the transmitter activate or deactivate any switchable function. Finally, for certain functions, you may control the volume settings by adjusting one of the knobs or sliders.

SWITCH SETTING SCREEN



VOLUME SETTING SCREEN



Setting the Activation Switch

From many different commands, the switch setting function may be displayed by pressing the SWT (P) key. This causes a pictorial display of the available switches to be displayed, as shown in the figure. In this case, the Timer function will be used as an example.

The A-H keys are used to select a particular switch location (in case you are confused about a switch's location, each is labeled with its letter key). Once you press the desired key location, the switch will be darkened on the display. If you press the NUL key, switch activation is disabled.

Once selected, you must choose the position of the switch which defines the ON or OFF position. This is done by pressing one of the two (or three, if a 3-position switch) left-arrow keys P to R. If you are satisfied with the choice, press the PRE (N) key to get back to the previous screen. If you have used the Timer as an example, the switch you have chosen will be displayed at the bottom of the timer definition area (if no switch is chosen, "**" is displayed).

Setting STICK Activation

If you would rather have your on/off function controlled by the motion of one of the transmitter sticks, press the STK (O) button while in the switch setting display. This displays the STICK SET function in the lower part of the figure.

Use the J1 to J4 (A to D) buttons to select the desired stick. Now, you will need to define the position at which the switching occurs. To do this, hold the stick in the desired location and press the SET (Q) key. Finally, select the ON/OFF direction by pressing the +/- (P) key (note that the ACT and INH positions swap each time the button is pressed). When you are done setting up the stick switching, return to the original setting screen with the PRE (N) key.

Setting Volume Controls

Some functions may be controlled by either stick position or knobs/sliders (for example. Pitch Curve in the Helicopter setup). In these functions, the VOL key will appear at (O). Press the VOL key to get to the setting screen. You may select the desired function to be set with the right and left-arrow keys (A and R). Next, use the F, H, J , or L keys to define which control selects the volume. Now you must use the +/- key to choose the operating direction of the control. Use the PRE key to return to the previous menu.

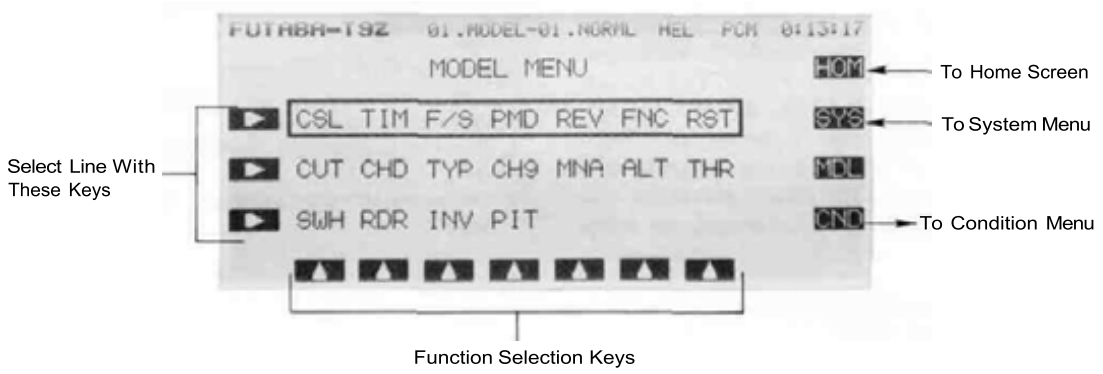
The same procedure may be used if a stick control, rather than a slider or knob, is desired. In this case you will select the stick and direction as given earlier for the "Setting Stick Activation" section above.

MODEL SETTING SECTION

The following controls and menus are used for model settings. These are settings that may be used *individually* for any and all of the different model setups stored in the PCM 1024Z's memory. Each model setup can have different model settings — for example, each model may have different servos reversed, its own name, different transmission type (PCM or PPM/FM), etc.

To get to these settings, press the MDL key from any menu. To select one, first select the line containing the desired function with the B, C, or D keys. Then use the F to L keys to select the function to be entered.

The last five functions in the list below are only appropriate to powered models.



Model Setting Section Contents

Item	Definition	Function	Page
CSL	Condition Select	Use to select flight condition	40
TIM	Timer Function	Sets up different timer modes & displays	41
F/S	Failsafe Function	Defines servo positions when signals are lost	42
PMD	Pulse Mode	Select Transmission mode, PCM or PPM/FM	43
REV	Servo Reversing Function	Use to reverse the throw directions	44
FNC	Function Change	Use to define which control moves which function	45
RST	Data Reset	Use to clear & reset different portions of memory	46
CUT	Engine Cut	Makes stopping engine safe and easy	47
CHD	Condition Hold	Limits throttle when adjusting flight conditions	48
TYP	Type Selection Function	Select Airplane, Heli, or Sailplane model type	49
CH9	Channel 9 Switch Definition	Defines location and function of Channel 9	50
MNA	Model Name Definition	May be used to identify model setups	51
ALT	Alternate Switch	Defines actions for trainer switch	52
THR	Throttle Curve	Adjusts throttle servo response (A.H)	53
SWH	Swashplate Type	Used to input geometry of swashplate (H)	54
RDR	Rotor Direction	Defines the rotor rotation direction (H)	56
INV	Inverted Pitch	Sets inverted pitch response of helicopter (H)	57
PIT	Pitch Curve	Defines helicopter pitch response (H)	58

A = Applies to Airplane mode only. H = Appears with Helicopter models only.

CSL—CONDITION SELECT

One of the most powerful features of the Futaba PCM 1024Z system is the ability to allocate as many as eight different flight conditions to a single model memory. It is possible to define different values of mixing, trims, neutrals, and other functions for each flight condition, making it possible to choose from eight different aircraft setups while flying one model! You may have differing flight conditions automatically called up by a predefined position of a stick, knob, lever, or switch. This command may also be used to define what switches and/or controls are used to activate each flight condition.

The CSL function automatically allocates four flight conditions to the Airplane, Helicopter (NORML, IDLE-UP 1&2, and THROTTLE HOLD) and Sailplane (define NORML, START, SPEED, and Landing) model types. However, each flight condition must be activated and assigned to a switch. Condition D is the default condition, also referred to as NORML, and is the only one active when a new model type is defined. This condition is always on, and remains on until other conditions are activated by switches.

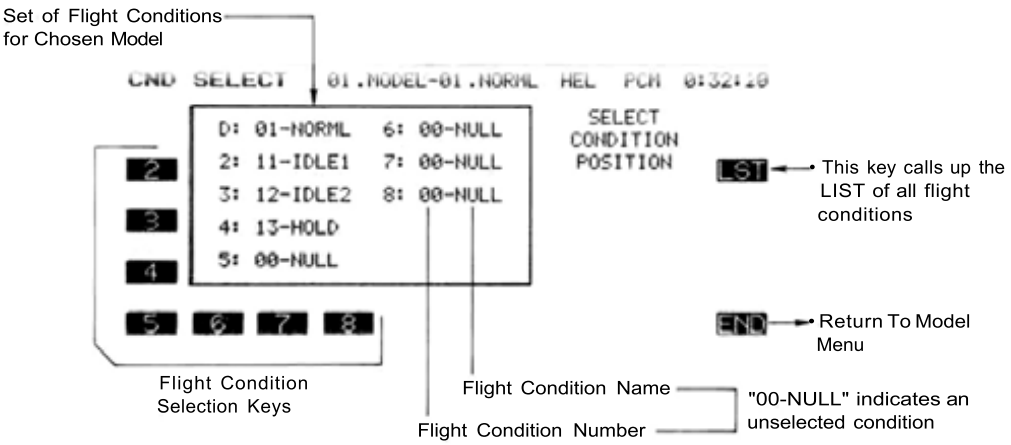
The PCM 1024Z system maintains each flight condition separately, and the same condition may not be used by two different models — they must have separate ones (of course, you may use the CPC copy function to make an identical flight condition for the second model).

Also, for a particular model, you cannot have model conditions stored in both the transmitter and the CAMPac — they must all be in one or the other. You may store any type of flight conditions in the CAMPac.

Setting Up Flight Conditions

The allocation of a flight condition to a particular model memory has two steps:

1. Select an unused flight condition number and activate it;
2. Define the activation switch and the ON position you want.



Flight Condition Allocation

To allocate flight conditions to a particular model memory, first check for an unused condition in the flight conditions list. Press the LST (Q) key to display this list. Model No. 00 indicates an unused flight condition. Conditions 01—50 reside within the transmitter, and conditions 51—72 are stored within the external memory module (optional). Conditions 1—10 are the default or normal conditions for models 1—10.

To view the next ten conditions, press the NXT (P) key; to view the previous ten, press the PRE (O) key. You may return to the setting screen by pressing the END (N) key.

Now you select the flight condition you wish to define; select this with the 2 to 8 (B to H) keys (remember that the Default condition cannot be changed). Next, enter the number of the unused flight condition using the numeric keys. The numeric keys allow you to choose a number very near to the desired one, then you may use the + and - keys (F and G) to increase or decrease the displayed number by one. You can use the NUL (H) key to reset the number to an unselected state.

Next you press the SET (O) key to set the condition. If you get a warning "CONDITION IN USE CANNOT ASSIGN" you must go back and choose another, unused condition.

Activation Switch Definition

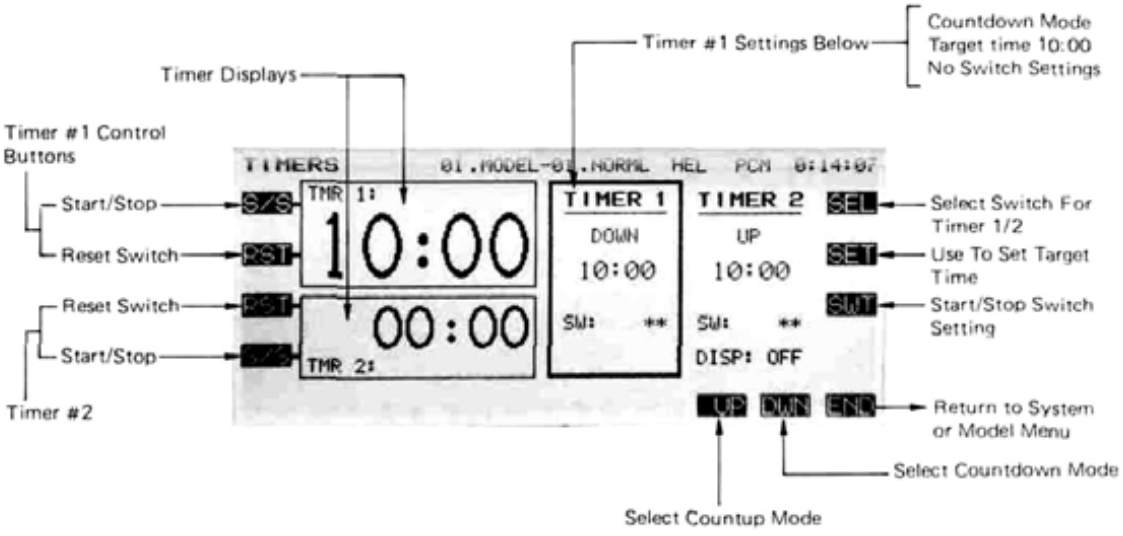
Call the switch setting screen by pressing the SWT (P) key. Next, set the desired switch position and ON direction with the appropriate buttons (for a description of the switch setting function, see p.37). Use the END (N) key to complete the setting.

TIM—TIMERS & ELAPSED TIME COUNTER

The Timer function may be set for any desired time, i.e. engine run time, specified times for competitions, etc. Two independent timers are provided for your use. The timers are stored independently with each model, meaning that when you switch between model setups, the timer associated with the new model is brought up automatically.

The timers may be set to start and stop from the soft keys, or from the motion of any switch or stick. You may set the ON and OFF directions freely. Each timer has a capacity of up to 59 minutes 59 seconds. You may set the timer from either the Home Display or the Model Menu, using the TIM key.

Each timer may be set for countdown or count-up operation with a target time. If a target time is set and the timer reaches the set time, a buzzer sound for each count is generated. Countdown timers sound two short beeps during the last ten seconds before reaching the target, then a long tone at the target time, and continue counting while displaying a minus (-) sign. Count up timers also beep the last ten seconds, beep the target time, and keep counting upwards until shut down.



Setting Up Timers

To select the timer you wish to set, use the SEL (R) button. This key toggles between the two timers, Next, choose either an up or down timer using the UP and DWN (L and M) keys.

Set your desired target time by pressing the SET (G) key. This calls up the timer-setting keys on the screen bottom. You may input the desired number of minutes by pressing any of the number keys, then adjusting with the + (F) and - (G) keys. To adjust the seconds value, press the minute/second M/S (E) key once. To get back to the minute setting, press *M/S* again.

The timer you have just set will now work on the start/stop (S/S) keys (B and D). If you'd like to have a switch or stick position turn them on and off, press the SWT key (P) now. Then use either the switch setting or stick setting menu to set the desired switch or stick (for more info, see page 37).

You may choose whether Timer 2 is displayed on the home screen. To display it, press the DSP (J) key. The Timer 2 display is turned on and off alternately as this key is pressed.

When you are satisfied with all the timer setups, press the END (N) key to return to the home menu.

Timer Operations

To start and stop Timers 1 and 2, press the S/S keys (A and D respectively). Each time the Start/Stop key is pressed, the timer stops (if running) or starts (if stopped). To reset the two timers, press the RST keys (B and C).

F/S—FAILSAFE/HOLD SETTING

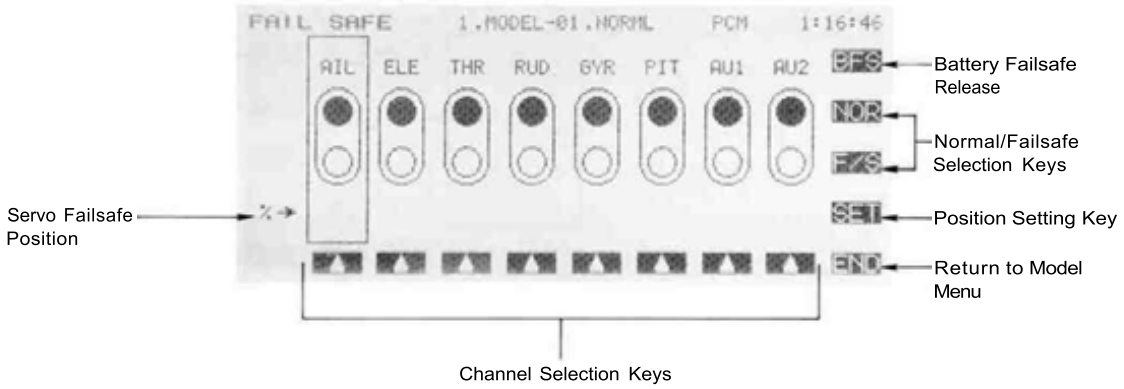
The Failsafe function may be used to set up positions that the servos move to in the case of radio interference. This function only works with PCM receivers (FM receivers do not have the fail-safe capability).

You may set either of two positions for each channel: normal, where the servo maintains its last commanded position, or Failsafe, where each servo moves to a predetermined position. You may choose either mode for each channel.

The PCM 1024Z system also provides you with an advanced battery monitoring function that warns you when the receiver battery has only a little power remaining. In this case, the throttle is moved to the defined failsafe position, or if one was not defined, to a medium speed position. The throttle may be released by operating a predefined control on the transmitter (the default is throttle), do not continue to fly — land as soon as possible. Remember, if your throttle suddenly moves to a position you did not command, land at once and use the voltmeter function, with a 250 or 500 mA load, to check your receiver battery. Quite a few models have been saved from unnecessary crashes, thanks to the battery failsafe function.

Failsafe Setting Procedure

In the Model Menu, press the Failsafe key (F/S) to get the Failsafe menu shown below.



Now you must decide which channels you want to go to preset positions, and which you want to maintain their last commanded position.

Use the Up-Arrow keys (F to M) to select the desired channel. Now, press the F/S key to switch that channel to the failsafe mode. Hold the stick, knob, or slider at the desired position and press the SET (O) key. The chosen servo command is now displayed in percent underneath the selected channel buttons.

If you wish to reset the channel to the normal (hold) function, press the NOR (Q) key. If you desire the failsafe function later, the last setting is remembered and displayed when the F/S key is again activated.

If you want the Battery Failsafe function to move the throttle to a defined position, be sure to set it before you leave this menu.

Battery Failsafe Release Function

This function releases the throttle from is held position after indicating that your receiver battery is low. You did remember to set a throttle failsafe position, didn't you? REMEMBER TO LAND AS SOON AS POSSIBLE.

Call the Battery Failsafe setting screen by pressing the BFS (R) key while in the Failsafe menu. Now, you may choose that moving the throttle resets the condition, or select another stick or switch deactivates it.

To set a desired throttle release position, move the throttle stick to the point at which you wish the failsafe to be released (perhaps low throttle but a bit above idle). Now press the SET (Q) button to set this position (the position is displayed in percent).

If you want to use another function to switch off the battery failsafe, either choose the desired stick motion, or move to the switch setting menu by pressing SWT (O). For more information on the switch setting menu, refer to page 37.

When you are through setting all the desired channels, press the END key (N) to return to the Model Menu.

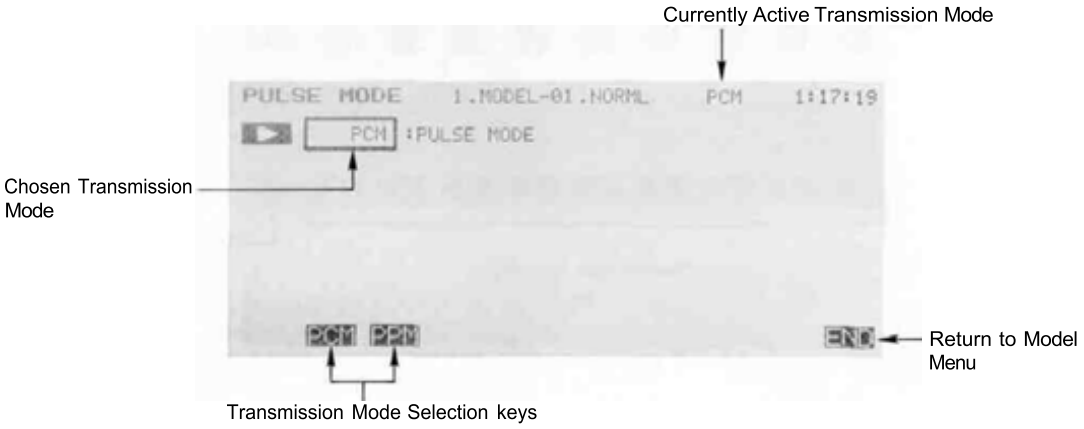
PMD—PULSE MODE

(SWITCHING FM/PCM)

The PMD function allows you to select the transmission mode that your PCM 1024Z uses. You may select between PCM (Pulse Code Modulation) and PPM (Pulse Position Modulation, also commonly called FM). Of course, the choice depends on the type of receiver being used. If you change the mode of transmission, you need to cycle the power switch Off and the On before it will operate in the chosen mode.

Transmission Setting Procedure

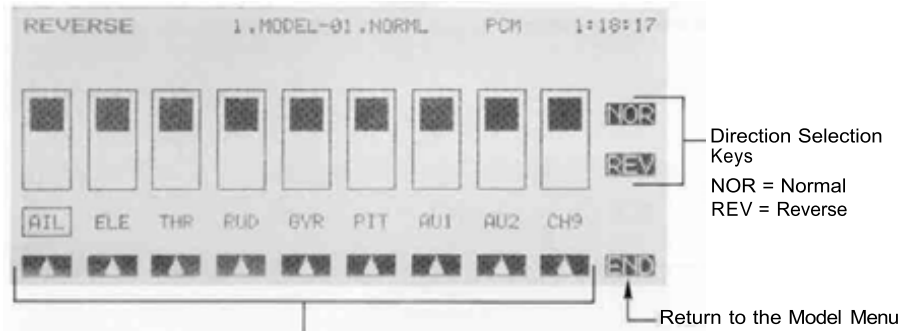
In the Model Menu, press the Pulse Mode key (PMD) to get the Pulse Mode menu shown below.



Now, simply select the desired mode by pressing either the PCM key (F) or the PPM (G) keys. Press the END (N) key to leave the PMD command. To operate the transmitter in the new mode, turn power off and then on again.

REV—SERVO REVERSING FUNCTION

This function is used to reverse the direction a servo operates for a given command. This function should be used AFTER any special menus are defined to assure that all servos are moving the correct directions.



Reversing Procedure

After defining a new model, be sure to define all special menus (such as Flaperons, Aileron-Speed Flap mixing. Differential, etc.). Be sure that all servos are plugged into the proper receiver channels. Now, determine whether you need to reverse any channels by moving each stick and observing the corresponding movement in the model's controls.

In the Model Menu, press the reverse function key (REV) to get the Reversing menu shown below.

Now you must choose which channels you want to reverse. Use the Up-Arrow keys (E M) to select the desired channels.

Once you have selected the desired channel, use the NOR (Q) key and the REV (P) key to choose the proper direction for the servo. Repeat for each servo needing reversal.

When done, press the END (N) key to return to the Model Menu.

FMC—FUNCTION CONTROL

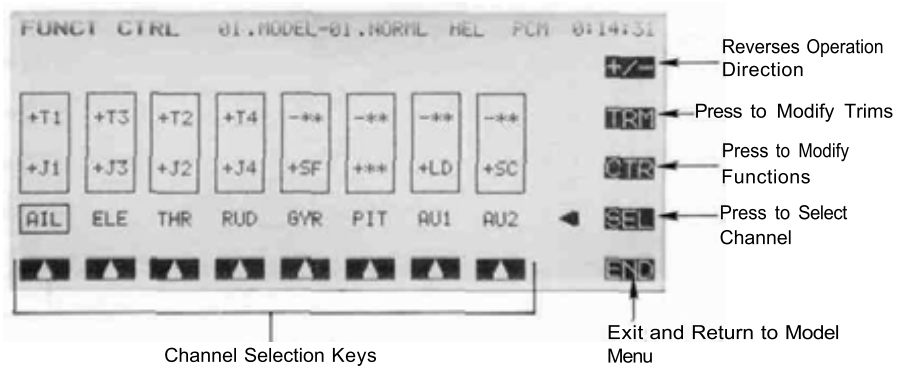
The Function Control Menu may be used to define the relationship between the transmitter controls and the receiver output channels. Any function on the transmitter may control any receiver output channel. It is not necessary to change the servo connections in the receiver.

This function is useful for changing the control items for certain functions. For example, you may wish to set the sailplane Butterfly function on the throttle stick (J3) rather than on the default Knob A.

You may also use this function to select the trim positions, independently from the sticks. For instance, to set cross trims, simply exchange the elevator (CH2) and throttle (CH3) trim positions. One advantage of cross trims is that it is possible to set the elevator trim without releasing the elevator stick, by using the other hand. The default mode for the PCM 1024Z system is for cross trims.

Control Modification Procedure

In the Model Menu, press the FNC key to get the function modification menu.



Use the SEL (O) key to make the channel selection keys appear, then select the desired channel with the channel select keys E to L on the screen bottom.

To change the control, press the CTR (P) key. Now you may select the desired control source from the Stick, Control, or Switch keys. The bottom of the display shows the keys LS , LD , RD , RS (Left Slider, Left Dial, Right Dial, Right Slider) followed byJ1,J2,J3, J4 (right stick horizontal, right stick vertical, left stick vetical, left stick vertical, left stick horizontal). If you want to use a switch as an input instead, hit the NXT (M) key and Switches A through H are displayed. If you wish to have no function for a certain control, press NXT again and select the NUL key (E). Repeat these steps for every channel that needs to be changed. If you'd like to reverse the function direction, press the +/- key (R).

Stick AIL ELE THR RUD GEA FLP AU1 AU2
Control AIL ELE THR RUD GYR PIT AU1 AU2
Switch AIL ELE ABR EBB SF1 SF2 AU1 BFL

As an example, take a four-wing-servo sailplane. You decide that you want the throttle stick (J3) to control the Butterfly function. To do this, select *SF2* with the (J) key, press the CTR key, and choose the *J3* button (K). You may then press the SEL key, select airbrake (ABK), again press the control key (CTR), and then null out the input control by pressing the NXT (M) key twice, and finally pressing NUL (E).

Press the END (N) key to leave this menu and return to the Model Menu.

Trim Modification Procedure

This procedure is used to change the location of the trim associated with a particular function. Use the SEL key (O) to get the selection arrows across the screen bottom, then use the arrow keys (E to L) to select the desired channel.

To change the trim, press the TRM (Q) button, then press the T1, T2 , T3, T4. or NUL keys. If you wish to reverse the trim direction, press the +/- (R) key.

Repeat this process for each trim channel to be changed. When complete, use the END (N) key to return to the Model Menu.

RST—DATA RESET

This function is designed to allow you to reset selected portions — or all — of the settings saved in the active memory. You may individually choose to reset the following sets of data:

REV & F/S. . . .Resets all reversing and failsafe data

AFR & D/R . . .Clears all AFR and Dual Rate information

TRIM . . . . . . .Resets the trims stored

ATV . . . . . . .Initializes all throw volume information

PMIX . . . . . . .Clears all programmable mixers

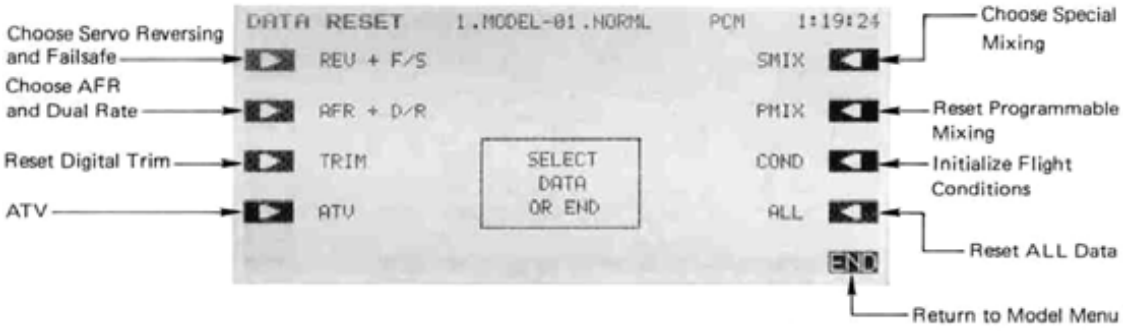
SMIX . . . . . . .Resets all special mixing functions EXCEPT ATV, AFR, D/R,PMX,CNA,TRM

COND. . . . . . .Clears all condition menu items except CNA

ALL . . . . . . .Resets all functions except for CSL, PMD, and MNA (also resets CSL switch settings)

Data Resetting Procedure

In the Model Menu, press the RST key to get the reset menu.



Selection the function to be reset using the A toD and O to R (right and left arrow) keys.

To reset the active condition only, press the SGL (Single) key. To reset all conditions, press the GRP (Group) key. If you only went to reset REV+F/S or ALL, skip these buttons and continue.

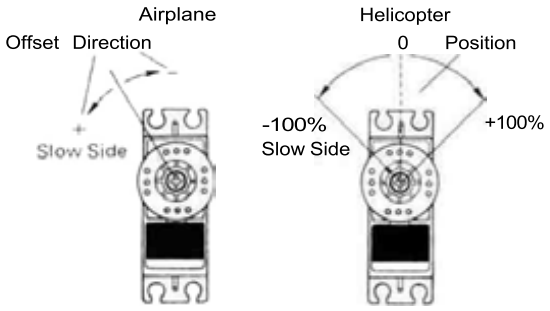
If you are happy with your choices, choose the YES (I) key. If you'd like to make corrections, press the NO (J) key.

If you would like to reset other items, repeat this procedure. When complete, use the END (N) key to exit.

CUT—ENGINE CUT

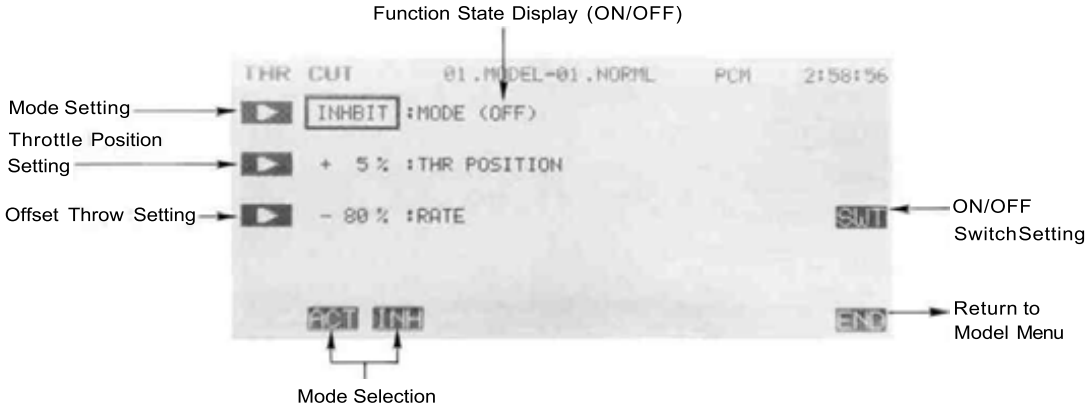
This function may be used to define a switch setting that may be used to cut the engine. It will only work when the throttle stick is at the low side; the throttle position may be set.

When this function is actuated with the throttle stick below the set threshold, the throttle servo is commanded to an offset position (there is no effect above the threshold position). When activated, the Alarm light flashes to remind you the command is on.



Engine Cut Setting Procedure

Activation of command In the Model Menu, press the **CUT** key to get the Engine Cut menu.



Use the A key to activate mode setting, then press the *ACT* or INH keys (F and *G)* to activate or inhibit the engine cut command.

Threshold Setting Now you will set the throttle position that the engine cut command will operate underneath: press the B key to activate position setting, place the throttle stick in the desired position, and then use the SET (F) key to enter the position into memory. If the throttle stick is above this position, CUT will not occur.

Throttle Servo Offset Setting You now set the amount and direction of throttle servo throw. Press the C right-arrow key and set the rate with the numeric keys. The number keys (0) through (100*)* input the value directly. The (+) and (-) keys increase or decrease the value by 1. The +/- key may be used to reverse the offset direction.

Setting the Engine Cut Command Switch Call the Switch Setting screen by pressing the SWT (P) key. Set the desired switch using the instructions on page 37. When complete, press the PRE button (N) to return to the previous screen. Use the END (N) key to leave this menu.

CHD—CONDITION HOLD

This function may be used to limit the maximum speed of the engine so that you may adjust flight conditions when the engine is running. The maximum throttle position is settable, and an alarm indicates that the function is operating. The function is especially useful for helicopters, because it will prevent the engine from racing dangerously when adjusting the Idle-Up settings.

While this function is active, the throttle operates on the default condition throttle curve, and mixing is applied as normal, except the throttle is not allowed to move past the set point.

You must deactivate this function when you are through making adjustments. The system will not allow you to deactivate this function in either of the following states:

1. When all the flight condition switches are off
2. When the throttle stick is lower than the **set** point.

In either of these two states, you will receive the warning message "TO INHIBIT TURN OFF SPECIAL CONDITION AND LOWER THROTTLE PAST MAX SET POINT", and will not be allowed to turn off the Condition Hold function until the states are turned off.

Condition Hold Setting Procedure

Activation of command In the Model Menu. press the CHD key to get the function modification menu.

Use the A key to activate mode setting, then press the ACT or INH keys (F and G) to activate or inhibit the condition hold function.

Throttle Servo Maximum Throw Setting You now set the amount of throttle servo throw. Press the B key to activate throttle travel setting, place the throttle stick in the desired position, and then use the SET (F) key to enter the position into memory. Use the END (N) key to leave this menu.

NOTE: You may also activate the condition hold function from the Condition menu by pressing the M key, or from the Normal Display by pressing the G key.

TYP—MODEL TYPE SELECTION

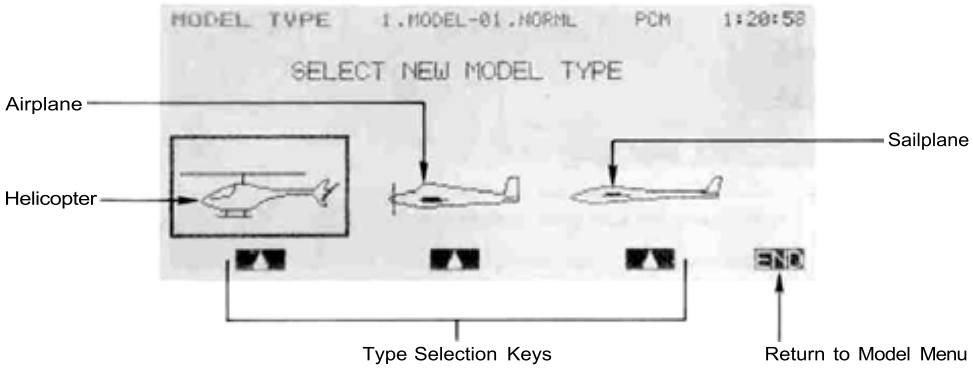
This function is used to select the type of model from airplane, helicopter, and sailplane. Sailplanes may be set up with either two wing servos (2-S), four wing servos (4-S), or five wing servos (5-S).

The model type function automatically selects the appropriate mixing functions for the chosen model type, so you must refer to the particular model section of this manual to determine the appropriate servo connections.

When the Model Type Selection command is invoked, all the data in the active memory is cleared. Be sure that you don't mind losing this data, or back it up to another memory using the copying functions.

Model Type Selection Usage

In the Model Menu, press the TYP key to get the Model Type Selection menu.



Select the appropriate model type by pressing the key underneath the view of the model: F for Helicopter. I for Airplane, or L for sailplane. If the selection is correct, press the YES (R) key, otherwise reselect the type after pressing the *NO* (Q) key-If you have selected the Sailplane model type, you now must select the wing type from the submenu that appears. Use the 2, 4, or 5 (K, L, or M) keys to select the wing type. If the selection is correct, press the YES (R) key, otherwise reselect the type after pressing the *NO* (Q) key.

When complete, exit by pressing the END (N) key.

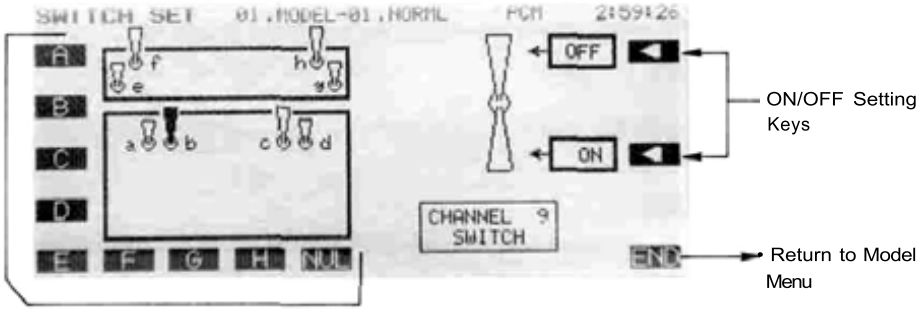
CH9—CHANNEL 9 SWITCH DEFINITION

Your PCM 1024Z system has nine channels. The ninth channel is a switch channel, and the location of the switch may be selected with this menu. The default switch is SW(B), with its ON position at Position 2.

SW(B)

CH9 Switch Selection

In the Model Menu, press the CH9 key to get the Channel 9 Switch Selection menu. This will put the switch display onto the screen. The Factory-Default CH9 Switch Position is Switch B, Turning On at Position 2



Switch Selection Keys (NUL cancels input)

Choose the desired switch location with the A to H keys. NUL (I) clears the set switch.

CH9 Switch On/Off Direction Definition

To select the ON/OFF direction, press the P and R left-arrow keys. On and off are toggled with each press of the button.

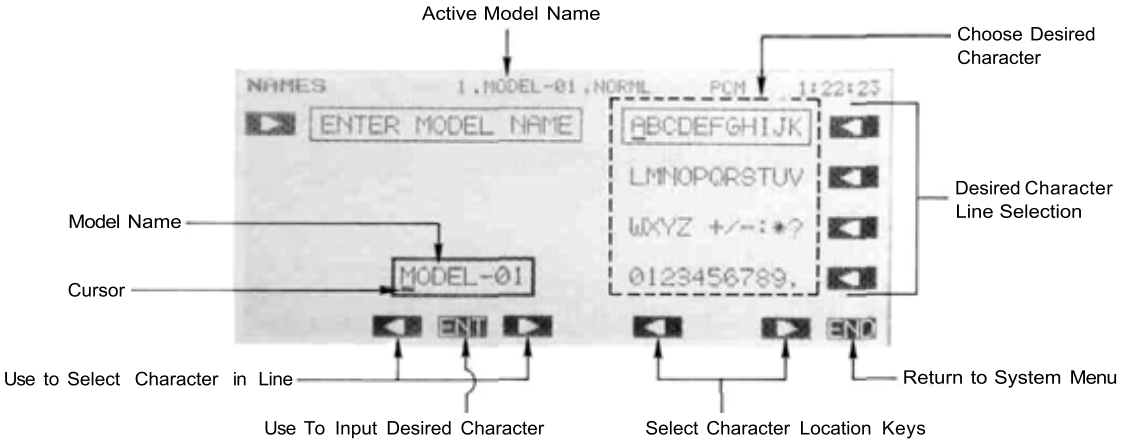
Exit this function by pressing the END (N) key.

MNA—MODEL *NAME* DEFINITION

This function may be used to input or change the name of the model in active memory. This can be very useful to tell different models settings apart. Each model name can be as long as eight characters, and the model name always appears in the top center of the display screen.

Registering a Model Name

To register the desired Model Name. press the MNA key from the Model Menu to enter the naming function as shown below.



Press the A arrow key to select the registration function. If necessary, move the cursor to the desired location within the Model Name with the *G* and I keys (left- and right-arrow).

Select the line containing the desired character with the O to R keys. Now, use the K and M keys to move across the line until the cursor is underneath the desired character. To enter the character into the Model Name line, press the ENT H key. Repeat this procedure for the remaining characters of the desired name. To make corrections to entered characters, use the *G* and I keys to move to the character to be changed, and enter a new one.

When the name entry is completed, press the END N key.

ALT—ALTERNATE SWITCH

This function allows the spring-loaded switch operation to be defined in two different ways. The default definition is that the switch is off unless it is moved against spring tension to its second position, where it is on. Releasing the switch turns it off.

ALT function allows you to make the switch function differently, where it remains in a state until activated again. In other words, if the switch is off, pulling and releasing turns it on, and pulling and releasing again turns it off. Therefore, the ALT mode creates a PULL-ON, PULL-OFF switch.

For example, while using the trainer system the ALT function allows the instructor to release the switch, and still allow the student to have control. The switch must be pulled again in order to disconnect the student transmitter.

Be careful not to activate the ALT function if the spring-loaded switch is being used for Snap Roll!

Alternate Switch Setting Procedure

In the Model Menu. press the ALT key to get the Alternate Switch Setting menu.

Use the H key to select the switch type. NOR = normal switch action (turns off upon release), ALT = Alternate switch action (stays on until pulled again).

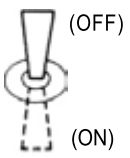
End setting by pressing the END (N) key.

NOR (Normal) Type

ON in Forward Position

▼

OFF When Released



ALT (Alternate) Type

ON in Forward Position

▼

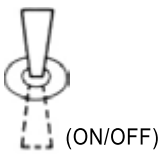
Does Not Change When Released

▼

OFF in Forward Position

▼

Does Not Change Even When Released



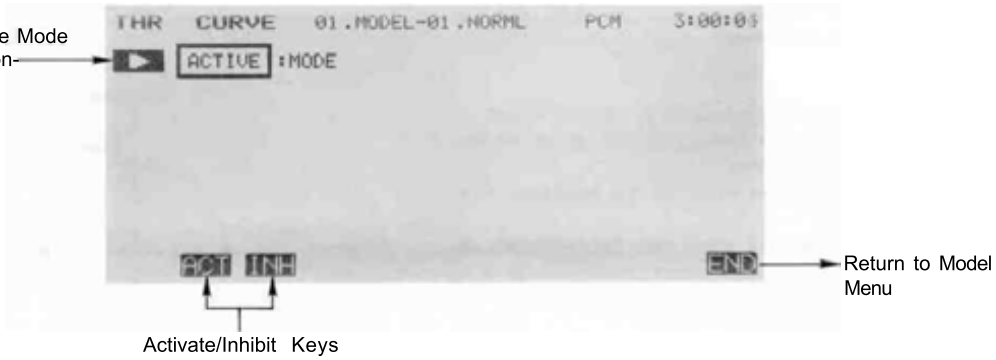
THR—THROTTLE CURVE

The Throttle Curve function applies only to Airplanes and Helicopters. Its purpose is to select whether the throttle curve function is to be used with the active model.

The throttle curve divides the full travel of the throttle stick into twelve segments separated by thirteen points. The location of these points may be set with the TCV key in the Condition menu.

Throttle Curve Activation Procedure

In the Model Menu, press the THR key to get the Throttle Curve Activation menu.



Use the ACT (F) key to activate the curve setting, and use the INH (G) key to deactivate the curve.

End setting by pressing the END (M) key.

SWH—SWASHPLATE TYPE

This function is used to define which type of swashplate mixing is to be used for the active helicopter model. The mixing functions should be selected to match the swashplate on the model.

Swashplate Type Setting Procedure

S-1 Type

Use this type for helicopters with conventional linkages.

S-2 Type

Use S-2 mixing when the pushrods are positioned as shown in the figure. Elevator operates with a mechanical linkage.

With Aileron inputs, the aileron and pitch servos tilt the swashplate left and right;

with Pitch inputs, the aileron and pitch servos raise the swashplate up and down.

S-4 Type

If the servo inputs are located as shown, use S-4 Mixing.

With Aileron inputs, the aileron and pitch servos tilt the swashplate left and right;

with Elevator inputs, the servos tilt the swashplate fore and aft;

with Pitch inputs, all four servos raise the swashplate up and down.

SR-3 Type

If the servo inputs match the figure, use SR-3 Mixing.

With Aileron inputs, the aileron and pitch servos tilt the swashplate left and right;

with Elevator inputs, the three servos tilt the swashplate fore and aft;

with Pitch inputs, all three servos raise the swashplate up and down.

SN-3 Type

Use SN-3 Mixing if the servo inputs match the figure.

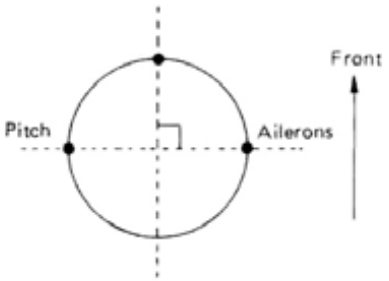
With Aileron inputs, the three servos tilt the swashplate left and right;

with Elevator inputs, the elevator and pitch servos tilt the swashplate fore and aft;

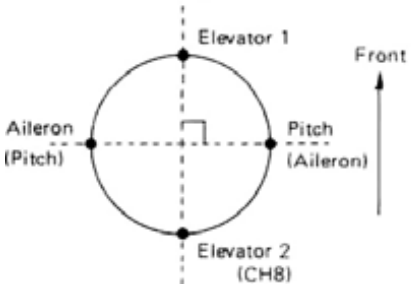
with Pitch inputs, all three servos raise the swashplate up and down.

Use the reversing function (REV) as necessary to get the proper aileron, elevator, and pitch operations.

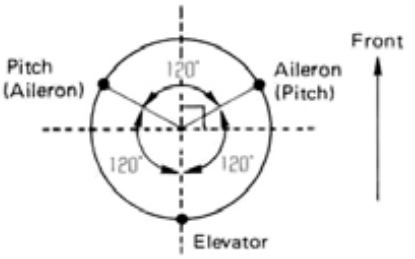
S-2 Type



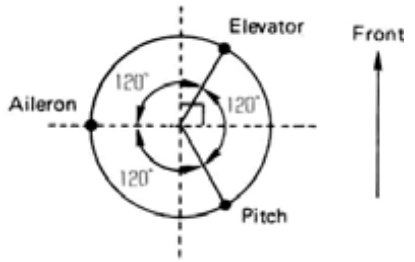
S-4 Type



SR-3 Type

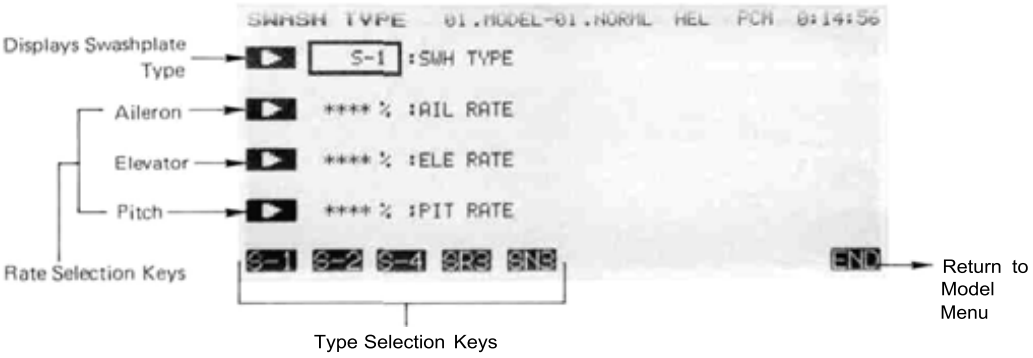


SN-3 Type



Swash Plate Selection Procedure

In the Model Menu, press the SWH key to get the Swash Plate Selection menu.



Use the (A) key to activate the selection menu, then use the E to D type selection keys to choose the type matched to your model. If the selection is OK, press the YES (E) key, otherwise press the NO (F) key and choose again.

Rate Setting Procedure

To set the aileron rate. press the B right-arrow key and use the rate-setting keys E toM. The number keys (0) through (100) input the value directly. The (+) and (-) keys increase or decrease the value by 1. The +/- may be used to reverse the offset direction. The default value is 50%, but the setting may vary between -100 to +100%.

Repeat the rate setting procedure for Elevator by using the C key, then set the Pitch rate using the D key.

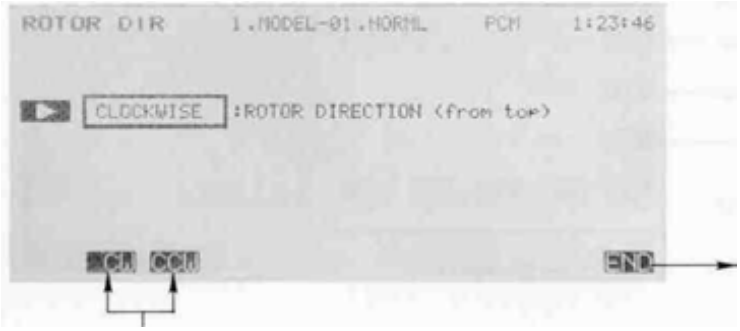
End setting by pressing the END (N) key.

RDR—ROTOR DIRECTION

This function is used to tell your PCM 1024Z system the rotor rotational direction, so it can properly set the mixing directions. The rotation direction, when viewed from the top, is entered.

Rotor Direction Setting Procedure

In the Model Menu, press the RDR key to get the Rotor Direction Setting menu.

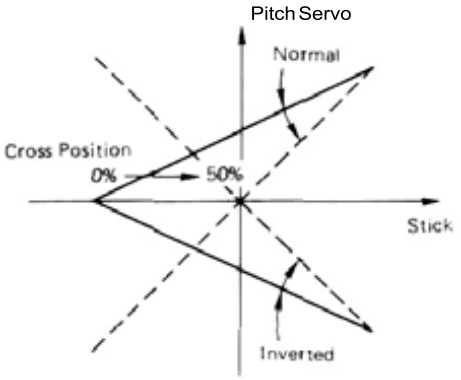


Use the CW (F) key to select the clockwise (as viewed from above) rotation direction, and use the CCW (G) key to select the counter-clockwise direction. The chosen direction appears in the display box.

End setting by pressing the END (N) key.

INV—INVERTED PITCH

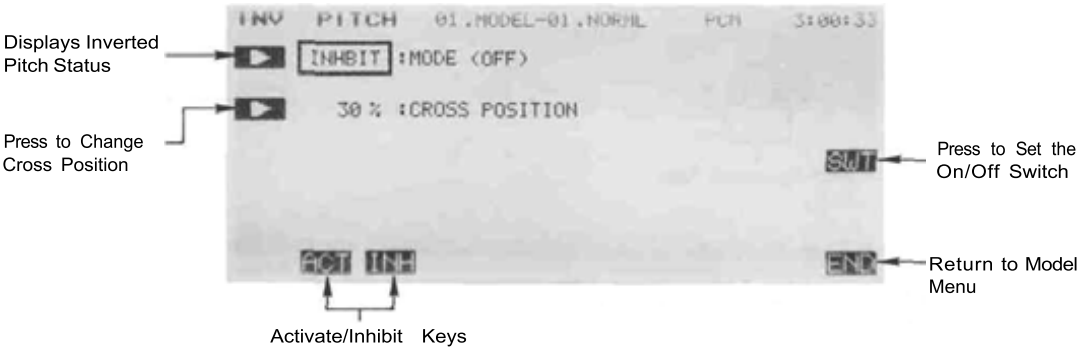
This function is used to activate inverted flight functions for the model in active memory. This function allows the inverted flight to use the normal flight functions (the linkages must be adjusted for inverted flight, however). The position at which the normal-inverted low side pitches cross ("cross position") can be set. However, the inverted flight high pitch/low pitch rate may be set with the inverted pitch (INV) function available in the Flight condition menu.



Inverted Pitch Setting Procedure

Activation of command

In the Model Menu, press the INV key to get the Inverted Pitch Setting menu shown below.



Use the ACT (F) key to activate the function, and use the INH (G) key to deactivate it.

Cross Position Setting

Press the B key to activate the Cross Position Setting menu. The rate-setting keys F to M appear, and include the number keys (0) through (50), which may be used to input those values directly, and the (+) and (-) keys used to increase or decrease the value by 1. The default cross position is 30%, but the setting may vary between 0 to 50%.

ON-OFF Switch Setting

Use the SWT {P) key to call up the switch-setting menu. Switch F is the default switch, but the on direction is not set. Use this menu to set the switch and on direction. For a description of the switch setting method, refer to page 37.

Exit the inverted pitch setting menu by pressing the END (N)) key.

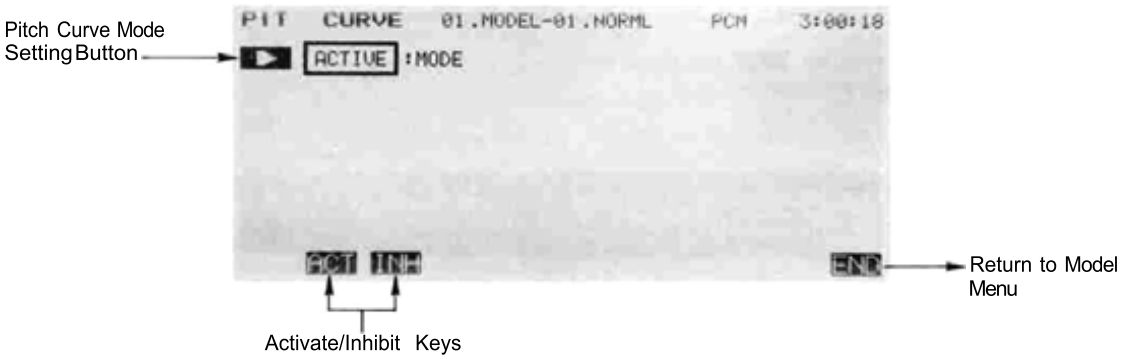
PIT—PITCH CURVE

The Pitch Curve function applies only to Helicopters. Its purpose is to select whether the pitch curve function is to be used with the active model.

The pitch curve divides the full travel of the stick into twelve segments separated by thirteen points. The location of these points may be set with the PCV key in the Condition menu.

Pitch Curve Activation Procedure

In the Model Menu, press the PIT key to get the Pitch Curve Activation menu.



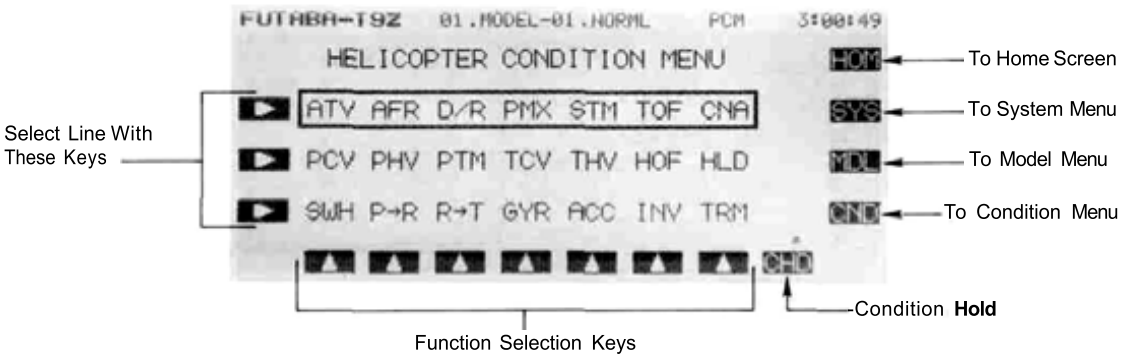
Use the ACT (F) key to activate the curve setting. and use the INH (G) key to deactivate the curve.

End setting by pressing the END (N) key.

COMMON CONDITIONS SECTION

This section contains information on how to use the model conditions that are common to ALL types of models, including such as throw volumes, dual rates, programmable mixes, subtrims, and condition naming. This material should be used in conjunction with the Condition Settings sections for each type of aircraft, following this section. (The helicopter condition menu is shown below for demonstration purposes.)

These functions are found in all Model Menus (Airplane, Helicopter, and Sailplanes with 2, 4, and 5 wing servos), so rather than repeat them in each model section, they are presented once in this section.



Common Conditions Section Contents

Item	Definition	Function	Page
ATV	Adjustable travel volume.	Set maximum servo travel	60
	Channel delay	Use to slow changes between different trims	
AFR	Adjustable function rate	Use to set exponential throws.	62
D/R.	Dual rate.	Program switches to reduce control motion	64
PMX	Programmable mixing	Use to correct unwanted. tendencies during flight	65
STM	Sub trim	Set the neutral position of. each servo	68
TOF	Trim offset.	Use to set different trims for different flight conditions	69
CNA	Condition naming.	Name each flight condition for easy recognition	70
TRM	Digital trim	Adjust the sensitivity of the electronic trims	71

ADJUSTABLE TRAVEL VOLUME (ATV)

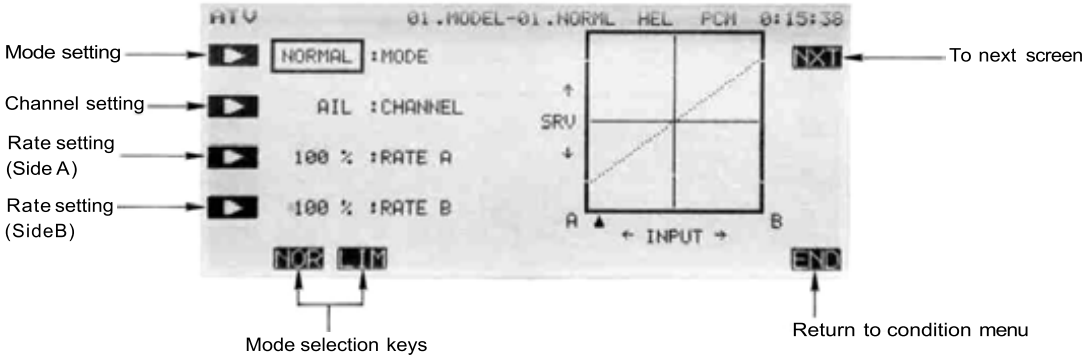
The ATV function adjusts the servo left and right throws, and to generate differential throws and correct for linkages. The travel rate can be varied from 1% to 140% in each direction on channels 1 to 8. Setting so that the servo travel exceeds the set value even when the travel is increased by mixing, etc., is also possible by setting the mixing mode. NOTE: Stick movement is indicated by the " ▲ "symbol on the screen.

Included in this function is the servo delay setting menu. This function is used to smoothly transition between different servo neutral positions when the flight condition is changed.

Inputting Travel Volumes

Activation of command

In the Condition Menu, press the ATV key to get the ATV menu shown below.



Channel selection

To enter the channel selection menu, press the B key, and then press the key of the channel to be set. Depending on the Model setup, the following keys will appear on the bottom of the screen:

Airplane:	AIL ELE THR RUD GEA FLP AU1 AU2
Helicopter:	AIL THR RUD GYR PIT AU1 AU2
Sailplane:	AIL ELE ABR RUD SF1 SF2 AU1 AU2

ATV Mode selection

To select the ATV mode, press the key. Select the normal mode by pressing the NOR key.

Input Rates

You can select the amount of travel in both directions, which are designated as "A" and "B". To enter the rate for Side A, press the C key and use the rate setting keys F to M to input your desired rate. The rate is initially set to 100%.

Press the numeric key nearest the rate you desire from among the H (0) to M (100) keys. You can then increase and decrease the selected value with the G (-) and F (+) keys. Each key press adds or subtracts 1. Set the movement up so that no binding occurs at any extreme motions of sticks, knobs, or sliders. You may set the travel to anywhere between 10 and 140%.

Now you will set up Side B's rate similarly. Press the D key and set the rate with the rate setting keys F to M As before, use the numeric keys to get the travel you desire.

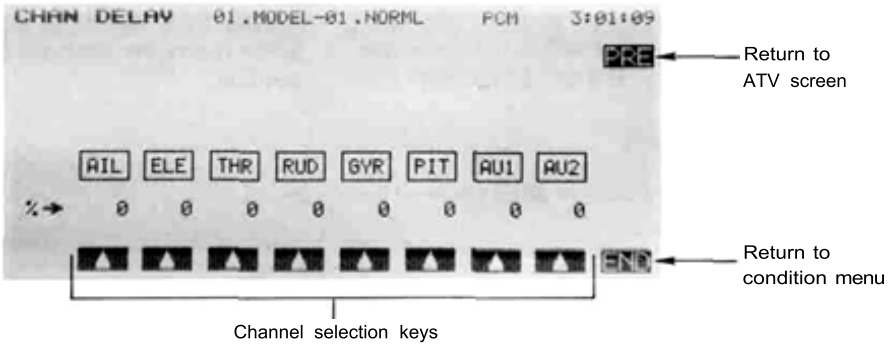
Repeat this procedure for all the channels in sequence. When you are finished, end by pressing the END N key, or use the NXT R key to get to servo delay programming.

Programming Servo Delay at Condition Switching

This function is used to set the servo delay for each channel, from channel 1 to channel 8. Whenever a flight condition is switched, the system uses the programmed delay to slow down sudden servo position changes. This might be used, for example, to prevent a sudden loss of lift on a sailplane when switching from flaps down for launch to a regular position for normal flight.

Inputting Channel Delays

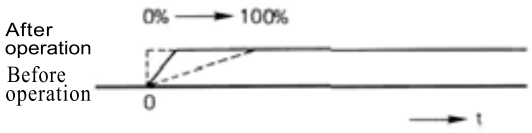
The setting screen for this function is called from the ATV setting screen. If you are not already in the ATV menu, select it from the condition menu. Next, press the NXT R key at the ATV setting screen. This action displays the channel delay setting screen shown below.



Select the desired channel with the F to M keys. When selected, input the delay with the numeric keys F to M. The delay may be set independently for each channel between 0 and 100%. Each 20% delay works out to be approximately one second, but experiment to be sure that you get what you want.

Select the next channel with the SEL O key and repeat these steps to input its delay.

When you are finished, you may return to the ATV menu by pressing the PRE R key, or you may return to the Model menu by pressing the N (END) key.



ADJUSTABLE FUNCTION RATE (AFR)

This function is used to adjust the throw and operation curve of the stick, lever, and switch functions (CH1 to CH8) for each flight condition. This is normally used after ATV has defined the maximum throw directions (ATV acts on ALL flight condition settings). When mixing is applied from one channel to another channel, both channels can be adjusted at the same time by adjusting the operation rate by AFR function.

In the AFR mode, the function operation rate can be adjusted for each travel direction. The servo's response curve can be changed so that the control can be performed comfortably by setting the EXP1/EXP2 modes. This is best understood by examining the curves that the PCM 1024Z system displays as the parameters are changed. The AFR function may be programmed to have a rate variation from 0 to 140%; the EXP1/EXP2 curve rate can be adjusted from -100 to +100%. With 0%, exponential produces a normal straight-line response.

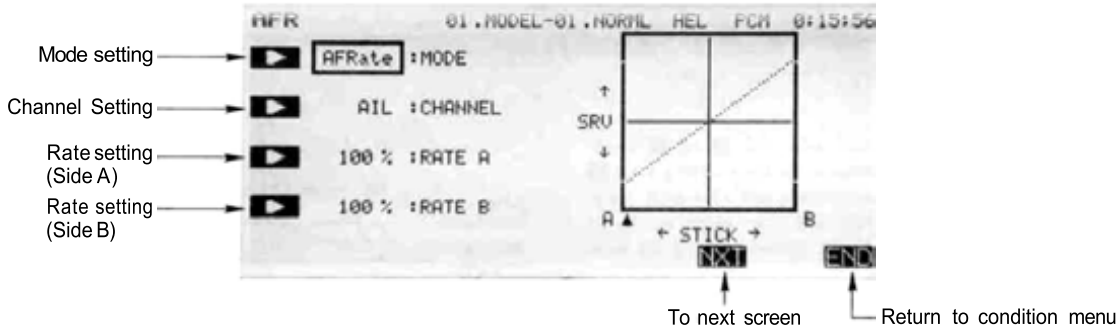
In the EXP1 mode, the servo movement near the neutral position can be made sensitive or insensitive. EXP2 mode is applicable to throttle and other control sliders and levers that do not self-center, and changes the response shape at one end of the control movement. The response rate can be made steep or gradual. NOTE: if you activate the throttle curve and pitch curve functions, the throttle channel and pitch channel EXP curves are overridden.

If the LIN mode is defined *within* the EXP1 mode, you can make an ordinary rotary servo have similar motion to that of a linear servo. In other words, the rotary servo moves more the further it is away from neutral, to simulate a linear output, which moves the same amount regardless of servo position.

Adjusting Function Rates

Activation of command

In the Condition Menu, press the AFR key to get the AFR menu shown below.



Channel Selection

To enter the channel selection menu, press the B key. and then press the key of the channel you wish to set. Depending on the Model setup, the following keys will appear on the bottom of the screen:

Airplane:
Helicopter:
Sailplane:

Input Rates

You can select the rates in both directions, which are designated as "A" and "B". To enter the rate for Side A, press the C key and use the rate setting keys F to El to input your desired rate. The rate is initially set to 100%.

Press the numeric key nearest the rate you desire from among the H (0) to M (100) keys. You can then increase and decrease the selected value with the F(+) and G (-) keys. Each key press adds or subtracts 1. Set the movement up so that no binding occurs at any extreme motions of sticks, knobs, or sliders. You may set the travel to anywhere between 10 and 140%.

Now you will set up Side B's rate similarly. Press the D key and set the rate with the rate setting keys F to M. As before, use the numeric keys to get the travel you desire.

Repeat this procedure for all the channels in sequence.

Mode selection

Press the Mode Selection A key. then press the NXT L key to get to the mode setting menu. To choose the EXP1 mode, press the EX1 I key. If you want the EXP2 mode, press the EX2 J key.

Side A curve rate setting

Set the rate as described earlier. If you need to change the polarity of the exponential response, use the +/- F key

Side L rate setting

Set the rate as described earlier. Note this setting is not available for EXP2 mixing.

Linear Mode Mixing

To set the linear mode, do the following: press the A key, then press the LIN H key. This automatically sets the side A and side B rate curves to —16%, to approximate linear response.

Ending

Press the END N key to exit to the Condition menu.

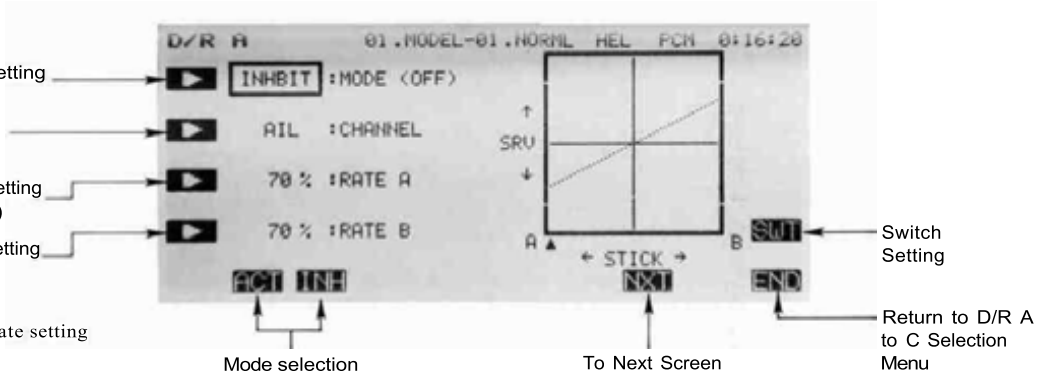
DUAL RATES AND EXP CURVE SWITCHING

Programming this function allows you to change the function operation rate and operation curve for any three channels by moving a switch. **You** may add switchable exponential response to a function without using the AFR menu. The switch position and ON/OFF direction can be chosen, or you may link ON/OFF control with the position of a control stick, such as throttle.

If you want to change the response rate around stick neutral, you can use the EXP1 mode, and make the servo movement sensitive or insensitive (0% exponential produces a normal straight-line response). For positionable controls like throttle, the EXP2 mode may be used to control the rise of the curve, either steep or gradual as the stick is moved. A special linear mode uses a particular value of the EXP1 curve to simulate operation of a linear servo with an ordinary rotary servo.

Initially, the three separate Dual rate circuits are set as follows: D/R A: Aileron; D/R B: Elevator; D/R C: Rudder. Of course you may change these to control any function.

NOTE: If the throttle curve and pitch curve functions are activated, the throttle channel and pitch channel EXP curves are cleared.



Setting Up Dual Rates and Curve Switching

Activation of command

In the Condition Menu, press the D\R key to get to the A to C Dual Rate circuit selection screens (not shown). Choose the desired Dual Rate circuit with theA to C keys, to get the D/R menu shown below (the 'A' menu is shown).

Dual Rate Control Selection

To select the control to be used in the Dual Rate function, press the B key, then press the key of the channel to be set with the E to L keys. Initially, Circuit A is set for Aileron. Depending on the Model setup, the following keys will appear on the bottom of the screen:

Airplane: AIL ELE THR RUD GEA FLP AU1 AU2
Helicopter: AIL ELE THR RUD GYR PIT AU1 AU2
Sailplane: AIL ELE ABR RUD SF1 SF2 AU1 BFL

Activate the Dual Rate

Press the A key to get to the activation keys. Select the D/R mode by pressing the ACT F key, or deactivate the function by pressing the INH G key.

Setting The Dual Rates

Press the C key, and set the side A rate with the rate setting keys F to M . Use the numeric key closest to the value you'd like to set, then press the + and - keys (F and G) to increase and decrease the selected value.

For the side B rate, press the D key and set as done for Side A.

To use the exponential curve in dual rates, press the A key, then press the NXT L key.

Press the EX1 I key to activate the EXP1 mode, or press the EX2 L key to activate the EXP2 mode. Set the Side A and Side L rates as described previously.

To choose linear response mode, press the A key, then press the NXT L key. Select the INH H key to choose the linear mode. The A and B rate curve settings are automatically made.

D/R switch selection and ON/OFF setting

Call the switch setting screen by pressing the SWT O key. For a description of the switch setting method, see page 40. If you'd like the dual rates to be turned on automatically by stick position, press the STK O button while in the switch selection screen. For example, you could have dual rates turned on when the throttle stick passed a defined position.

Dual Rate circuits B and C are set the same way as for Circuit A.

To Exit, press the END N key. This returns you to the D/R A-to-C selection screen. Press the END N key again to return to the Condition Menu.

PROGRAMMABLE MIXING (PMX)

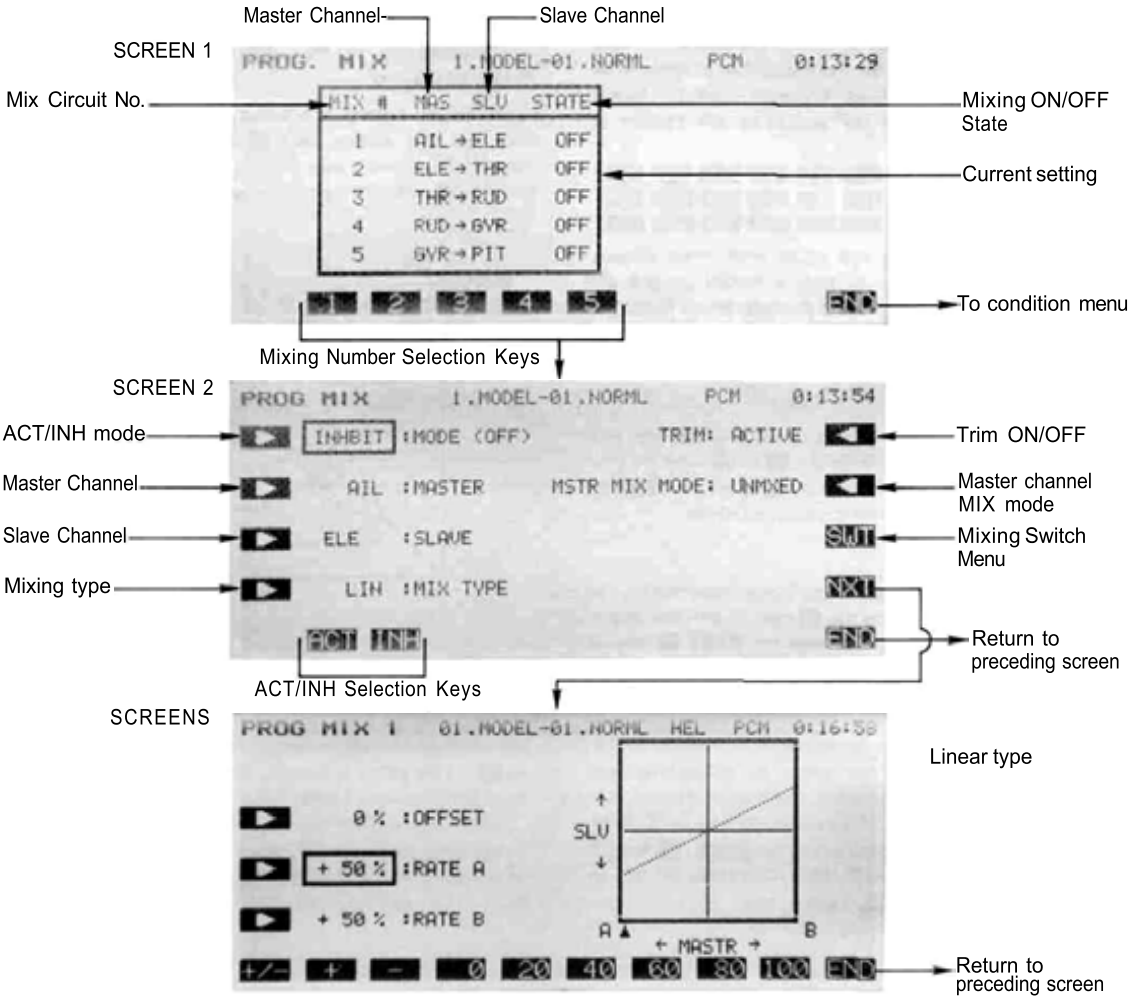
Programmable mixing may be used to correct undesired tendencies of the aircraft, and may be used for unusual control configurations. Mixing means that the motion of a command channel, called the "master," is added to the motion of the mixed channel, called "slave." For example, Aileron-to-Rudder mixing applies the aileron motion to the rudder servo as well as the commanded rudder position. You may even set up mixing so that the mixing rate can be changed according to the position of a channel other than the mixing channel ("Rate Control"), for example throttle position.

The midpoint of the mixing curve (mixing rate = 0 point) can be freely set. You may choose to have the Master trim rate added to the Slave channel response, or not ("TRIM" setting). The mixing rate can also be input as a seven-point curve. You may define Mixing ON/OFF switches or you may choose to have mixing remaining on all the time.

Any two channels can be mixed in each of the five available mixing circuits. Each mix circuit may use one of three mixing types. For Linear-type mixing, the mixing rate is proportional to the master channel motion. Offset-type mixing applies a fixed offset or preset to the programmed channel servo operation, and strictly speaking, is not really mixing at all. Hovering-type mixing applies an offset to the neutral point of the slave function.

Your PCM 1024Z system includes a powerful Link function, which allows Programmable mixing to be linked with the special mixing functions in the Flight Condition menus, or with other programmable mixing functions.

The Master channel MIX mode may be selected, where the master channel AFR and D/R settings are observed, or the UNMIX mode can be used. In the UNMIX mode, the motion of the master control is utilized without regard to the AFR and D/R settings.



Programming the Mixers

Activation of command

In the Condition Menu, press the PMX key to get the PROG MIX menu shown as Screen 1 in the top of the illustration below.

Selection and Activation of Mixing Menu (Nos. 1 to 5)

Press the number key associated with the mixing menu that you wish to program with the 1 to 5 (F to H) keys. Press the A key (moves to Screen 2 display shown below), then activate the mixer by pressing the ACT—Fkey. You may inhibit the mixer by pressing the INH Gkey.

Choosing the Mixing Type

Press the D key to get to the mix type selection menus. Now, you may select the Linear type by pressing the LIN E key, select the hovering type by pressing the HOV G key, select the 7-point curve type by pressing the CRV H key, or select the Rate Control type by pressing the CTL I key.

Master channel setting (not for offset and hovering type mixing)

To select the control to be used as the Master channel, press the B key. then press the key of the channel to be set with the E to L keys. Depending on the Model setup, the following keys will appear on the bottom of the screen:

Airplane: AIL ELE THR RUD GEA FLP AU1 AU2
Helicopter: AIL ELE THR RUD GYR PIT AU1 AU2
Sailplane: AIL ELE ABR RUD SF1 SF2 AU1 BFL

If you will be linking this mixer with other mixers, press the LNK M key. Linking is turned on and off alternately each time the key is pressed. When linking is ON, a "-»" is displayed in front of the Master channel name.

Slave channel setting

To select the Slave channel, press the C key and select the desired channel with the E to M keys. To link the Slave channel with other mixing, press the LNK M key. A "-»" is displayed after the channel name.

Trim ON/OFF Setting

Trim ON/OFF only applies to Linear type mixing. To select Trim ON/OFF, press the R key. To add the master trim operating rate to mixing, press the ACT F key. If you do not wish to add trim operating rate to mixing, use the INH G key.

Master Channel MIX Mode Definition

This definition does not apply to offset-type and hovering-type mixing. To define the Master channel mix mode, press the Q key. If you wish to add AFR, D/R, and curve set rate to mixing, press the MIX F key, if you do not wish to add AFR, D/R, and curve set rate to mixing, press the G (UN) key.

Mixing ON/OFF switch selection and ON/OFF direction setting

When a mixer is first activated, an ON/OFF switch is not defined. If you wish to define an on/off switch to control the mixing, call the switch setting screen by pressing the SWT P key. For a description of the switch setting method, see page 37.

Mixing Rate Inputting

To input the mixing rate, call the rate setting screen by pressing the NXT O key. This action calls up the menus shown in the figure as Screen 3.

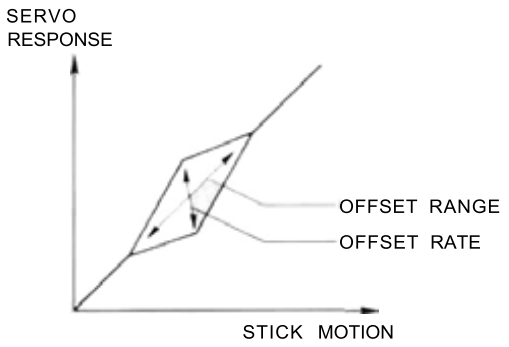
If the linear type of mixing is selected, you may offset the Mixing switching point setting by pressing the B key. then setting the master control to the desired switching point, and pressing the SET F key.

Mixing Rate Setting, Sides A and F

To input the numerical mixing values for the A side of Linear mixing, press the C key. You may then set the rate with the numeric setting keys E to M. The mixing rate is initially set to a value of +50%, but may be set anywhere in the range between —100 to +100%. Note that on the setting screen graph, the top is — and the bottom is+.

You may now set the values for Side B mixing as side A was done above.

If Offset mixing is selected, you may set the offset with the rate setting keys E to M The initial offset value is 0%, but you may set this anywhere between —100 and +100% with the numeric keys.



If Hovering mixing is selected, you input the Slave channel neutral position offset range setting using the C key, and set the offset range with the rate setting keys F to M . This value is initially set 5to 100%, but can vary anywhere between 0 and 100%.

Now you will set Slave channel neutral width setting. To do this, press the D key and set the offset with the rate setting keys E to M. This value is initially set to 0%, but can vary anywhere between 0 and 100%.

For the 7-Point Curve mixing method, each of the points on the curve must be defined. To set the points, first select the point with movement keys Q and R. The PT-> key increases the point number by one (moves one to the right), and the <-PT reduces the point number by one (moves one to the left). Once you have selected the point on the curve you wish to set, input the rate with the numeric setting keys E to M.

For the Rate Control Type of mixing, you need to specify the control channel (this is not the master or slave channel). Press the A key and select the desired channel with the channel keys E to L . You will then need to input the Mixing rate setting at the seven points. Press the B key and select the point with the movement keys Q and R. then input the rate with the numeric keys.

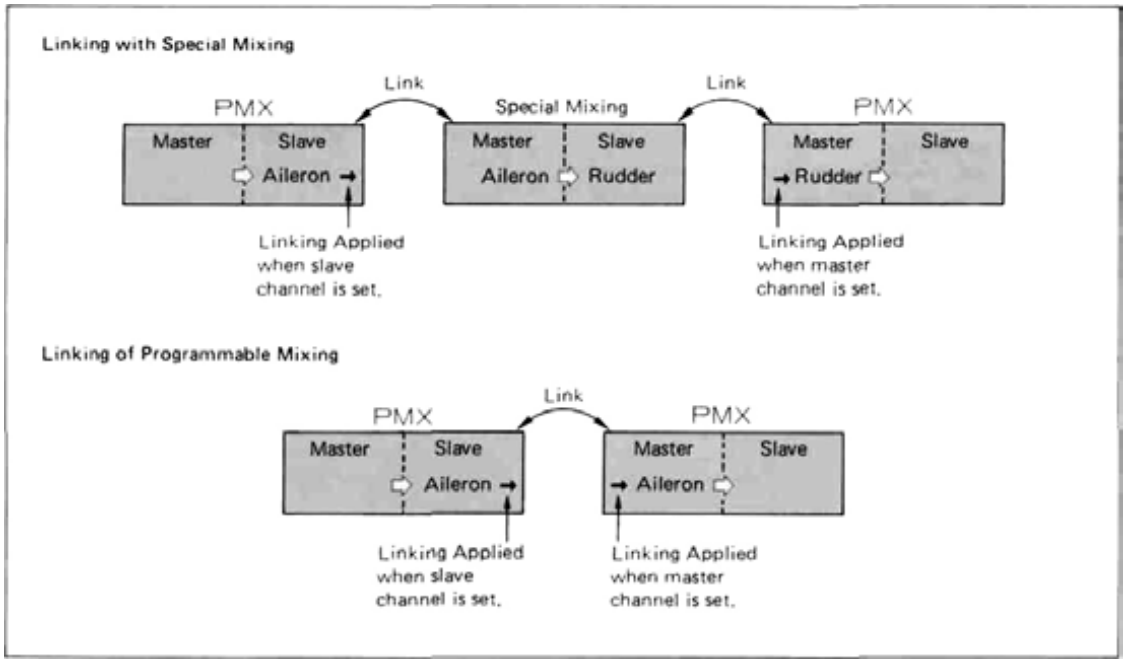
Rate control mixing has some interesting applications. For example, in a sailplane model you might want to adjust the rate of aileron-rudder coupling depending on the amount of wing camber — the more camber, the slower the model is flying, and the more rudder mixing is needed. For this function, you could link the rudder coupling mixer in the Special mix menu to a PMIX mixer, with the rate control specified by the slider control that controls the camber. Note that if you have differential set up, you will not get equal coupling to either side, UNLESS you turn the master mix mode to UNMIX, so that the differential is ignored for the mixing.

The PMIX menus on the PCM 1024Z are extremely powerful, and we would recommend that you experiment with all the different mixing types in the menus. Just set up a receiver and some servos, and try different mixing curves, types of mixing, offsets, linking, and all the other parameters. This is a simple way to understand how the mixing functions work, and after trying out a few of them, you will discover that programming the mixers is easier than trying to read these instructions!

Ending

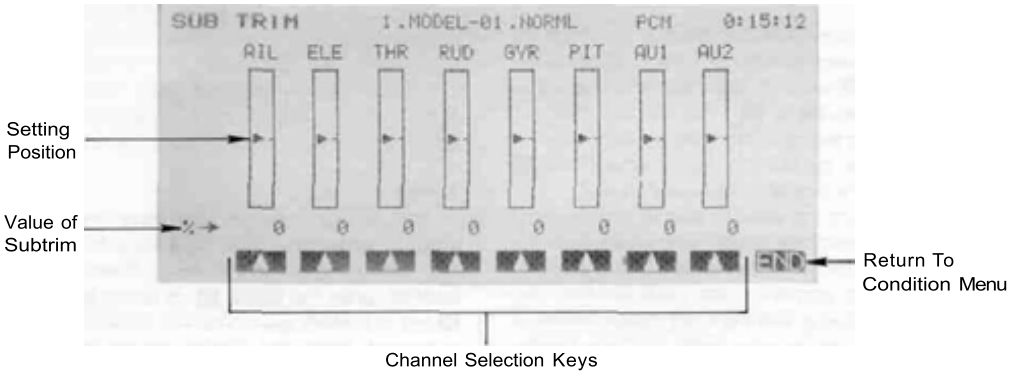
Had enough? Before you leave, try different stick motions to be sure that the mixing functions that you have defined behave as you expect them to. When you are satisfied, press the END N to return to Screen 2. If the N key is pressed again, you will return to Screen 1 If N is pressed again, the display returns to the Condition menu.

MIXING LINKING METHODS



SUBTRIM (STM)—SERVO NEUTRAL ADJUSTMEMT

The Subtrim function is used to set the servo neutral position, and may be used to make fine adjustments of control surface neutrals as linkages and pushrods are hooked up. When you begin to set up a model, be sure that the digital trims are set to their center position (page 71).



Using the Subtrim Command

Activation of command

In the Condition Menu, press the STM key to get the SUB TRIM menu shown below.

Subtrim Channel selection

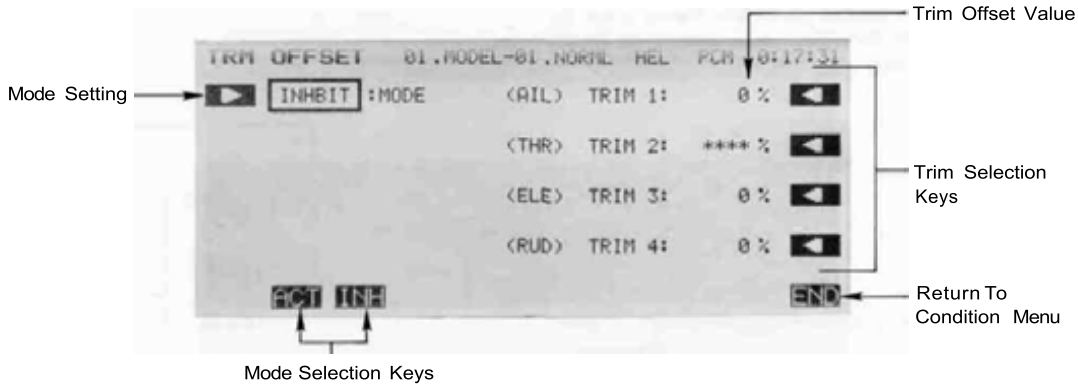
Press the key corresponding to the channel to be selected, using the F to M keys. Next, you input the subtrim position with the rate setting keys E to M Initially all subtrims are set to a 0% value, but actual settings may range from —120 to +120%. You should try to adjust your linkage so that the subtrims are near zero for all surfaces and linkages.

Repeat this procedure for each control on the model. End by pressing the END N key.

TRIM OFFSET (TOF)

The Trim Offset function may be used to set a trim offset for different flight conditions. For Helicopters, this is very useful to set offsets when the Pitch -> rudder (P->R) mixing is used. For Sailplanes, it may be used for setting trims for both elevator (ETM) and full wing camber, which may be programmed within Trim mixes 1 and 2 (TM1, TM2).

You may set a time delay to slow down the servo motions when the flight condition is switched. The delay should be entered in the digital trim TRM function (page 71).



Using the Trim Offset Command

Activation of command

In the Condition Menu, press the •TOF key to get the TRM OFFSET menu shown below.

Press the A key to get the activation menu. You may activate the Trim Offset function by pressing the ACT F key; to deactivate the function, press the INH G key.

Trim Position Selection (T1 to T4)

Select the trim to be set with the O to R keys. The displayed trims T1 to T4 are the channels set by the function change (FNC) menu. Initially, the display should show T1 (trim 1): Aileron; T2 (trim 2): Throttle; T3 (trim 3): Elevator; T4 (trim 4); Rudder. Note that when a trim is set to ATL type (throttle, for example), the offset rate cannot be set.

Offset Rate setting

Set the trim offset with the rate setting keys EtoM . Initial values are set to 0%, but may range between —100 and +100%. Repeat these steps for each trim.

End setting by pressing the END N key.

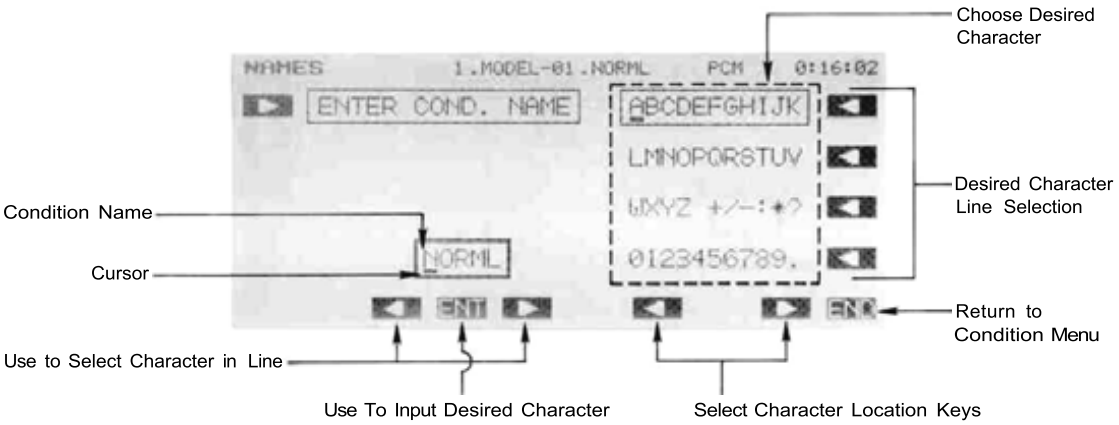
CONDITION NAME REGISTRATION (CNA)

This function may be used to name the active flight condition, and can be a maximum of five characters long. Once entered, the active condition name is displayed after the model name at the top center of the screen.

We recommend that you register a name that is easy to remember for easy confirmation of the active flight condition.

Registering a Condition Name

To register the desired Condition Name, press the CNA key from the Condition Menu to enter the naming function as shown below.



Press the A arrow key to select the registration function. If necessary, move the cursor to the desired location within the Condition Name with the G and I keys (left- and right-arrow).

Select the line containing the desired character with the O to R keys. Now. use the K and M keys to move across the line until the cursor is underneath the desired character. To enter the character into the Condition Name line, press the ENT H key. Repeat this procedure for the remaining characters of the desired name. To make corrections to entered characters, use the G and I keys to move to the character to be changed, and enter a new one.

When the name entry is completed, press the END N key.

DIGITAL TRIM (TRM)

The Digital Trim function may be used to program how the trims change as the force changes on the trim tab switches. When you press lightly on the trim you get one speed of operation, and when you increase the pressure, the repetition speed and rate also increase. The repetition speed and step rate and can be adjusted to match each model, and the beeping sound that occurs when a trim is operated can be turned on or off.

Any time you use the model select (MSL) function to choose another model, the new model comes with its own trim data, and the previous trim data are stored with the previous model. When a model is retrieved, its trim positions are also recalled.

There are two Trim modes available. The Normal mode is suitable for centering controls such as the transmitter sticks, and trimming is performed at the neutral position. The ATL mode is usually used for throttle, where trimming is performed only at the low end.

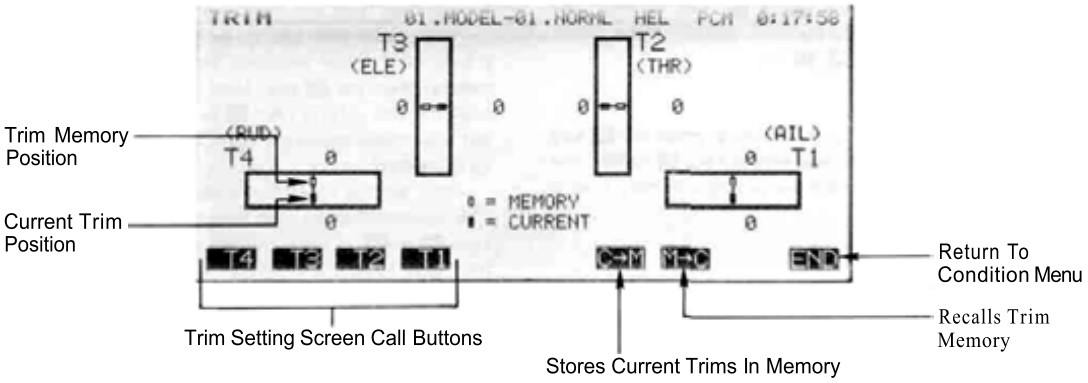
The trim functions on your PCM 1024Z have two operational modes. The Separate mode trims each flight condition separately, and has no effect on the trim of other conditions. The Combination mode should be used when you want to link the trim operation between modes. When a trim position is changed, it changes for ALL flight conditions.

The Digital Trim function is also used to set the delay for trim offsets when switching between different flight conditions.

Using the Digital Trim Menu

Activation of command

In the Condition Menu, press the TRM key to get the TRIM menu shown below.



Trim Storage

To store the current trim positions in memory, press the *C->M* K key and press the YES I key. This will over write the previous positions. If you DO NOT wish to memorize the trim positions, press the NO K key.

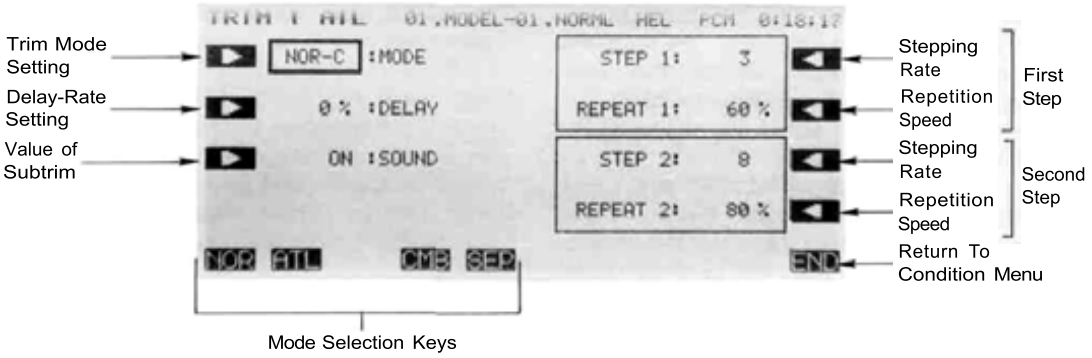
Recall Trim Memory

Press the *M->C* L key, then the YES I key, to recall the memorized trim position (this will wipe out your current trim settings). If you do not wish to overwrite the trim state, press the *NO* J key.)

Trim setting

To set the trim switch parameters, call the trim to be set with the trim keys E to H . This will bring up the Trim setting screen as shown below.

Screen 2



Trim Mode Selection

To select the trim mode, first press the A key. You may select the normal mode by pressing the NOR E Key, or select the ATL mode by pressing the ALT F key.

Combined/Separate Mode Selection

Select the Combination mode (trim controls all flight conditions) by pressing the CMB H key, or select the Separate mode (trim only controls current flight condition) by pressing the SEP I key.

Delay setting

To set the delay for trim changing, press the B key and set the delay with the rate setting keys F to M . The initial delay value is 0%, but the setting may vary from 0 to 100%.

Trim Notification Beeper

Press the C key to activate the beeper control, then turn on the beeper by pressing the ON F key. You may turn off the beeper by pressing the OFF G key.

First Step Rate and Repetition Speed

To set the first step parameters, press the R key. Now you may set the step rate with the rate setting keys E to M. The initial value is 3. but your value may vary from 1 to 50 or left unchanged by using INH.

Now set the repetition speed by pressing the Q key. The repetition speed may now be set with the rate setting keys F to M . This is initially set to 60%, but may vary from 0 to 100%.

Second Step Rate and Repetition Speed

The second step rate is reached when further pressure is held on the trim switches. To set the second step parameters, press the P key. Now you may set the step rate with the rate setting keys E to M The initial value is 8. but your value may vary from 1 to 50 or left unchanged by using INH.

Now set the repetition speed by pressing the O key. The repetition speed may now be set with the rate setting keys F to [M . This is initially set to 80%, but may vary from 0 to 100%.

Returning

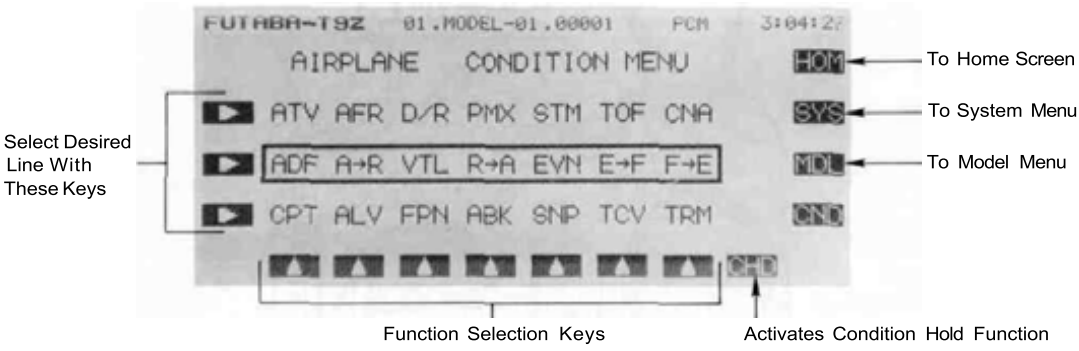
Press the END N key to return to Screen 1. Press the N key again; the display returns to the condition menu.

AIRPLANE SECTION

This section contains information on the commands that apply to powered aircraft only. Each of these functions can be set independently for different flight conditions.

For conditions that apply to all models (ATV, AFR, D/R, PMX, STM, TOF, CNA, and TRM functions), refer to the Common Conditions section. For instructions on Helicopters and Sailplanes, refer to the sections pertaining to those aircraft.

To get to these settings, press the MDL key from any menu in an Airplane setup. To select one, first select the line containing the desired function with the B, C, or D keys. Then use the F toL keys to select the function to be entered.



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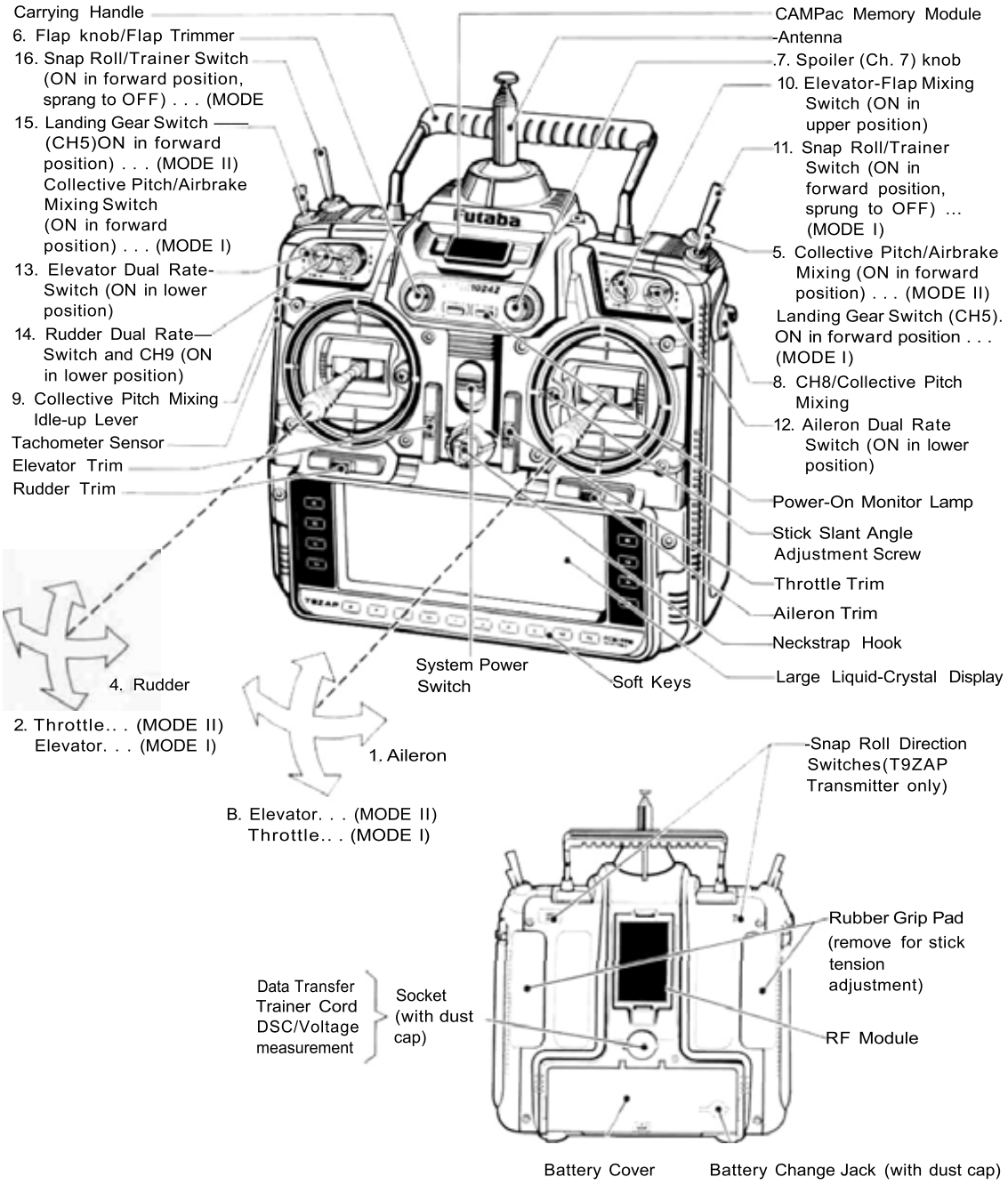
AIRPLANE CONTROLS AND FUNCTIONS

Functions and locations given in this drawing are the factory default positions, which occur upon startup. Each setting can be easily changed as the owner desires. The Function Change menu [FNC] may be used for this purpose.



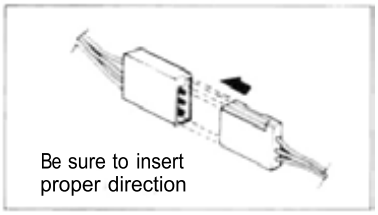
Note that all stick & switch positions may be changed

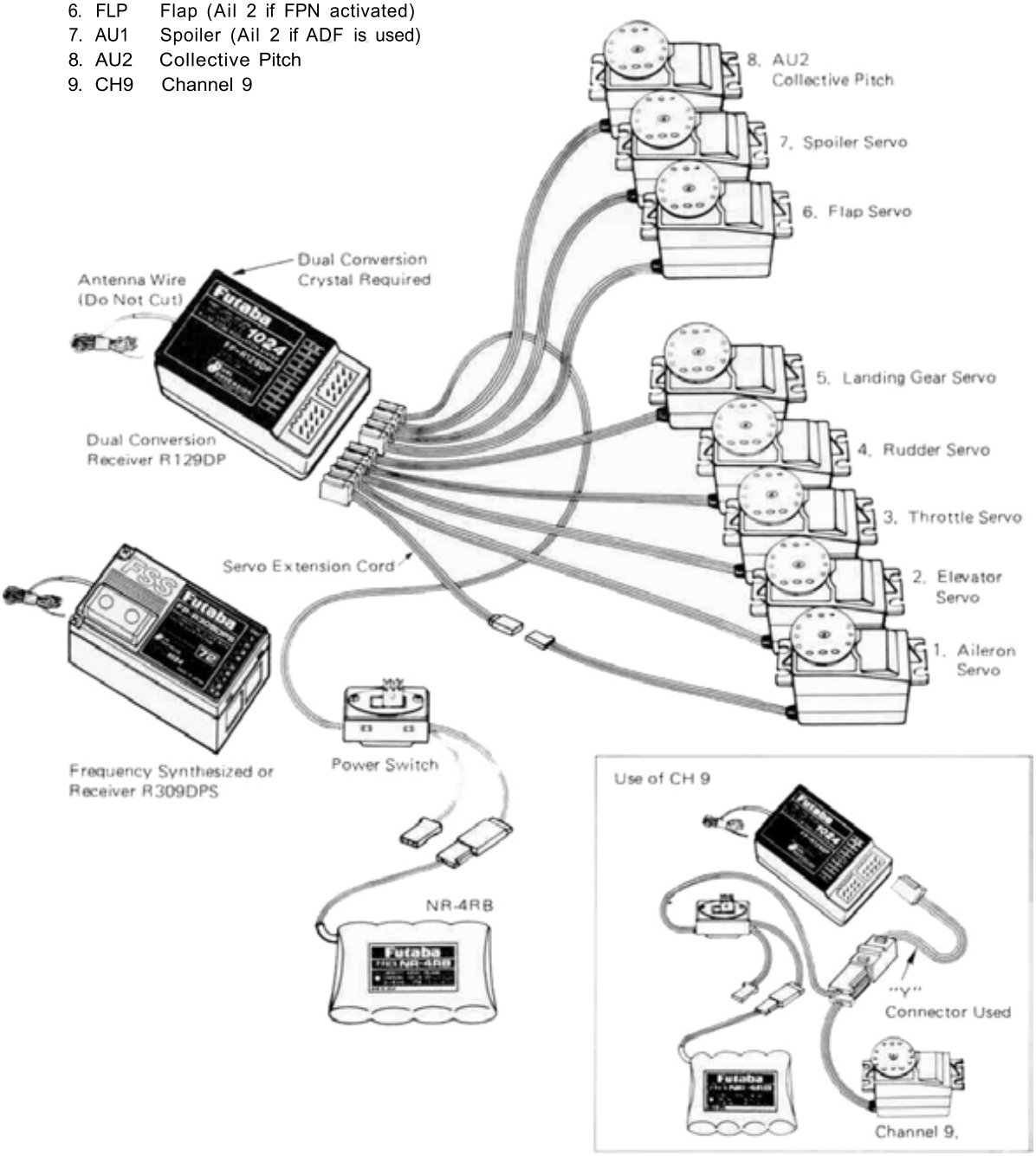
1. Aileron Control
2. Throttle Control ... (MODE II)
   Elevator Control . . . (MODE I)
3. Elevator Control ... (MODE II)
   Throttle Control . . . (MODE I)
4. Rudder Control
5. Collective Pitch Mixing/Airbrake Mixing Switch.
   ON in forward position, OFF in rear position . . . (MODE II)
   Landing Gear Switch . . . (MODE **I)**
6. Flap Knob/Flap Trim (CH6)
   Can be used as the flap trimmer when CH6 is used for flap control and mixing
7. Spoiler (CH7) Knob
   Controls the spoiler as CH7. (not used in aileron differential)
8. CH8 or Collective mixing pitch control HIGH side lever. Serves as the pitch control high side trimmer when CH8 is used for pitch control and for mixing from throttle CH3 to Pitch Control CH8.
9. Collective Mixing Idle-Up Lever
   Raises the engine idling speed at the variable pitch propeller LOW side.
10. Flap/Elevator or Airbrake Mixing Switch
11. Snap Roll Switch
    Commands snap roll. ON in Forward position, spring-loaded to OFF position . . . (MODE I)
12. Aileron Dual Rate Switch
13. Elevator Dual Rate Switch
14. Rudder Dual Rate Switch/Channel 9 Switch
15. Landing Gear Switch ... (MODE II)
    Collective Pitch Mixing/Airbrake Mixing Switch. ON in forward position, OFF in rear position . . . (MODE I)
16. Snap Roll Switch Command Snap roll.
    ON in Forward position. Spring-loaded to OFF position . . . (MODE II)

AIRPLANE RECEIVER AND SERVO CONNECTIONS

The receiver output order is shown below:

1. AIL Aileron (Ail 1 if FPN or ADF on. Elevon 1 if EVN on)
2. ELE Elevator (V-Tail 1 if VTL on, Elevon 2 if EVN on)
3. THR Throttle
4. RUD Rudder (V-Tail 2 if VTL on)
5. GEA Landing Gear (Elev 2 if ALV on)
6. FLP Flap (Ail 2 if FPN activated)
7. AU1 Spoiler (Ail 2 if ADF is used)
8. AU2 Collective Pitch
9. CH9 Channel 9





SAMPLE AIRPLANE SETUP INSTRUCTIONS

The following example shows how the PCM 1024Z may be programmed for a pattern airplane. The settings presented here are for a typical model. Your model's settings are likely to vary from these, but the procedures given will still be applicable.

1. Model Selection

Use the Model Select function MSL to select a vacant model memory (or one you don't mind erasing) and choose the AIRPLANE Setup using the Type TYP function from Model menu.

2. Name The New Model

Rename the model using the Model Name MNA function in the model menu. Switch to the Condition menu CND and name the default flight condition (we recommend NORML). Later you may add other flight conditions, which may also be named to make them easier to identify.

3. Activate Special Mixing

Activate Flaperon FPN or Aileron Diferential ADF if you desire these functions (you may only choose one; both require two aileron servos). FPN is suggested since it can accommodate differential through end point adjustments, and has Flap mixing. The Flap mixing is used to have the ailerons behave as flaps as well, which can be used to make tighter loops and squarer corners in maneuvers. Use ALV to get elevators that act as ailerons (two servos are required for ALV function). You need not adjust the throws and mixing ratios at this time.

4. Reset Control Order

If necessary, reset the Control Order using the Function Control FNC in the model menu. Here you may choose what sticks and sliders control the different functions. If you use the ALV function, move the retract operation to another switch, perhaps CH7 or CH8.

5. Connect Servos

Plug Servos into Correct Channel Numbers

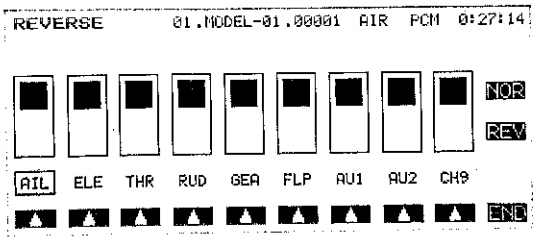
1. AIL Aileron (Ail 1 if FPN or ADF on)
2. ELE Elevator
3. THR Throttle
4. RUD Rudder
5. GEA Landing Gear (Elev 2 if ALV on)
6. FLP Flap (Ail 2 if FPN activated)
7. AU1 Spoiler (Ail 2 if ADF is used)
8. AU2 Collective Pitch
9. CH9 Channel 9

6. Set Neutral Points

Use the Subtrim function STM to move each servo to its neutral position. If the amount of subtrim is large, you should reset the subtrim to zero and move the splined servo arm to a position that is as close to the desired neutral as possible. Then use the subtrim to get the neutral position "right on." Repeat with the remaining channels.

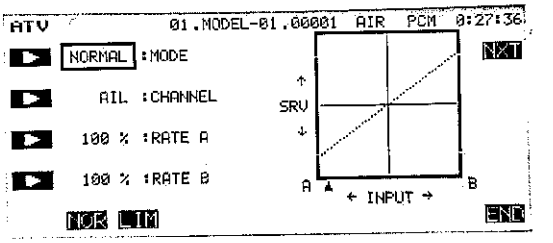
7. Adjust Servo Throws

Check the proper direction of throw for each servo. Use Reversing Function REV in the Model menu to set proper throw directions for each servo. Double check that eash servo moves the proper direction.



8. Limit Servo Throws

Now use the ATV function to limit servo throws. The travel of the ailerons should be limited to roughly 10–12° maximum in both directions with the ATV function. Repeat for elevator. Adjust rudder lateral motion to about ±45°. Be sure that no servo "bottoms out" at maximum control throw. After setting maximum throws, ATV is rarely used. Instead use AFR in the different flight modes.

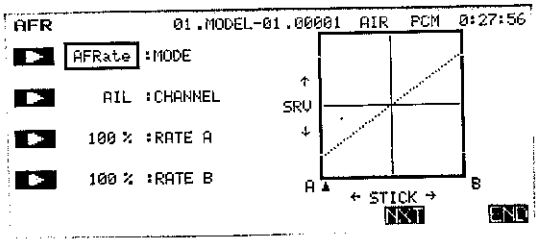


9. Changing The Control Feel

If you would like to soften the control feel for ailerons, use the AFR menu. Press the NXT key, then the EX1 key to get exponential curve. Set a rate of –15% to –25%. EX2 is used for throttle only.

Change to Elevator using the Channel key. Use the AFR to get slightly more up than down travel, and use EX1 with a –10% setting.

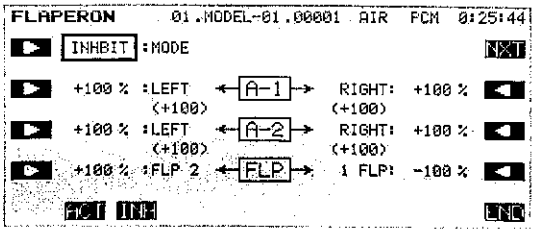
Change to Rudder with the Channel key, and set EX1 for –10%.



10. Set Flaperon Throws

Now go back to the FPN (Flaperon) menu. Set differential by limiting the down aileron throws on both sides. The down throw should be set between 70% and 95% of the up throw. This setting depends on the individual model and its particular flight characteristics, so make changes after flight testing. Be sure that the flap mixing settings are the same (default is ±100%).

Move to the E→F menu to set up how much the ailerons move due to elevator. Approximately 10–30% up and down mixing should be used (be sure that up elevator causes the ailerons to drop, and down elevator raises the ailerons up). The amount of aileron droop at neutral elevator may be set with the A knob. You may adjust this travel by adjusting the trim rate – it can be set to zero to prevent accidental changes (be sure this knob is zeroed before resetting subtrims). Using the SWT button, you can also define a switch to turn the elevator-flaperon mixing on and off.



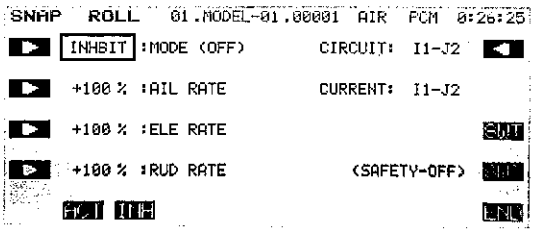
11. Setting Up Airbrakes

To make landings easier, you may set a switch to move both the elevators and flaps to a preset position for an airbrake effect. Normally, the ailerons are raised 5–10° and the elevator is offset to cancel any trim change.

Call the Airbrake ABK function from the condition menu. Select the Manual mode by pressing the MAN key. Auto is available.

This system should normally be used in manual mode. To select the operating switch, press the SWT key. The display shows that the default airbrake control switch is the C switch, ON in the lower position. You may choose another switch or direction at this time. Verify proper operation of the switch by activating it and watching the servos move.

Press the PRE key to get back to the preceding key. If you have spoilers, they may be actuated also. Read the section on ABK for more details.

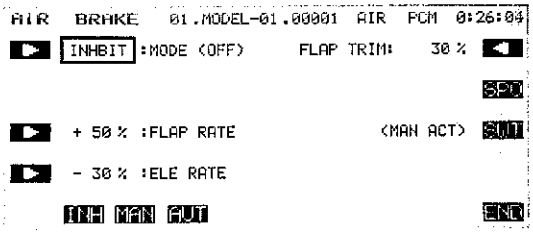


12. Snap Roll Setup

You may have any switch activate the Snap Roll function (the spring-loaded switch is strongly recommended!). Call the Snap Roll function SNP form the Condition menu. Activate it with the ACT key.

Set the deflection for each switch position: ailerons ±100–110%, elevator ±80–100%, rudder ±70–80%. Be sure to choose the correct directions with the +/– key E.

For safety, you may also turn on the safety switch using the O button. This safety inhibits the activation of snap roll if the landing gear are down. Check to make sure the switch is set for the correct direction.



13. Setting Up Differential Elevator

Your PCM 1024Z system has a unique function called ALV for "Ailevators," or differential elevators. This function provides roll control whenever the propeller slipstream is acting on the tail, and is effective at low airspeeds.

Press the ALV key to enter the menu. Activate with the ACT key, then adjust the rates given by the A-3 and A-4 settings. We recommend starting out with small deflections at first. Be sure that the settings for ELE are 100% to get full elevator authority.

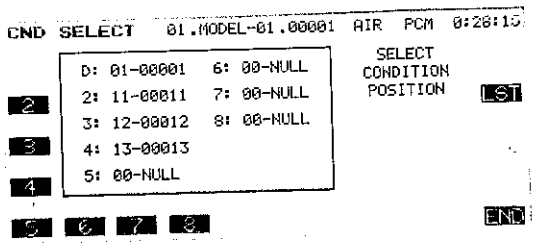
14. Flight Conditions Switching

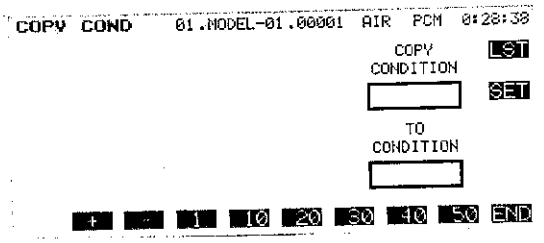
If you like, you may set up the system to call up more than one function or switch to a new set of trims or control settings simultaneously by moving a single switch. You can have different subtrims, coupling, differential, exponentials, and throw volumes. In fact you may change EVERY parameter between flight modes.

We recommend that you fly the model and adjust trims and control responses to your liking before defining another flight condition. Any bad tendencies may be corrected with custom programmable mix settings **PMX** . Then, copy the set of adjustments to a new flight condition, where they may be modified for the new desired conditions. After copying you may add new functions as necessary.

Use the Condition Select **CSL** button in the Model Menu. This function allocates the necessary number of flight conditions to the model memory. Note the condition number next to the D (default) in the display. This is the set of conditions that will be copied into a new condition and modified. Also note the number after the next display. You will copy to this condition.

Use the Copy Condition **CPC** from the System menu. This function copies the contents of one condition into another. Choose the default flight condition number, press the SET button, then choose the second condition number in the lower box "TO CONDITION." Give the command to copy.





The switch that calls the flight conditions should be selected. Return to the Condition Select **CSL** function, press the desired flight condition number, and use the SWT button to choose the desired switch location. Once you have selected a condition, use the CNA (Condition NAme) button to label the new condition (you may have to flip the chosen switch to the correct position to get the desired condition). Now, you may go through the Condition menu items to get the desired settings in the new mode. Read the condition name after the model name to be sure you are changing the condition you want.

15. Volume Setting

Some functions can have their mixing ratio vary with the motion of another slider or knob: use the **VOL** key **O** to get to this choice (for example, see ADF). Move the selected control to determine how it affects the mix. You can also add a time delay on many of the menus: look for a DELAY setting.

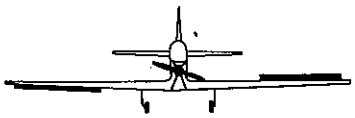
16. Programmable Mixers

Up to five mixers are available in all flight conditions. These may be used to enhance flight capabilities or to correct bad tendencies by adjusting mixing from one control to another. For example, you may use Elevator→Flap coupling to tighten up the corners on square loops, Throttle→Rudder coupling to correct for torque tendencies, etc. There is no limit to the number of corrections that can be made.

Your PCM 1024Z system is filled with powerful, predefined mixing functions. Be sure to browse through the various function menus in the Aircraft section following this example.

AILERON DIFFERENTIAL (ADF)

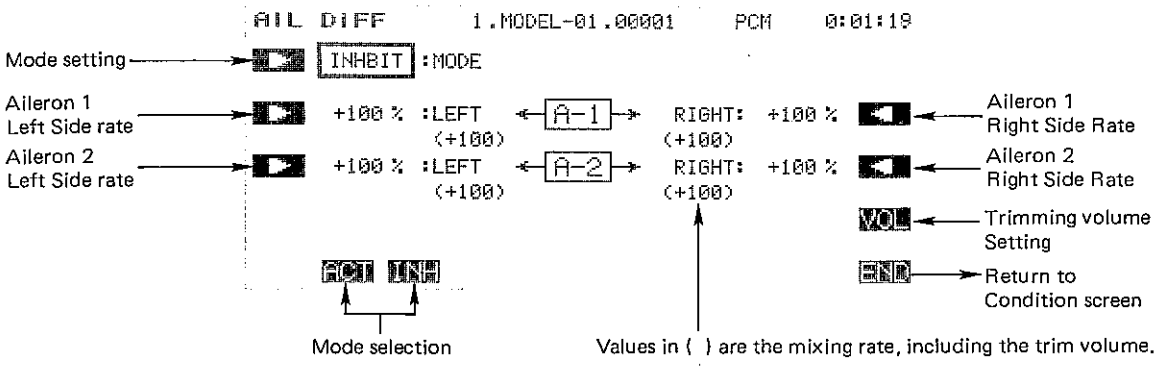
This function uses two separate aileron servos to independently correct yaw tendencies during rolls. It is possible to adjust each aileron's positive and negative deflection angles. When this function is activated, receiver outputs CH1 and CH7 are used for the two aileron channels. This function may not be used if Flaperon (FPN) is chosen. If desired, the amount of down aileron deflection may be trimmed in flight with a knob or trimmer.



Setting Up Aileron Differential

Activation of command

In the Condition Menu, press the ADF key to get the AIL DIFF menu shown below. Use the A (▶) key to activate mode setting, then press the ACT or INH keys (F and G) to activate or inhibit the aileron differential function.



Aileron 1 Travel Setting

You now set the amount of servo throw for Aileron 1. Press the B key to activate travel setting for the Left direction and set the throw with the numeric keys. The number keys 0 through 100 input the value directly. The + and − keys increase or decrease the value by 1. The +/− key may be used to reverse the throw direction.

If you are not sure what you are changing, hold the stick to one side and press different keys — if there is no effect, move the aileron stick to the other side and continue. Your setting may vary from −120 to +120%, the initial value is +100%.

Now set the travel for the Right throw on Aileron 1. Press the Q key to activate travel setting for the Right direction and set the throw with the numeric keys as before.

Aileron 2 Travel Setting

The setting process given above is repeated for Aileron 2. Press the C key to activate travel setting for the Left direction and set the throw with the numeric keys.

Finally, set the travel for the Right throw on Aileron 2. Press the P key to activate travel setting for the Right direction and set the throw with the numeric keys as before.

Trim volume setting

You may set up the Aileron Differential function so that its effect may be changed in flight by moving a trim control. The trim control adjusts the volume within ±25% of the set differential rate. This option is not activated at initial setup.

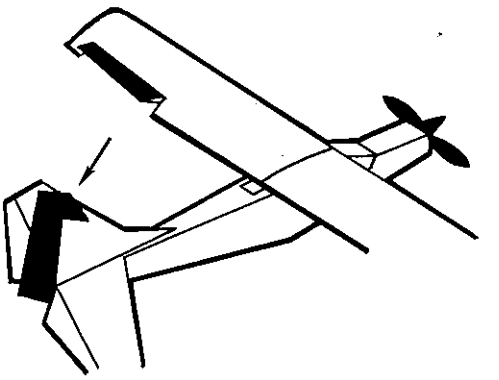
Call the volume setting screen by pressing the VOL O key, and select the desired control using the screen menus (for a description of the volume setting method, see page 37).

Use the END (N) key to leave this menu.

RUDDER COUPLING (A→R)

This function is used to mix rudder operation with aileron operation automatically, to make realistic, coordinated turns. It is especially effective when turning and banking scale models or large models that resemble full-sized aircraft. This mixing keeps the fuselage aligned into the wind and helps to make what is called "coordinated turns."

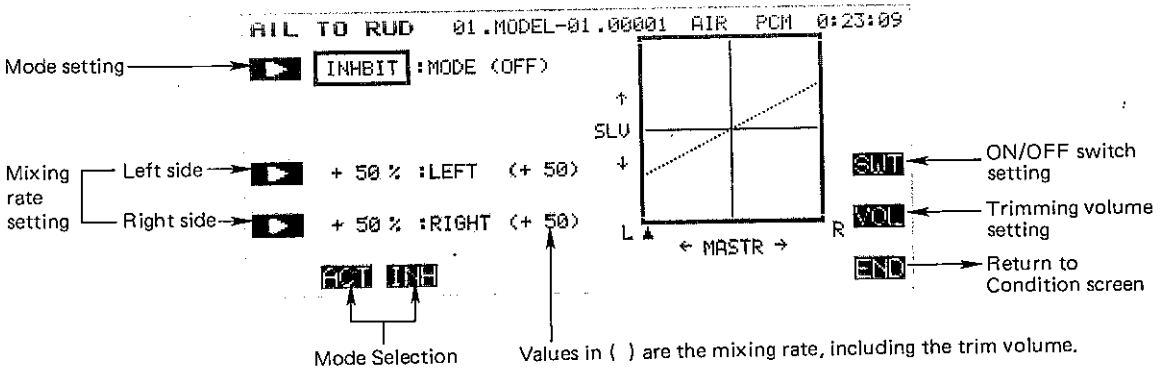
The function allows you to set up the left and right mixing rates independently. Furthermore, mixing can be turned on and off during flight by setting a switch, or it may be set to stay on all the time if the function is activated (ACT) without setting an ON/OFF switch. Also, it is possible to adjust the amount of rudder coupling in-flight, by setting a volume control.



Setting Up Rudder Coupling

Activation of command

In the Condition Menu, press the A→R key to get the AIL TO RUD menu, as shown below. Use the A (▶) key to activate mode setting, then press the ACT or INH keys (F and G) to activate or inhibit rudder coupling.



Setting the Mixing Ratio – Left and Right

You now set the amount of mixing for left aileron command. Press the C key to activate mixing ratio for the Left direction and set the value with the numeric keys E to M . The number keys 0 through 100 input the value directly. The + and − keys increase or decrease the value by 1. The +/− key may be used to reverse the throw direction.

If you are not sure what you are changing, hold the stick to one side and press different keys – if there is no effect, move the aileron stick to the other side and continue. Your setting may vary from −100 to +100%, the initial value is +50%.

Now set the amount of mixing for the Right aileron command. Press the D key to activate mixing ratio for the Right direction and set the throw with the numeric keys as before.

On/Off Switch Setting

On initial setting, an activation switch for rudder coupling is not set, meaning that once activated, it is on all the time. If you would like to set a switch to turn it on and off, call the Switch Setting screen by pressing the SWT P key. Then use the keys to choose the desired switch location and on direction. For more information on the switch setting method, see page 37).

Trim Volume setting

You may set up the Rudder coupling function so that its effect may be changed in flight by moving a trim control. The trim control adjusts the volume within ±25% of the set mixing rate. This option is not activated at initial setup.

Call the volume setting screen by pressing the VOL O key, and select the desired control using the screen menus (for a description of the volume setting method, see page 37).

Use the END (N) key to leave this menu.

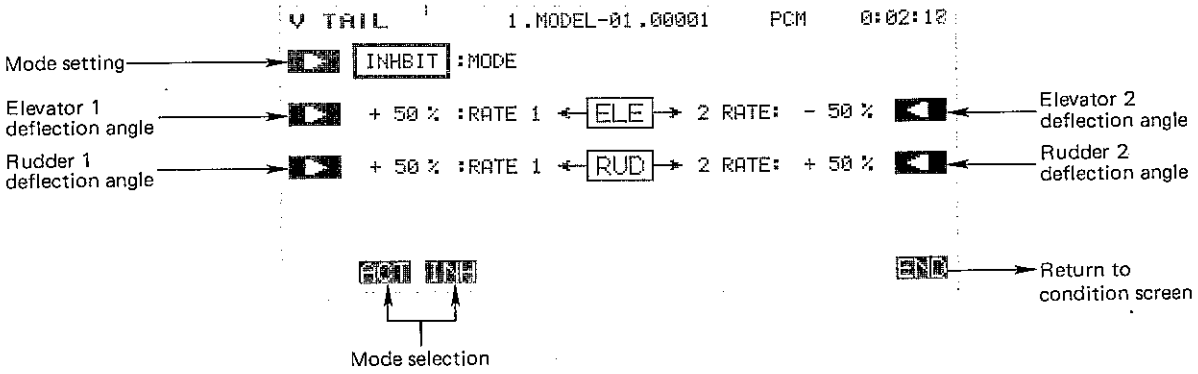
V-TAIL (VTL)

This function automatically sets up the PCM 1024Z to control a V-tail airplane with combined elevator and rudder functions. It requires two servos, one hooked up to receiver output CH2 (elevator 2/rudder) and the second plugged into CH4 (elevator 2/rudder 1). The elevator and rudder deflection can be adjusted independently.

Setting Up V-Tail Mixing

Activation of command

In the Condition Menu, press the VTL key to get the V-TAIL Mixing menu shown below. Use the A (▶) key to activate mode setting, then press the ACT or INH keys (F and G) to activate or inhibit V-Tail Mixing.



Setting the Elevator Rates — 1 and 2

You now set the rate for Elevator 1. Press the B key to activate rate setting for Elevator 1 and set the rate with the numeric keys E to M . The number keys 0 through 100 input the value directly. The + and − keys increase or decrease the value by 1. The +/− key may be used to reverse the throw direction.

If you are not sure what you are changing, hold the stick to one side and press different keys — if there is no effect, move the elevator stick to the other side and continue. Your setting may vary from −100 to +100%, the initial value is +50%.

Now set the rate for Elevator 2. Press the Q key to activate Elevator 2 rate setting and set the rate with the numeric keys as before.

Setting the Rudder Rates — 1 and 2

You now set the rate for Rudder 1. Press the C key to activate rate setting for Rudder 1 and set the rate with the numeric keys E to M as before.

If you are not sure what you are changing, hold the rudder stick to one side and press different keys — if there is no effect, move the rudder stick to the other side and continue. The initial value is +50%, but your setting may vary from −100 to +100%.

Now set the rate for Rudder 2. Press the P key to activate Rudder 2 rate setting and set the rate with the numeric keys as before.

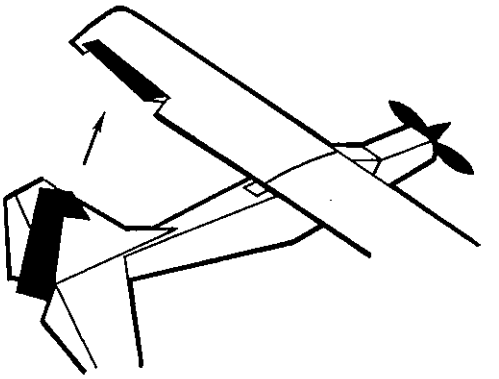
Checking Your Work

After you have set up the V-Tail rates, be sure that they move the correct directions. For up elevator command, both V-tails should move upward. For right rudder command, the trailing edge of both surfaces should move to the right. If they do not, use the +/− to reverse the direction as needed.

Use the END (N) key to leave this menu.

RUDDER→AILERON (R→A)

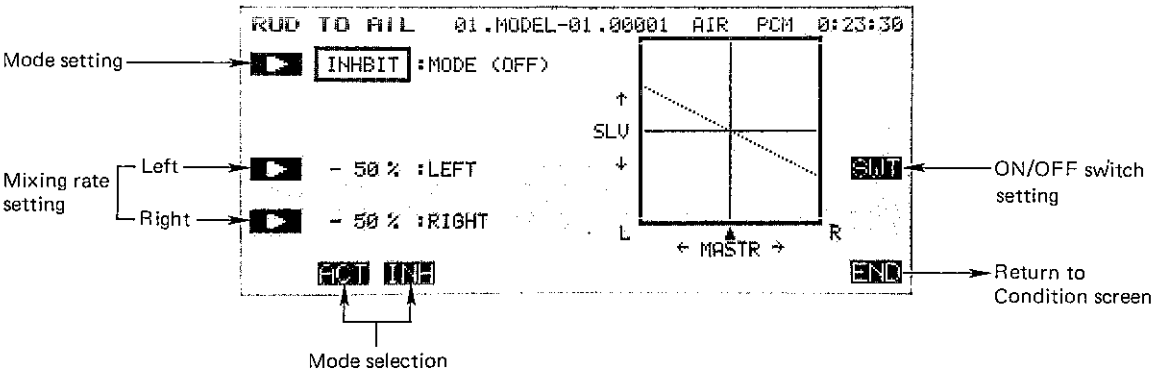
Rudder to aileron coupling may be used for correcting unwanted tendencies with aerobatic planes. For example, this mixing can be used to cancel out any rolling that occurs during knife edge flight. The rates for left and right rudder travel can be set independently. Mixing can be set to be turned on and off during flight by setting a switch (if no ON/OFF switch is set, mixing remains on all the time).



Setting Up Rudder→Aileron Mixing

Activation of command

In the Condition Menu, press the A→R key to get the RUD TO AIL mixing menu shown below. Use the A (▶) key to activate mode setting, then press the ACT or INH keys (F and G) to activate or inhibit rudder-to-aileron coupling.



Setting the Mixing Ratio — Left and Right

You now set the amount of mixing for Left rudder command. Press the C key to activate mixing ratio for the Left direction and set the value with the numeric keys E to M. The number keys 0 through 100 input the value directly. The + and − keys increase or decrease the value by 1. The +/− key may be used to reverse the throw direction.

If you are not sure what you are changing, hold the stick to one side and press different keys — if there is no effect, move the rudder stick to the other side and continue. Your setting may vary from −100 to +100%, the initial value is −50%.

Now set the amount of mixing for the Right rudder command. Press the D key to activate mixing ratio for the Right direction and set the throw with the numeric keys as before.

On/Off Switch Setting

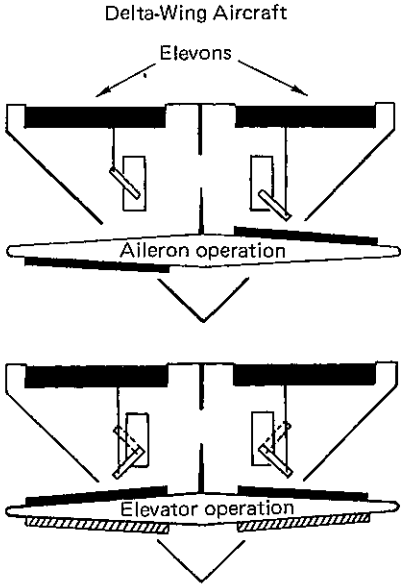
On initial setting, an activation switch for rudder to aileron coupling is not set, meaning that once activated, it is on all the time. If you would like to set a switch to turn it on and off, call the Switch Setting screen by pressing the SWT P key. Then use the keys to choose the desired switch location and on direction. For more information on the switch setting method, see page 37).

Use the END (N) key to leave this menu.

ELEVONS (EVN)

This function may be used to set up the controls for delta wings, flying wings, and other tailless aircraft which need combined aileron and elevator functions. Receiver CH1 and CH2 are made the operating channels for the two elevons, and differential operation is possible.

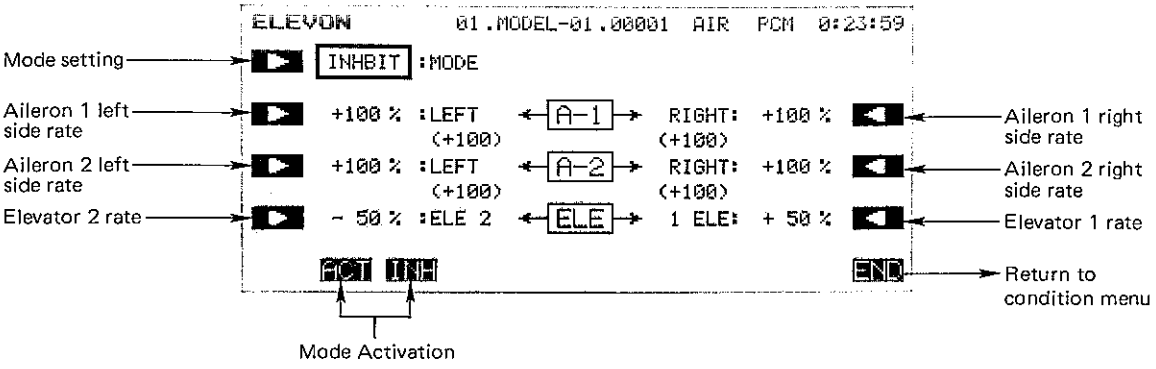
The elevator deflection angle and operating direction can be set for each servo. For convenience, the elevon deflection angles can be trimmed in flight when a volume-setting lever is activated (this setting is performed by the aileron differential ADF function on page 125).



Setting Up Elevon Mixing

Activation of command

In the Condition Menu, press the EVN key to get the ELEVON Mixing menu as shown below. Use the A (▶) key to activate mode setting, then press the ACT or INH keys (F and G) to activate or inhibit Elevon Mixing.



Setting the Aileron 1 Rates

You now set the left-side rate for Aileron 1. Press the B key to activate left rate setting for Aileron 1 and set the rate with the numeric keys E to M . The number keys 0 through 100 input the value directly. The + and - keys increase or decrease the value by 1. The +/- key may be used to reverse the throw direction.

If you are not sure what you are changing, hold the stick to one side and press different keys — if there is no effect, move the aileron stick to the other side and continue. Your setting may vary from -120 to +120%, the initial value is +100%.

Now set the right-side rate for Aileron 1. Press the Q key to activate Aileron 1 right rate setting and set the rate with the numeric keys as before.

Setting the Aileron 2 Rates

This procedure is repeated for Aileron 2. Press the C key to activate left rate setting for Aileron 2 and set the rate with the numeric keys E to M as before.

Now set the right-side rate for Aileron 2. Press the P key to activate Aileron 2 right rate setting and set the rate as before.

Setting the Elevator Rates — 1 and 2

You now set the rate for Elevator 2. Press the D key to activate rate setting for Elevator 2 and set the rate with the numeric keys E to M .

Now set the rate for Elevator 1. Press the O key to activate Elevator 1 rate setting and set its rate with the numeric keys.

Checking Your Work

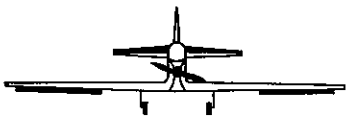
After you have set up the Elevon rates, be sure that they move the correct directions. For up elevator command, both elevons should move upward. For right aileron command, the trailing edge of the right-hand surface should move up, and the trailing edge of the left-hand surface should move down. If they do not, use the +/- to reverse the direction as needed.

Use the END (N) key to leave this menu.

ELEVATOR→FLAP (E→F)

This mixing is used to droop the flaps whenever an up elevator command is given (and may be set up for down elevator as well, helpful during 'outside' maneuvers). It helps to eliminate 'bucking,' and makes tight, square corners in maneuvers for aerobatic aircraft.

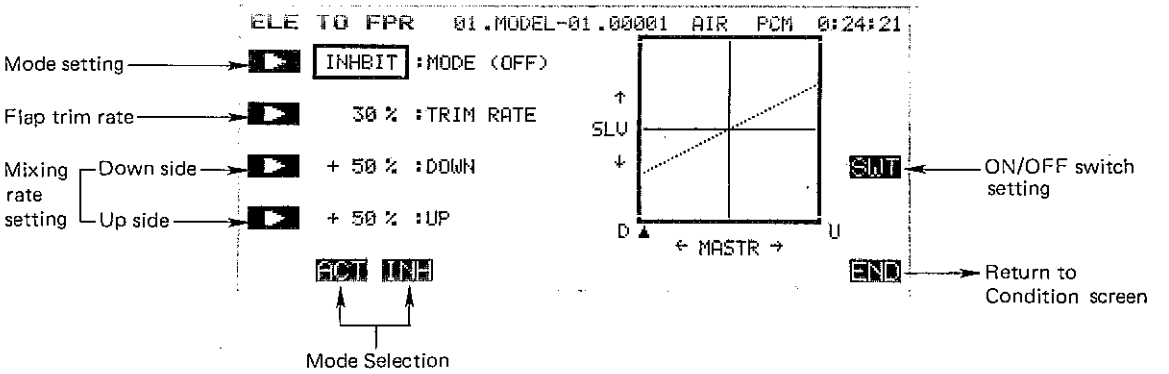
Elevator-to-flap mixing can be set up to be turned on and off during flight by a switch (if no switch is activated, this mixing remains on all the time). You can also set the flap trim rate in this function. If the flaperon function is activated, the elevators are mixed with the ailerons, otherwise, the mixing is with the flaps only.



Setting Up Elevator-to-Flap Mixing

Activation of command

In the Condition Menu, press the E→F key to get the ELE TO FPR menu shown below. Use the A (▶) key to activate mode setting, then press the ACT or INH keys (F and G) to activate or inhibit Elevator-to-Flap.



Setting the Mixing Ratio — Down and Up Side

You now set the amount of mixing for down elevator command. Press the C key to activate mixing ratio for the Down direction and set the value with the numeric keys E to M. The number keys 0 through 100 input the value directly. The + and − keys increase or decrease the value by 1. The +/− key may be used to reverse the throw direction. Your setting may vary from −100 to +100%, the initial value is set to +50%.

Now set the amount of mixing for the up elevator command. Press the D key to activate mixing ratio for the Up direction and set the throw with the numeric keys as before.

Flap Trim Rate Setting

You may choose any value for the Flap Trim Rate. Knob (A) is used to trim the position of the flap servo, and the trim value controls the authority of the knob. The authority may be set anywhere from 0% to 100%, and the initial setting is 30%.

Call the flap trim setting screen by pressing the TRIM RATE B key, and select the desired trim rate using the screen menus. You may want a small number for this rate, so that an accidental movement of the knob doesn't give a large flap deflection.

On/Off Switch Setting

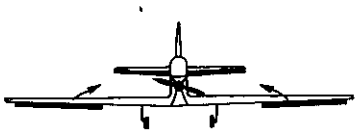
On initial setting, the activation switch for Elevator-to-Flap mixing is set as SW (C) on at the upper position. If you would like to change the switch or turn mixing on all the time, call the Switch Setting screen by pressing the SWT P key. Then use the keys to choose the desired switch location and on direction. For more information on the switch setting method, see page 37).

Use the END (N) key to leave this menu.

FLAP-ELEVATOR MIX (F→E)

This function is used to compensate for trim changes when flaps are deployed for show flight or landing by mixing in a small movement of elevator. The elevator should be adjusted to move only a small deflection amount: too much elevator can make the model difficult to control.

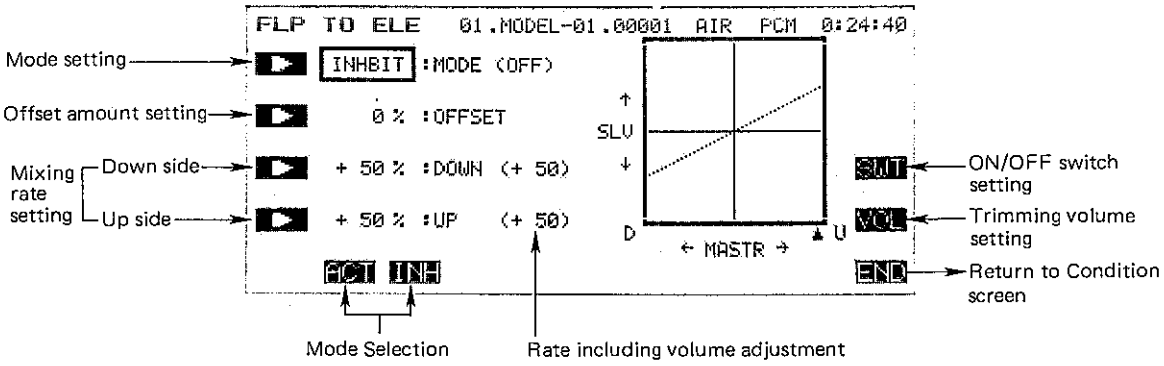
The amount of correction can be adjusted separately for both positive and negative flap inputs, and the neutral mixing position can be offset from the flap neutral position. Flap-to-elevator mixing can be turned on and off during flight by setting a switch, but if an ON/OFF switch is not set, it remains on all the time. The amount of mixing can be changed by setting a volume control.



Setting Up Flap-to-Elevator Mixing

Activation of command

In the Condition Menu, press the F→E key to get the FLP TO ELE menu shown below.



Use the A (▶) key to activate mode setting, then press the ACT or INH keys (F and G) to activate or inhibit flap-to-elevator coupling.

Offset Position Setting

Use the B (▶) key to activate offset setting mode. Then set the flap control to the offset position, and press the SET key F to store the desired position in memory.

Setting the Mixing Ratio — Down and Up Side

You now set the amount of mixing for down flap command. Press the C key to activate mixing ratio for the down direction and set the value with the numeric keys E to M . The number keys 0 through 100 input the value directly. The + and − keys increase or decrease the value by 1. The +/− key may be used to reverse the throw direction. Your setting may vary from −100 to +100%, the initial value is set to +50%.

Now set the amount of mixing for the up elevator command. Press the D key to activate mixing ratio for the Up direction and set the throw with the numeric keys as before.

On/Off Switch Setting

Initially an activation switch for is not set, meaning that once activated, this function is on all the time. If you would like to set a switch to turn it on and off, call the Switch Setting screen by pressing the SWT P key. Then use the keys to choose the desired switch location and on direction. For more information on the switch setting method, see page 37.

Trim volume setting

You may set up the Flap-to-Elevator mixing so that its effect may be changed in flight by moving a trim control. The trim control allows you to adjust the volume within ±25% of the set mixing rate, which can be handy for getting the best value while flying the model. This option is not activated at initial setup.

Call the volume setting screen by pressing the VOL O key, and select the desired control using the screen menus (for a description of the volume setting method, see page 37).

Use the END N key to leave this menu.

COLLECTIVE PITCH FUNCTION (CPT)
(DIVING AIR BRAKE, HIGH PITCH TRIM)

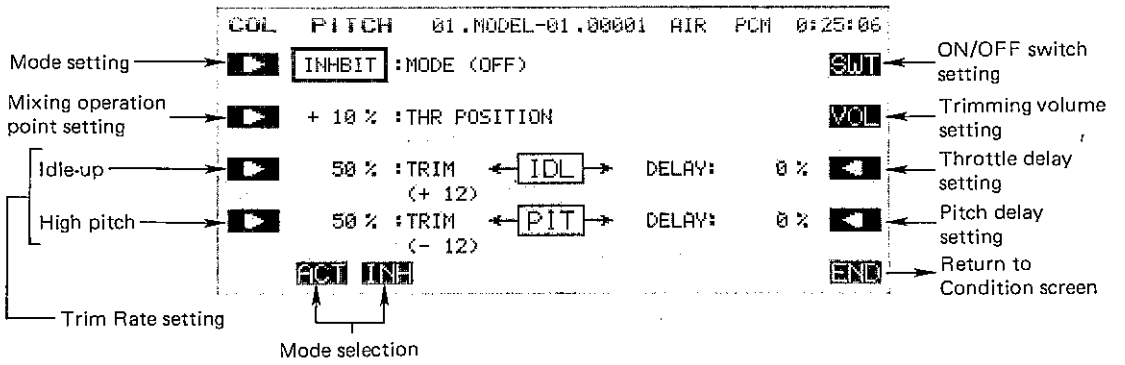
This function allows diving airbrake ("minus pitch") adjustment at low throttle and high pitch adjustment at high throttle for consistent model speed during vertical aerobatics. This mixing can be turned on and off during flight with a switch.

Air brake, engine idle-up trim, and the high-side pitch control trim can be set independently. The mixing switching point (minus pitch/high pitch switching point) can be set at a selected throttle stick position, and each trim rate can be adjusted. The throttle delay when switching from minus pitch to high pitch and the pitch delay when switching from high pitch to minus pitch can also be adjusted independently.

Setting Up Collective Pitch Function

Activation of command

In the Condition Menu, press the CPT key to get the COL PITCH menu shown below. Use the A (▶) key to activate mode setting, then press the ACT or INH keys (F and G) to activate or inhibit the function.



Switch Point Setting

Press the B key to enter the throttle position setting function. Then set the throttle stick to the desired switch point, and press the SET (F) key.

Idle-up Trim and Delay Setting

Press the C key to enter the Idle-Up Trim rate setting function, and set the rate with the numeric keys F to M. The range may be set from 0 to 100%, and the initial value is set to 0%.

Next, press the P key to enter the Throttle delay setting function, and set the delay with the numeric keys. The setting range is 0 to 100%, and the initial value is set to 0%.

Pitch Control Trim Rate and Delay Setting

Press the D key to enter the Pitch Trim Rate setting function. Set the desired rate with the numeric keys F to M. The range may be set from 0 to 100%, and the initial value is set to 50%.

Press the O key to activate the Pitch Delay setting menu, and set the delay with the numeric keys F to M. The range may be set from 0 to 100% (initial setting is 0%).

On/Off Switch Setting

On initial setting, the activation switch for the Collective Pitch function is set as SW (E) ON at the lower position. If you would like to change the switch or turn mixing on all the time, call the Switch Setting screen by pressing the SWT (R) key. Then use the keys to choose the desired switch location and on direction. For more information on the switch setting method, see page 37).

Idle-Up Trim/Pitch Control Trim Setting

You may set up the Collective Pitch function so that its effect may be changed in flight by moving a trim control. The trim control allows you to adjust the volume by moving a slider. At initial setting, the left-side lever is set for idle-up trim and the right-side lever is set for pitch control trim.

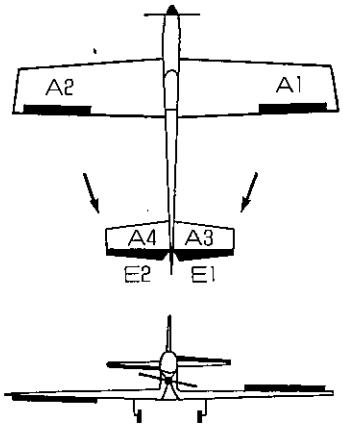
Call the volume setting screen by pressing the VOL O key, and select the desired control using the screen menus (for a description of the volume setting method, see page 37).

Use the END (N) key to leave this menu.

AILEVATORS/COMBINED AILERONS & ELEVATORS (ALV)

This function allows you to hook up the elevator surface on **each side** of the airplane independently, so that they operate together (elevator mode) and differentially (aileron mode). This function, sometimes called "ailevators" (ALV) will give aileron control even at low speeds, because the propeller wash is always passing over the tail surfaces and may be used for rolling commands.

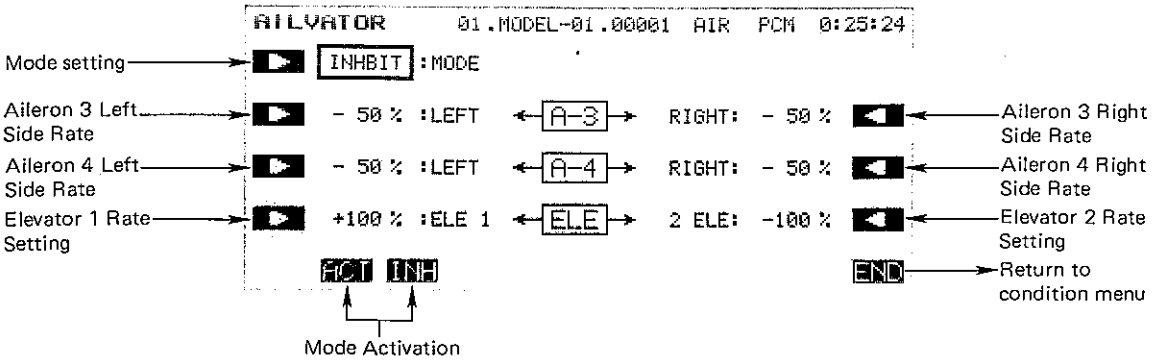
This function requires two elevator servos connected to receiver output channels 2 and 5. In this manual (see diagram), the rear control surfaces are referred to as Aileron 3 and Aileron 4. With this function, all control deflections — left and right ailerons, and elevator on both sides — can be adjusted. You may even add differential to the rear ailerons.



Setting Up Differential Elevators

Activation of command

In the Condition Menu, press the **ALV** key to get the AILVATOR menu shown below. Use the **A** (▶) key to activate mode setting, then press the **ACT** or **INH** keys (**F** and **G**) to activate or inhibit the function.



Setting the Aileron 3 Rates

You now set the left-side travel for Aileron 3. Press the **B** key to activate left rate setting for Aileron 3 and set the rate with the numeric keys **E** to **M** . The number keys **0** through **100** input the value directly. The **+** and **−** keys increase or decrease the value by 1. The **+/−** key may be used to reverse the throw direction.

Your setting may vary from −100 to +100%, the initial value is −50%.

Now set the right-side rate for Aileron 3. Press the **O** key to activate Aileron 3 right rate setting and set the rate with the numeric keys as before.

Setting the Aileron 4 Rates

This procedure is repeated for Aileron 4. Press the **C** key to activate left rate setting for Aileron 4 and set the rate with the numeric keys **E** to **M** as before. The max values and initial setting are the same as for Aileron 3.

Now set the right-side rate for Aileron 4. Press the **P** key to activate Aileron 4 right rate setting and set the rate as before.

Setting the Elevator Rates — 1 and 2

You now set the rate for Elevator 1. press the **D** key to activate rate setting for Elevator 1 and set the rate with the numeric keys **E** to **M** . The initial rate is 100%, but you may vary your setting between −100 and +100%.

Now set the rate for Elevator 2. Press the **O** key to activate Elevator 2 rate setting and set its rate with the numeric keys. Settings have the same range as Elevator 1.

Checking Your Work

After you have set up the Ailevator rates, be sure that they move the correct directions. For up elevator command, both elevators should move upward. For right aileron command, the trailing edge of the right-hand surface should move up, and the trailing edge of the left-hand surface should move down. If they do not, use the **+/−** to reverse the direction as needed. Adjust the travels on either side to get the differential effect, if you wish.

Exiting

Use the **END** (**N**) key to leave this menu.

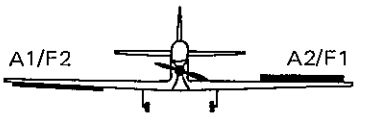
FLAPERONS (FPN)

This function allows you to program the ailerons to work in the same direction, giving a flap response as well as aileron control (see figure). For good square maneuvers, and landing, both ailerons can be raised and lowered simultaneously. While this function is on, regular aileron operation is always present.

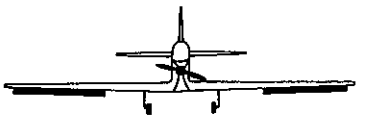
The Flaperon function requires two separate channels: Receiver CH1 (aileron 1/flap 2) and CH6 (aileron 2/flap 1) are the operating channels. The Aileron 1 and Aileron 2 left and right deflection angles can be adjusted independently, making it easy to apply differential to the ailerons. With differential, the up side travel is set to around 5% larger than the down travel.

You may also adjust the Flap 1 and Flap 2 throws independently, and you can set the flap trim rate as large or small as you like. Also, the flap trim offset can be adjusted, allowing you to freely change the flap neutral angle.

Aileron operation



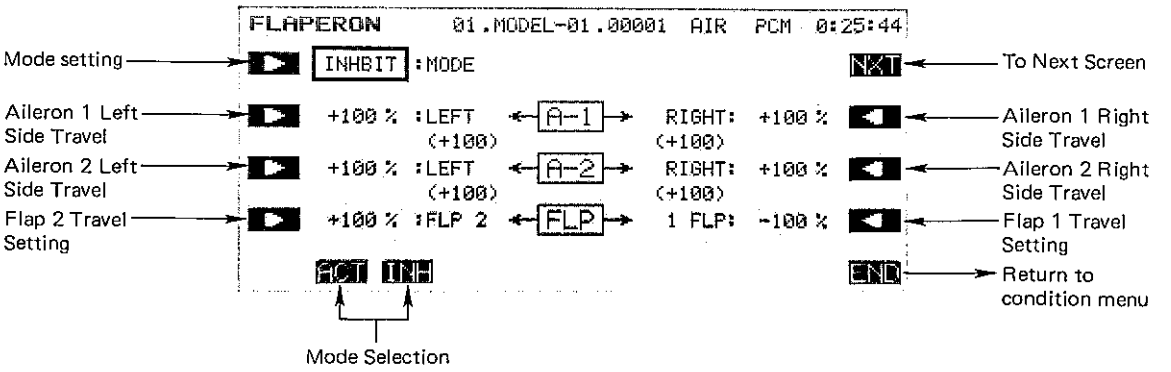
Flap operation



Setting Up Flaperons

Activation of command

In the Condition Menu, press the **FLP** key to get the FLAPERON menu as shown below. Use the **A** (▶) key to activate mode setting, then press the **ACT** or **INH** keys (**F** and **G**) to activate or inhibit the function.



Setting the Aileron 1 Travel

You now set the left-side travel for Aileron 1. Press the **B** key to activate left travel setting for Aileron 1 and set the travel with the numeric keys **E** to **M** . The number keys **0** through **100** input the value directly. The **+** and **-** keys increase or decrease the value by 1. The **+/-** key may be used to reverse the throw direction.

If you are not sure what you are changing, hold the stick to one side and press different keys — if there is no effect, move the aileron stick to the other side and continue. Your setting may vary from −120 to +120%, with an initial value of +100%.

Now set the right-side travel for Aileron 1. Press the **O** key to activate Aileron 1 right travel setting and set the travel with the numeric keys as before.

Setting the Aileron 2 Travels

This procedure is repeated for Aileron 2. Press the **C** key to activate left travel setting for Aileron 2 and set the travel with the numeric keys **E** to **M** as before.

Now set the right-side travel for Aileron 2. Press the **P** key to activate Aileron 2 right travel setting and set the travel as before.

Setting the Flap Travels — 1 and 2

You now set the travel for Flap 2. Press the **D** key to activate travel setting for Flap 2 and set the travel with the numeric keys **E** to **M** . Your setting may vary from −100 to +100%, with an initial value of +100%.

Now set the travel for Flap 1. Press the **O** key to activate Flap 1 travel setting and set its travel with the numeric keys. Its initial value is −100%.

Flap Trim Authority Setting

In the Flaperon mode, Flap Trim moves both ailerons upwards or downwards together. To input the Flap Trim Authority, move to the next screen by pressing the NXT R key. Then press the D key and set the rate with the numeric keys F to M. You may choose any value from 0% to 100% for the Flap Trim Authority. The initial setting is 30%, but a smaller number is recommended.

Flap Trim Offset Setting

Flap trim offset sets the flap position from which motion occurs. To input the flap trim offset amount setting, press the B key, then set the flap trimmer to the position to be set and press the SET F key. The offset can be anywhere between ±(trim authority setting).

Checking Your Work

After you have set up everything, be sure the controls move the correct directions. If they do not, use the +/- to reverse the direction as needed.

Exiting

Use the END (N) key to leave this menu, or hit PRE to get to the previous menu.

AIRBRAKE (ABK)

Airbrake presets are used to set up preset deflections of the elevators, flaps, and (optionally) spoilers for landing precision or for constant speed during vertical flight maneuvers. Airbrake presets can be turned on and off during flight by ON/OFF switch, or you may define an AUTO mode where mixing is turned on and off automatically by throttle stick position.

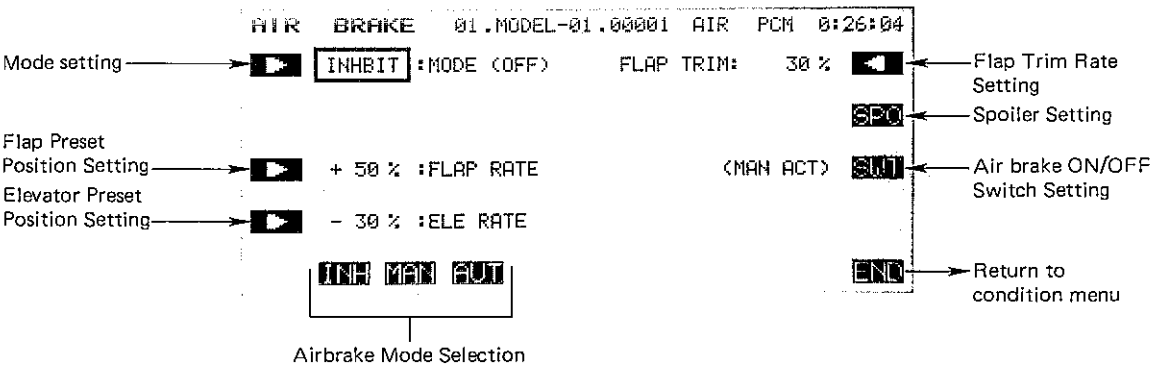
The AUTO mode, if used, may be turned on and off with a switch. However, a command on the air brake has priority and is followed regardless of the position of the AUTO mode ON/OFF switch.

Suggested settings for the Airbrake function are a flap deflection of +50%. The elevators will need to be set to about −20 to 23%. Of course, the elevators should be adjusted so that the model maintains level flight when the Airbrake function is operated.

Setting Up The Airbrake Presets

Activation of command

In the Condition Menu, press the ABK key to get the AIR BRAKE menu as shown below.



Use the A (▶) key to activate mode setting, and press the ACT F key to activate the function. Now you must decide on Manual or Auto operation. Select the manual mode by pressing the MAN (G) key. Select the auto mode by pressing the AUT H key.

Throttle Position Setting (Auto Mode Only)

For the Auto mode, you need to input the position at which the function will take effect. Press the B key, then move the throttle stick to the desired position, and press the SET (F) key to memorize the position.

Flap Preset Position Setting

To set the position that the flaps will move to, press the C key and use the rate setting keys E to M . This setting may vary from −100 to 100%, and is initially set to 50%.

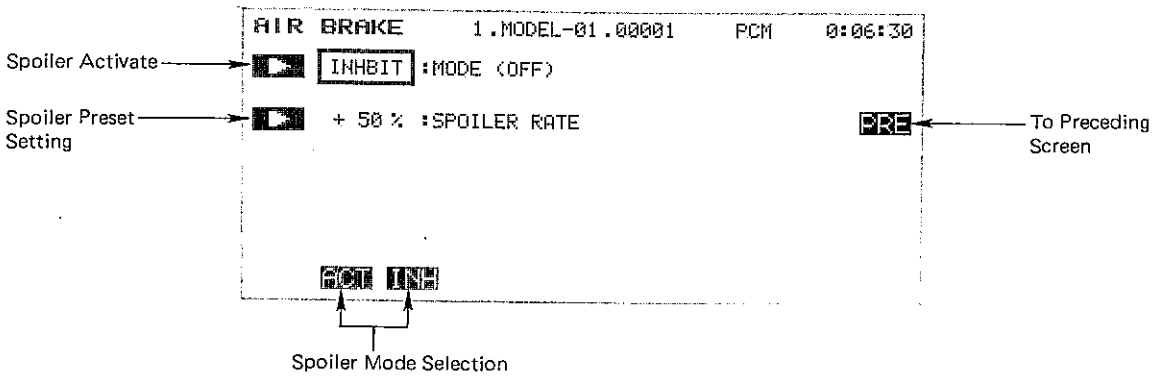
Elevator Preset Position Setting

To set the position that the elevators will move to, press the D key and use the rate setting keys E to M . This setting may vary from −100 to 100%, and is initially set to −30% by the system.

Flap Trim Authority Setting

Flap Trim moves both ailerons upwards or downwards together. To input the Flap Trim Authority, press the NXT R key. Then set the rate with the numeric keys E to M . You may choose any value from 0% to 100% for the Flap Trim Authority. The initial setting is 30%, but a smaller number is recommended. If you input a number here, it will override whatever value was input in the Flaperon menu.

Spoiler setting: Press the SPO Q key to get to the menu below.



Use the A (▶) key to activate mode setting, then press the ACT or INH keys (F and G) to activate or inhibit the function. Press the B key and set the rate with the numeric keys E to M . The initial spoiler preset is 50%, but you may set it between −100 and +100%. Return to preceding screen by pressing the Q key.

Airbrake ON/OFF Switch Definition

SW (C) is turned ON at the lower position at initial setting. If you'd like another switch, call the switch setting menu by pressing the SWT P key. For a description of the switch setting method, see page 37. Caution: if the ON/OFF switch is disabled with NUL, the Airbrake function remains on all the time.

Auto ON/OFF Airbrake Switch Definition (AUTO mode only)

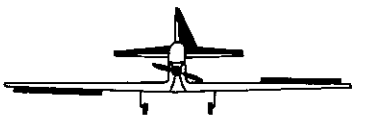
At first setting, the automatic airbrake control switch is defined as SW (E), ON at the lower position. To change this, call the switch setting menu by pressing the SWT O key. For a description of the switch setting method, see page 37.

Use the END N key to exit this menu.

SNAP ROLL (SNP)

Your PCM 1024Z system may be programmed to perform snap rolls by flipping a switch. Four snap roll directions can be defined, and the preset positions of the aileron, elevator, and rudder servos can be set for each one.

You may activate a safety switch to ensure that snap rolls are not accidentally commanded while the landing gear is down, even if the snap roll switch is turned on accidentally.



Setting Up The Snap Roll Presets

Activation of command

In the Condition Menu, press the SNP key to get the SNAP ROLL menu as shown below.

Snap Roll Directions

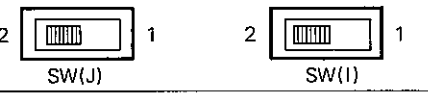
[1-2]: Right up snap
[1-1]: Right down snap
[2-2]: Left up snap
[2-1]: Left down snap

SW(I) SW(J)
↘ ↙
1–2

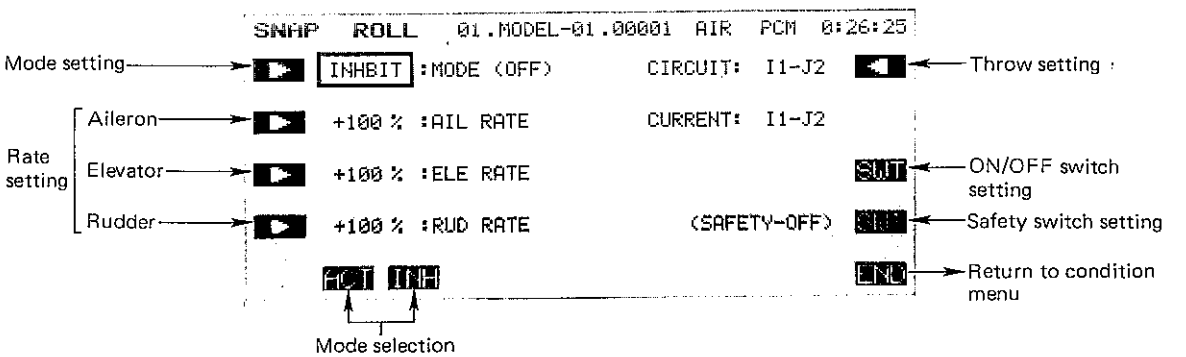
Direction Switches

This figure shows the direction from the FRONT of the transmitter.

Snap roll direction setting



(Note: These snap roll direction setting switches are only present on the T9ZAP systems, not on the T9ZHP)



Use the A (▶) key to activate mode setting, then press the ACT or INH keys (F and G) to activate or inhibit the function.

Inputting the Snap Roll Preset Control Positions

We'll start with the 1-2 direction (Right/Up) snap roll setting. Press the R key to get to the setting menu, then press the 1-2 F key.

To set the Aileron servo throw setting, press the B key. Use the numeric keys E to M to input the desired preset condition. The default is +100%, but you may use anything between –110 and +110%.

Now we'll set the Elevator servo preset. Press the C key, and set the preset with the numeric keys E to M . This also has a default of +100%, but you may use anything between –110 and +110%.

The last part of the setting is for the rudder position. Press the D key, and enter the rate that you want the rudder to move with the numeric keys E to M . This setting also has a default of +100%, and may be set anywhere between –110 and +110%.

This procedure should be repeated for the 1-1 direction (Rright/Down) snap roll setting, 2-2 direction (Left/Up) snap roll setting, and 2-1 direction (Left/Down) snap roll setting.

Snap Roll Switch ON/OFF Definition

SW (H) is defined to be the Snap Roll switch, and is turned ON at the forward position at initial setting. If you'd like another switch, call the switch setting menu by pressing the SWT P key. For a description of the switch setting method, see page 37. Caution: if you define a switch that doesn't have a spring return, the Snap Roll function will remain on all the time!

Snap Roll Safety switch setting

A safety switch should be used to prevent accidental operation of the snap roll function. To examine the snap roll safety switch settings, call up the switch setting screen by pressing the SWT O key. The function initially defines SW (F) for Mode I, (G) for Mode II to be the safety switch. You should set the ON direction of the safety switch to match the landing gear switch position when the landing gear is down. When this switch is ON, the snap roll function is inhibited.

Use the END N key to exit this menu.

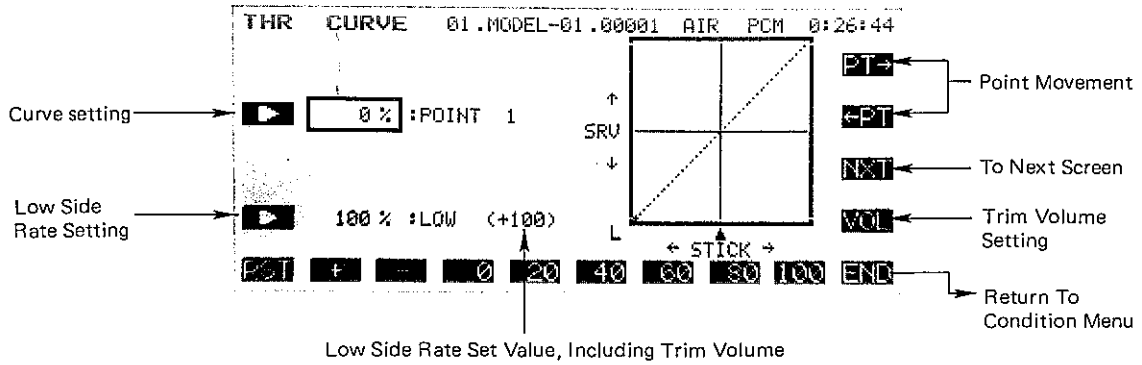
THROTTLE CURVE ADJ. (TCV)

This function programs throttle curves for different flight modes. The throttle curve sets the servo response over full stroke of the throttle stick by a 13-point curve. The low side rate can be adjusted with a volume control (point 7 is the reference). The servo delay at flight condition switching can also be programmed. You need to activate the Model menu throttle curve [THR] function (page 53) to allow the Throttle curve function to work properly.

Setting Up The Throttle Curve Function

Throttle Curve Inputting

In the Condition Menu, press the TCV key to get the THR CURVE menu shown in the figure below.



Setting Point Selection (Points 1 to 13)

Press the B (▶) key to turn on the curve inputting function. Use the movement keys Q and R to select the point whose value is to be set. The PT→ key increases the point number by one, and the ←PT key reduces the point number by one. The active point on the curve is shown as a black dot.

Once you have selected the desired point on the curve, you may input the rate with the rate setting keys E to M. The number keys 0 through 100 input the value directly. The + and − keys increase or decrease the value by 0.5 with each button pressing (so it takes two hits to see a number change because of numeric rounding).

You may set or reset each point on the curve by repeating these steps for each point.

Low-Side Rate Adjustment

Press the D key and you may input the rate with the numeric keys E to M. You may set anywhere in the range from 0 to 110% (initially the rate is set to 100%).

Low-Side Volume Control Assignment

No volume controller is defined when TCV is first activated. To set the control and direction of the volume adjuster, call the volume setting screen by pressing the VOL O key. Use the buttons to select the control and direction you desire. For a description of the volume setting method, see page 37.

Use the PRE N key to return to the previous menu, or use the END (N) key to leave this menu and return to the Condition menu.

Curve Setting Note

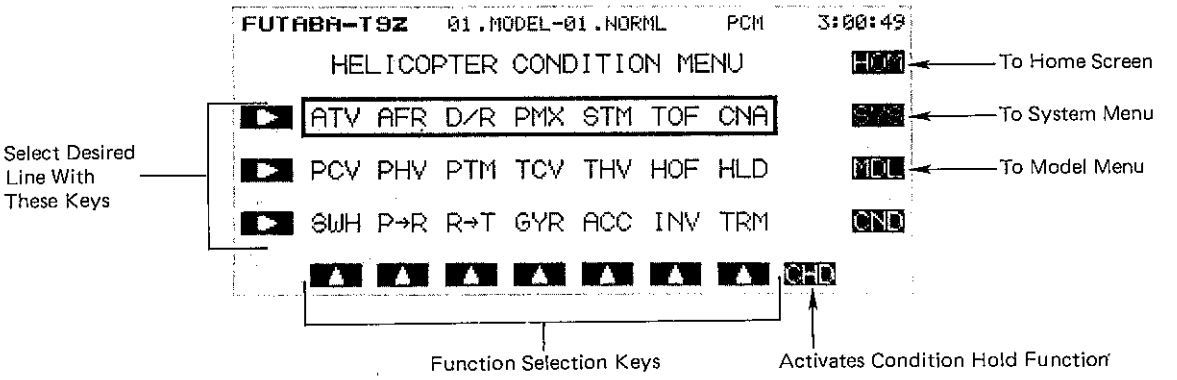
If you change Point 7 after setting the low side rate, other points in the throttle curve also change, because Point 7 is the reference point for the curve.

HELICOPTER SECTION

This section contains information on the commands that apply to helicopters only. Each of these functions can be set independently for different flight conditions.

To get to these settings, press the MDL key from any menu in a Helicopter setup. To select one, first select the line containing the desired function with the B, C, or D keys. Then use the F to L keys to select the function to be entered.

For conditions that apply to all models (ATV, AFR, D/R, PMX, STM, TOF, CNA, and TRM functions), refer to the Common Conditions section. For instructions on Airplanes and Sailplanes, refer to the sections pertaining to those aircraft.



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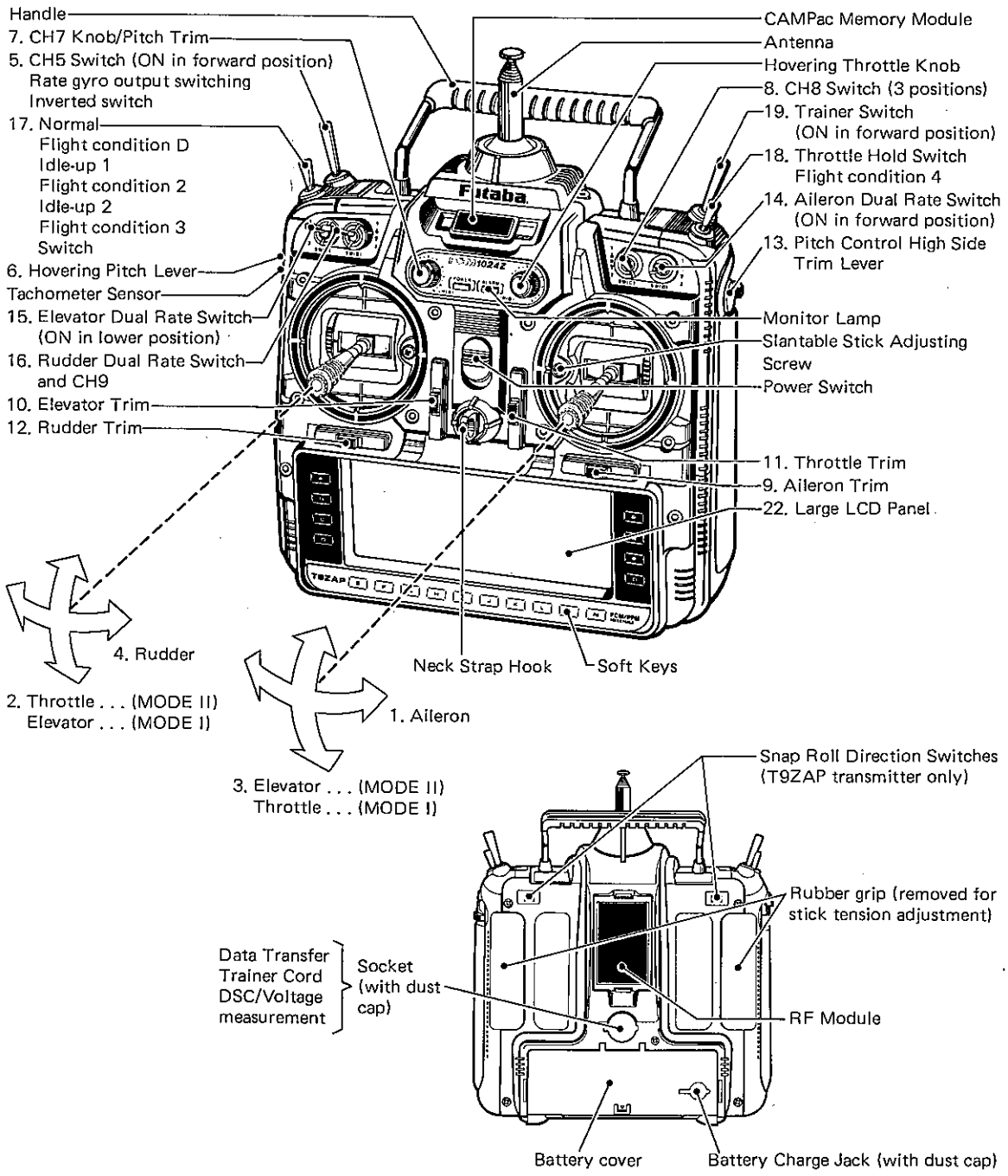
HELICOPTER TRANSMITTER CONTROLS AND FUNCTIONS

Functions and locations given in this drawing are the factory default positions, which occur upon startup. Each setting can be easily changed as the owner desires. The Function Change menu [FNC] may be used for this purpose.



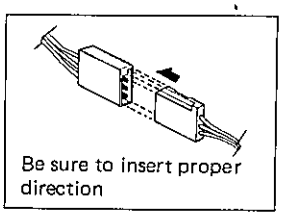
Note that all stick & switch positions may be changed

1. Aileron control
2. Throttle control . . . (MODE II)
   Elevator control . . . (MODE I)
3. Elevator control . . . (MODE II)
   Throttle control . . . (MODE I)
4. Rudder control
5. CH5 switch
   Rate gyro output switching/inverted switch.
6. Hovering rate lever (CH6)
   Adjusts the hovering point pitch independently from the throttle. Used in pitch trimming when hovering. When the throttle stick is at the SLOW or HIGH side, the pitch servo does not operate even if this lever is moved.
7. CH7/pitch trim knob
   Used as a spare channel, or as the pitch trimmer.
8. CH8 switch
   Used as a spare channel (3 positions).
9. Aileron trim lever trims the ailerons.
10. Elevator trim lever trims the elevators.
11. Throttle trim lever (with ATL) Adjustable throttle limiter type trim lever. Operates at the throttle stick SLOW side. Movement is maximum at maximum slow. Since the HIGH side does not change even if the SLOW side is adjusted, it is very convenient when connecting the linkage, etc.
12. Rudder trim lever trims the rudder.
13. Pitch control HIGH side trim lever.
    Pitch control servo HIGH pitch trimmer.
    Adjusted for optimum pitch during flight.
14. Aileron dual rate switch.
    Aileron deflection angle switch.
15. Elevator dual rate switch.
    Elevator deflection angle switch.
16. Rudder dual rate switch.
    Rudder deflection angle switch.
    Can also be used as the CH9 switch.
17. Normal/idle-up 1/idle-up 2 switch.
    Idle-up ON/OFF switch.
    The On direction is set by condition select (CSL) function (page 40).
    (Flight condition switch.)
18. Throttle hold switch.
    This switch is used during auto rotation.
    The ON direction is set by condition select (CSL) function (page 40).
    (Flight condition switch)
19. Trainer switch.
    This switch is turned on in the forward position. It is spring loaded and is turned off when released. It can also be changed to an alternate switch (page 29).

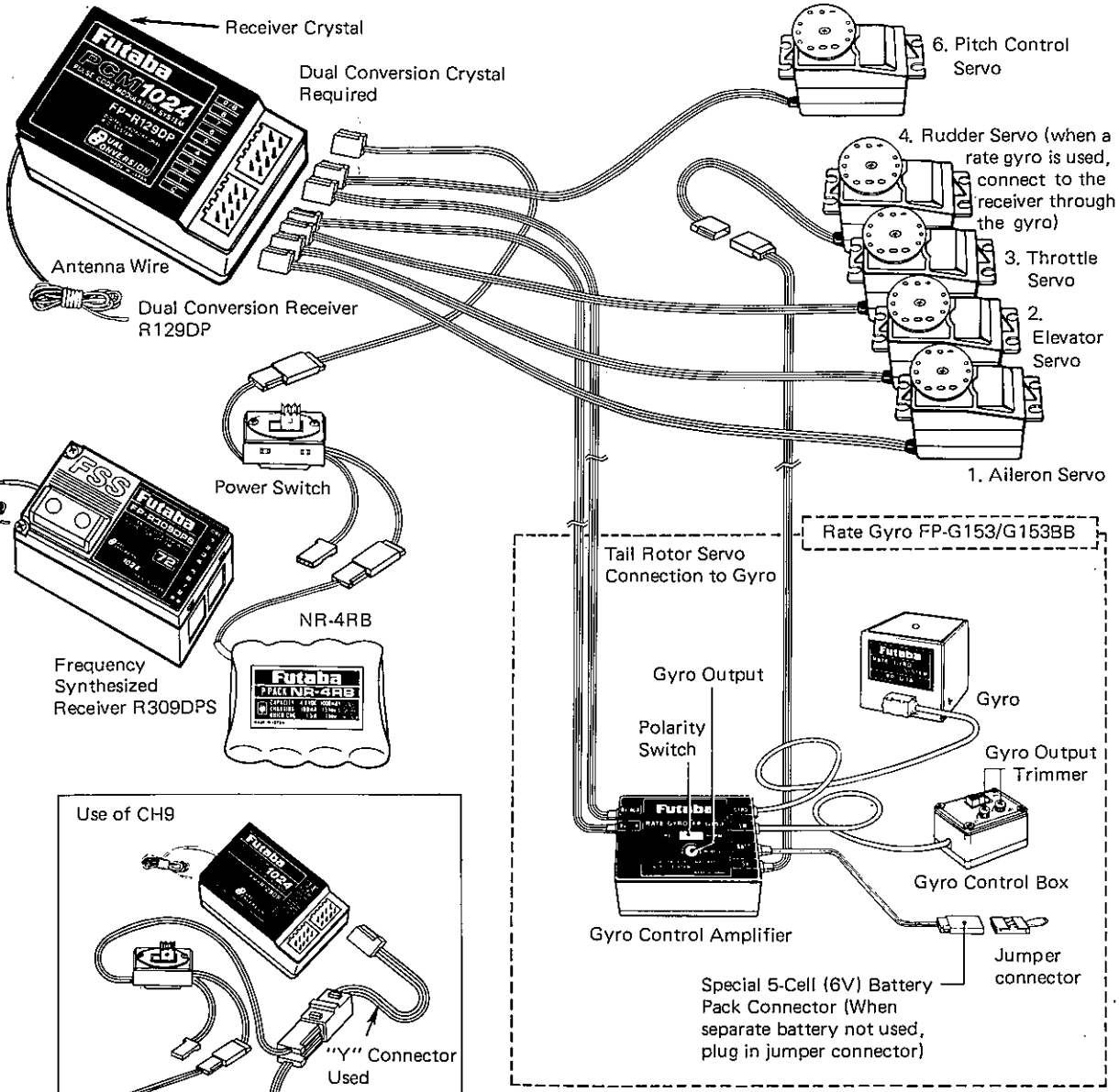
HELICOPTER RECEIVER AND SERVO CONNECTION

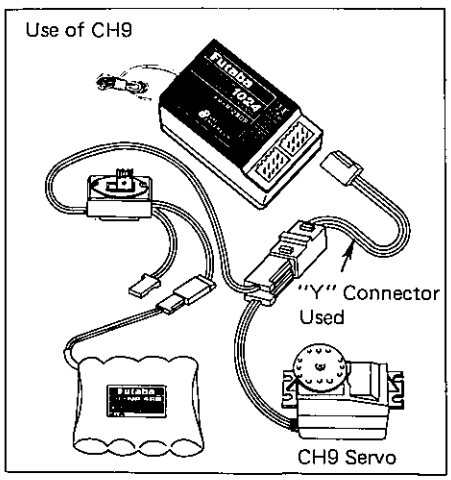
The receiver output order is shown below:

1. AIL Aileron
2. ELE Elevator
3. THR Throttle
4. RUD Rudder
5. GYR Rate Gyro Sensitivity Switching
6. PIT Pitch
7. AU1 (Spare)
8. AU2 (Spare)
9. CH9 Channel 9



Five Servos are supplied as standard



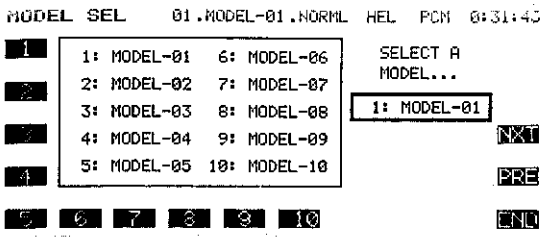


SAMPLE HELICOPTER SETUP INSTRUCTION

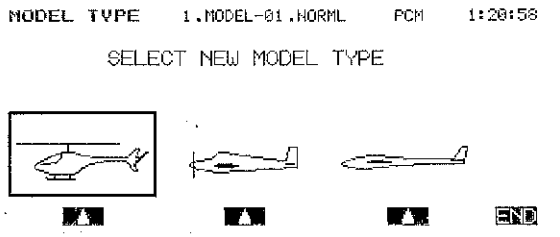
The following example shows how the PCM 1024ZH may be programmed for a contest helicopter model, although for completeness we have added other functions (these will be marked by a "†" sign). The settings presented here are for a typical model. Your model's settings are likely to vary from these, but the procedures given will still be applicable.

1 Memory Selection

Use the Model Select function **MSL** to select a model memory.



Choose the Helicopter Setup using the Type **TYP** function from Model menu.



2 Model Naming

Name the model using the Model Name **MNA** function in the model menu. Note that the default flight condition is named "NORML" (the condition name is located next to the model name). The system automatically adds and names three other flight conditions, which you will program later in this example.

3† Set Control Order

If desired, reset the Control Order using the Function Control **FNC** in the model menu. Here you may choose what sticks, sliders, and trims control the different functions.

4 Hook Up Controls

Hookup the aileron, elevator, throttle, and rudder servos in accordance with the model's instructions or plans.

5 Plug Servos Into Receiver

Plug Servos into Correct Channel Numbers

1 . . . .AIL. . . . .Aileron
2 . . . .ELE. . . . .Elevator
3 . . . .THR . . . .Throttle
4 . . . .RUD . . . .Rudder
5 . . . .GYR . . . .Rate Gyro Sensitivity
6 . . . .PIT . . . .Pitch
7 . . . .AU1 . . . .(Spare)
8 . . . .AU2 . . . .(Spare)
9 . . . .CH9. . . . .Channel 9

6 Set Servo Throw Direction

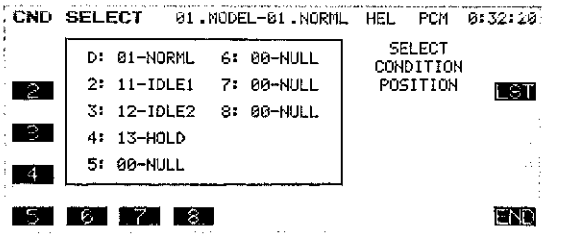
Check the proper direction of throw for each servo. Use Reversing Function **REV** in the Model menu to set proper throw directions. Reverse channels as necessary to correct throws. Link the carburetor to the throttle servo so that the carb may be fully closed to shut off engine.

7 Flight Conditions Switching

You may set up the system to call up more than one function or switch to a new set of trims or control settings simultaneously by moving a single switch. This is very convenient for loading different flight conditions such as Idle-up 1 **IDL1**, Idle-up 2 **IDL2**, and Throttle Hold **HOLD** in addition to the normal flight condition. You may change EVERY parameter between flight modes.

We recommend that you fly the model and adjust trims and control responses to your liking before defining another flight condition. Then, as described below, you will copy the set of adjustments to a new flight condition (this will maintain all trim settings between the different conditions), and define the condition switches that activate them. Each may be modified for the new desired conditions, and you may add new functions as necessary.

Use the Condition Select **CSL** button in the Model Menu. The four flight conditions listed above have already been allocated. The position and ON direction of each flight condition call switch are set as follows:



D. Normal . . . . .Operation when all switches OFF . . . .Used in hovering, etc.
2. Idle-up 1 . . . .ON at SW (E) Center position . . . .For 540° stall turns, looping, rolling stall turns

3. Idle-up 2 . . . .ON at SW (E) . . . . .Used for rolling Forward position aerobatics.
4. Throttle Hold . . . .ON at SW (G) . . . . .Activate for Forward position autorotation.

In the case above, the flight condition priority is 4>3>2>D, with 4 having the highest priority. This means that if the Idle-Up 1 switch is on, and Throttle hold is turned on, the system will use the Throttle hold settings.

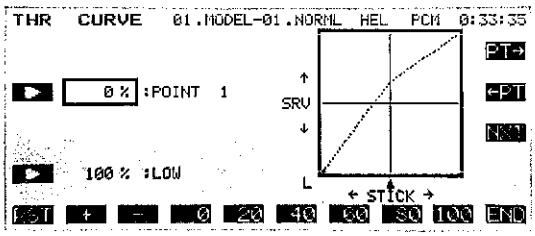
To set the condition data for each flight condition, be sure that you call the appropriate condition by turning on the correct switch (as given above). Read the condition name after the model name to be sure you are changing the condition you want.

8 Normal Flight Programs

Select the Normal flight settings by turning off all the flight condition switches.

9 Throttle Curve Setting

Call the Throttle Curve **THA** function from the Model Menu. Check to see that it is activated **ACT** .



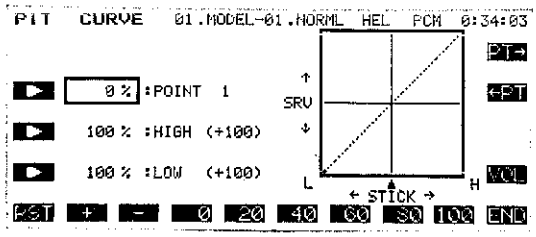
Next, move to the condition menu and press **TCV** to get the setting menu. Set the throttle curve to the values shown in the table below:

Point	1	2	3	4	5	6	7	8	9	10	11	12	13
Setting (%)	0	9	15	22	28	35	43	51	59	70	80	91	100

The throttle responds slowly at first and then the response rate increases at the top end.

10 Pitch Curve Setting

Call the pitch curve **PIT** function from the model menu. Verify that the PIT curve function is activated (**ACT**).



The following settings assume a semi-symmetrical rotor blade with no twist. For the pitch curve, the initial LOW rate is 100% and the HIGH rate is 100%. Set the maximum pitch angle in advance. The pitch angle is -4° to $+12^\circ$.

When setting the pitch angle, set the hovering pitch lever and the HIGH side pitch lever to the center positions. These levers may be activated in flight to make adjustments. Next, input the data so that the normal pitch used in hovering becomes -2.5° to $+10^\circ$ by LOW/HIGH side rate setting.

Although unimportant in calm conditions, the pitch angle should be set to that the High side pitch rate is large. This provides high collective sensitivity to help cope with windy conditions.

Pitch Curve Setting.

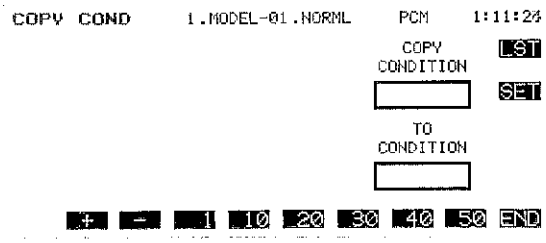
Move to the Condition menu, and select the pitch curve **PCV** key. Set the pitch curve to the following values:

Point	1	2	3	4	5	6	7	8	9	10	11	11	13
Setting (%)	9	18	27	35	43	52	59	67	73	78	82	86	88

The rise at the low end is fast, and then the rise rate is reduced at the high end. We recommend setting the hovering pitch to $+4.5^\circ$.

11 Flight Condition Copying

Use the Condition Select **CSL** button in the Model Menu. This function displays the flight conditions associated with the model in active memory. Note the condition number next to the D (default) in the display. This is the set of conditions associated with the trimmed model. Also note the three numbers following: these are the conditions associated with Idle-up 1&2 and Throttle Hold, that will be copied into and modified.



Use the Copy Condition **CPC** from the System menu. This function may be used to copy the contents of one condition into another. Choose the default flight condition number (next to the D), press the **SET** button, then choose the Idle-up 1 condition number in the lower box "TO CONDITION." Give the command to copy. Repeat for Idle-up 2 and Throttle-hold conditions.

Normal→Idle-up 1
Normal→Idle-up 1
Normal→Throttle Hold

12 Idle-Up 1 Setting

The switch that calls the Idle-up 1 conditions (SW-E, center position) is not yet activated. In the Model menu, press the Condition Select CSL key, then select the condition position. Press the Switch button SWT, select SW-E (if it is not already selected), and press the center position button (0). Hit the previous key PRE and END to finish.

Move the Idle-up 1 switch to its ON position and verify that the condition name after the model name refers to Idle-up 1. Then you may go through the Condition menu items to revise the desired settings in the new mode.

Throttle Curve Setting: move to the condition menu and press TCV to get the setting menu. Change the first seven Idle-up 1 throttle curve points to the values shown in the table below:

Point	1	2	3	4	5	6	7
Setting (%)	30	32	34	36	38	42	46

Pitch Curve Setting: Select the pitch curve PCV key. The Normal curve copied already appears on the screen. The Idle-up 1 pitch curve uses the same curve as the normal condition, but the maximum HIGH side pitch angle should be 8° to 10°, depending on the engine used. Set the pitch angle by curve or rate.

13 Idle-Up 2 Setting

Call up the Idle-up 2 conditions by setting SW-E to the 1 (forward) position. Be sure that the switch is defined using CSL as in the previous case. Now, you may go through the menu items to revise the desired settings in the new mode (be sure that the condition name after the model name refers to Idle-up 2).

Throttle Curve Setting: move to the condition menu and press TCV to get the setting menu. Change the first seven Idle-up 2 throttle curve points to the values shown in the table below:

Point	1	2	3	4	5	6	7
Setting (%)	58	52	47	44	40	39	44

Pitch Curve Setting: Select the pitch curve PCV key. The Normal curve copied already appears on the screen. Set the HIGH side pitch the same as Idle-up 1. Values may be easily compared by switching between Idle-up 1 & 2 with the condition switch, so settings may be easily matched. Set the LOW side pitch curve to the following values:

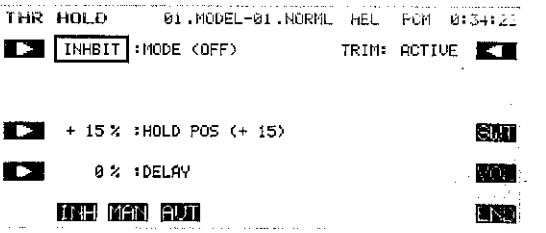
Point	1	2	3	4	5	6	7
Setting (%)	0	8	16	24	33	43	56

Adjust the pitch curve low side to −4°.

14 Throttle Hold Setting

Now the Throttle Hold conditions are set for use in autorotation. Call up the Throttle Hold conditions by setting SW-G to the 1 (forward) position. Now you will set the Throttle Hold ON/OFF switch so that SW (G) is turned on in the 1 (forward) position, the same as the flight condition call switch.

Call the Throttle Hold HLD function from the condition menu. Set the condition switch SW (G) to the 1 (forward) position. Select the Manual mode MAN and activate the throttle hold function. Press the SWT button to get to the Switch menu, and activate the SW (G)-1 position. Hit PRE and END to exit.



When SW (G) is in the 1 (forward) position, the throttle hold function is turned on and when SW (G) is in the 2 (rear) position, the function is turned off. In throttle hold, set the throttle to move the servo to engine idle (approximately 15%).

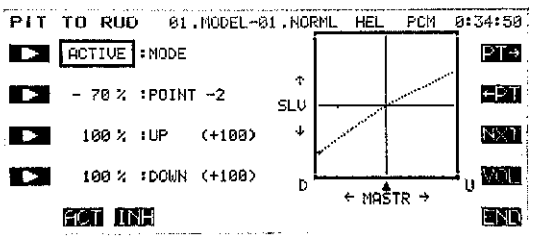
Pitch Curve Setting: Select the pitch curve PVC key. The Normal curve copied already appears on the screen. During autorotation, maximum pitch is used at both the HIGH and LOW sides. Therefore, normally set the HIGH and LOW rates to 100% each. The curve must be set so that the rise matches the rotor near points 2 to 6. The rotor blade pitch angle is −4° to +12°.

The pitch angle for each flight condition is shown below:

Normal . . . . . −2.5° ~ 4.5° ~ 10°
Idle-up 1 . . . . . −2.5° ~ 4.5° ~ 8°
Idle-up 2 . . . . . −4° ~ 4.5° ~ 8°
Throttle Hold . . . . −4° ~ 4.5° ~ 12°

15 Pitch→Rudder Mix Setting

Pitch→Rudder P→R mixing uses the tail rotor to suppress the torque reaction of the main rotor due to changes in collective pitch. The shape of the mixing curve may be set independently for each flight condition.



To set this feature, call the Pitch→Rudder **P→R** from the Condition Menu. The Normal setting is used during hover, so it should be set to match take-off, landing, and constant speed vertical climbing.

16 Normal Setting:

Select the normal flight conditions by turning off all the flight condition switches. Set the rudder mixing curve to the following values (initial settings):

Point	−2	−1	0	+1	+2
Setting (%)	−70	−35	0	+25	+50

Idle-up 1 Setting:

These settings are used in 540° stall turns, looping, and rolling stall turns and is set to be straight ahead when the model is pointing directly into or away from the wind. Call the Idle-up 1 flight conditions by moving switch **E** to the 0 (center) position. Set the rudder mixing curve to the following values:

Point	−2	−1	0	+1	+2
Setting (%)	−15	−15	−15	−15	−15

When these values are input, the rudder is offset at the half-throttle position.

Idle-up 2 Setting:

These settings are used in rolls. Activate the Idle-up 2 flight conditions by moving switch **E** to the 1 (forward) position. Set the rudder mixing curve to the following values:

Point	−2	−1	0	+1	+2
Setting (%)	−30	−22	−15	−15	−15

The rudder is offset at the half-throttle position.

Throttle Hold Setting:

Throttle Hold settings are intended to keep the model pointed straight ahead during linear autorotation. The tail rotor pitch angle is nearly 0°. Set the Throttle Hold flight conditions by moving switch **G** to the 1 (forward) position. Set the rudder mixing curve to the following values:

Point	−2	−1	0	+1	+2
Setting (%)	−45	−45	−45	−45	−45

Delay Settings

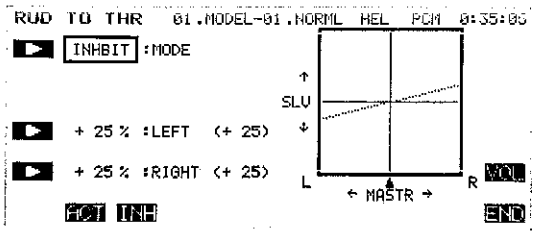
Set the amount of delay for each flight condition. We recommend the following settings:

Normal 20%
Idle-up 1 . . . . . 20%
Idle-up 2 . . . . . 20%
Throttle Hold 60%

The delay for Throttle hold should be large, because the rudder angle changes significantly during flight condition changes.

17 Rudder→Throttle Mix Setting

Rudder→Throttle **R→T** mixing is effective in hovering eight, nose in circle, top hat, pirouette, and other aerobatics. It should be set so that at half-throttle, if the rudder stick is operated, the rotor speed is maintained to keep altitude constant.

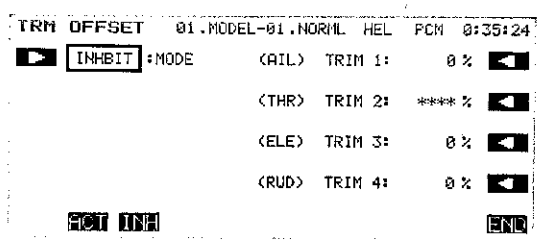


For normal models, commanding right rudder should increase throttle slightly, while using left rudder should decrease throttle slightly.

To set this feature, return to the Normal flight condition. Press the Rudder→Throttle **R→T** from the Condition Menu. Press the **ACT** button to activate it, and set the Left value to −10%, and the Right value to +10%.

18 Trim Offset Setting

The Trim Offset **TOF** setting should be adjusted for Idle-up 1 and Idle-up 2. Aileron, elevator, and rudder are offset so that the model flies straight ahead during normal flight.

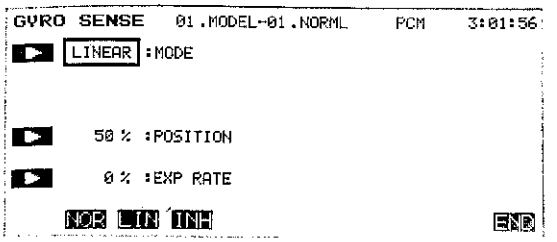


Call the Idle-up 1 or 2 flight condition by setting Switch **E** to the 0 (center) position. Press the **TOF** button from the Condition menu. Recommended settings for aileron and elevator offsets are 6% to 10%. A delay can be set with the digital trim **TRM** function.

Rudder offset is set by the Pitch→Rudder function set previously, so is not set here.

19 Gyro Sensitivity Switching

Gyro Sensitivity switching may be set for each flight condition. To set sensitivity, call the Gyro Sensitivity Function **GYR** from the condition menu.



Assuming that the sensitivity of the gyro is set so that the 1 side was made low sensitivity, and the 2 side was defined as high sensitivity, set the type at each flight condition as follows:

Normal . . . . . Type 2
Idle-up 1 . . . . . Type 1
Idle-up 2 . . . . . Type 1
Autorotation . . . . Type 1 (if the tail rotor is driven during autorotation, high gyro sensitivity (type 2) may be more effective.)

20 Engine Cut Setting

At the conclusion of a flight, you may use the Engine Cut function to kill your engine by one touch with a special switch. Because it is performed by stick lever, there is no need to fumble for the trim position, and the idle trim position need never be lost.

Press the Engine Cut **CUT** button from the model menu, activate it, and set the desired switch. Set the throttle a bit above the lowest throttle position, then press the **SET** button to memorize the position. This makes it so the engine cut function will only operate when the throttle is at the idle position, so the engine can't inadvertently be shut off.

Adjust the throttle servo motion so that there is no binding or excess travel.

21 Condition Hold Setting

If you want to set condition data while the engine is running, always use the Condition Hold function **CHD** to limit the throttle operation range. Press the CHD button on the Model menu. Set the maximum throttle position to be a bit above the idle position, and press the **SET** key. This should produce a maximum throttle setting of about 13%. Be sure not to set the maximum too high.

You may activate the Condition Hold menu from the Home menu (use the **G** key), from the Model menu (2nd line, **G** key), or from the Condition menu (use the **M** key). When Condition Hold is activated, a double beep repeats every few seconds to remind you that it is engaged, so that you do not attempt to fly with it on. This setting allows you to control the throttle between 0% and 13% with the throttle stick when the function is activated.

This concludes the setup procedure example. Be sure to browse through the pages following this example to see what other menus are available for helicopters, such as **HOF** , **GYR** , **ACC** , and **INV** . Many may be used to enhance flight capabilities or to correct bad tendencies. All of these menus may have different settings in different flight modes. For this reason, we recommend you set them up and use them in the Normal flight condition and trim the model before setting up the alternate flight modes.

PITCH CURVE (PCV)

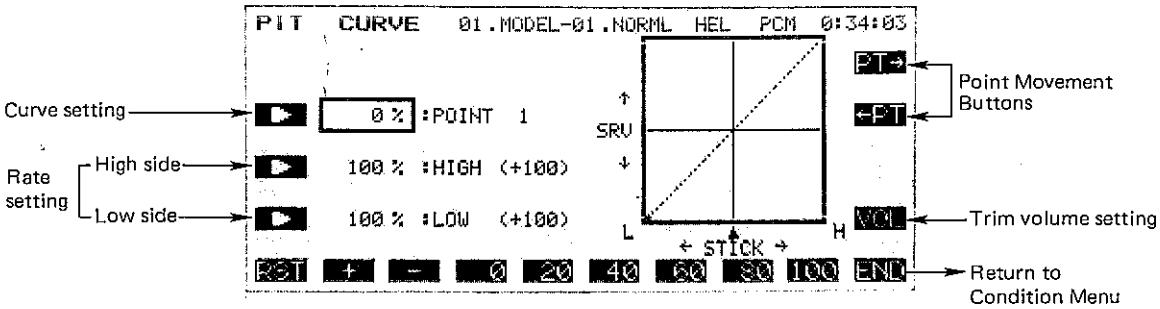
This function may be used to set different pitch response curves for each flight condition (normal, idle-up 1, idle-up 2, throttle hold, etc.). This function is activated when the respective flight condition is selected.

A 13-point curve can be input, and Point 7 can be defined as the pitch curve reference point. You may also define High and low side rate trim volumes (the high-side pitch trim volume control is defined as the right side lever at initial setting). Pitch curve activation should be done with the model menu pitch curve (PIT) function (page 58).

Setting Up Pitch Mixing

Pitch Curve Inputting

In the Condition Menu, press the PCV key to get the PIT CURVE menu shown below.



Setting Point Selection (Points 1 to 13)

Press the B (▶) key to turn on the curve inputting function. Use the movement keys Q and R to select the point whose value is to be set. The PT→ key increases the point number by one, and the ←PT key reduces the point number by one. The active point on the curve is shown as a black dot.

Curve Point Rate Setting

Once you have selected the desired point on the curve, you may input the rate with the rate setting keys E to M. The number keys 0 through 100 input the value directly. The + and − keys increase or decrease the value by 0.5 with each button pressing (so it takes two hits to see a number change because of numeric rounding).

You may set or reset each point on the curve by repeating these steps for each point.

High-Side Rate Adjustment

Press the C key to adjust the High-Side rates. The numeric keys E to M are used to directly set the rate, which may vary from 0 to 110%. The default value is 100%.

Low-Side Rate Adjustment

You may set the Low-Side rates by pressing the D key. As before, the rate may be set with the numeric keys E to M. This rate may vary from 0 to 110%, and its default value is 100%.

Trim Volume Setting

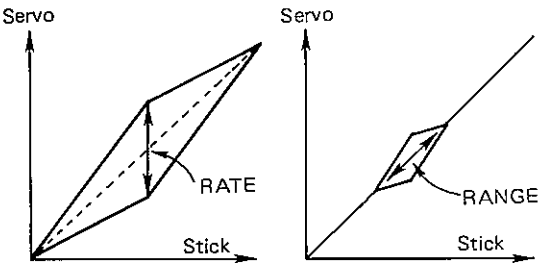
If you'd like to be able to change the pitch curve while in flight, you can set up this feature in the volume setting screen. Press the O key to get into this screen, and choose the control you'd like to use for this feature. For a description of the volume setting method, see page 37). The right slider is set as the high side trim volume when Pitch Curve is activated.

Note: when Point 7 of the pitch curve is changed after setting the HIGH/LOW side rates, the other points change also. This is because Point 7 is used as the rate setting reference point.

HOVERING PITCH (PHV)

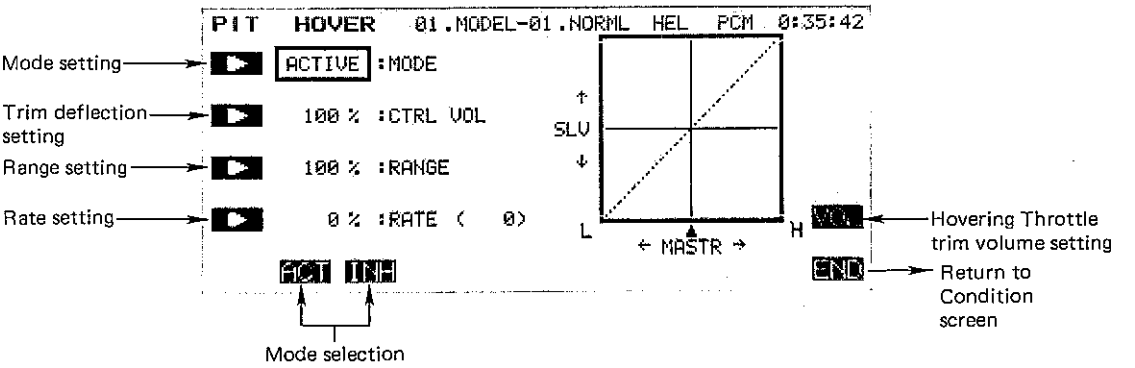
This function trims the pitch near the hovering point. By setting a range, adjustment is possible without changing the high and low points. This Hovering pitch setting can be made for each flight condition, but is commonly used for Normal flight condition.

At initial definition, the left sliding lever controls hovering pitch volume.



Activation of command

In the Condition Menu, press the PHV key to get the PIT HOVER menu shown below. Use the A (▶) key to activate mode setting, then press the ACT or INH keys (F and G) to activate or inhibit the function.



Hovering Pitch Trim Deflection Setting

Press the B key to allow input to this setting, and input the rate with the numeric keys F to M . The deflection may be set from 0 to 100% (the initial value of this parameter is defined to be 100%).

Setting of Range

Now you will set the Range of travel over which HIGH/LOW sides do not change. Press the C key and set the rate with the numeric keys F to M . The Range may be set from 0 to 100% (when activated, the initial value of this parameter is defined to be 100%).

Offset Rate Setting

The offset amount is entered by pressing the D key, and input with the numeric keys E to M . This may be input from −100 to +100%, and the initial value is programmed to 0%.

Hovering Pitch Trim Selection and Operation Direction Setting

Call up the volume setting screen by pressing the VOL O key. Set the volume control as desired (the left-side slider is set as the pitch trim volume control initially). For a description of the volume setting method, see page 37).

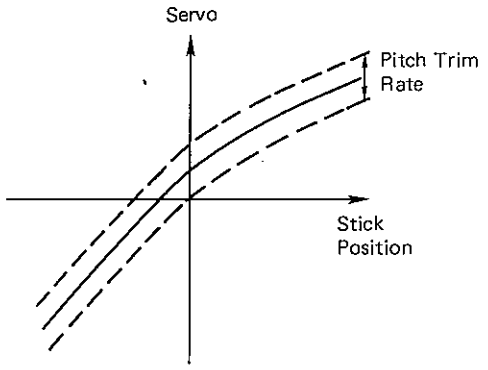
Precautions

When the range is set to 100%, the rate changes between points 1 and 13. When the range is set to 0%, the rate changes only between points 6 and 8. When you use this function, set up the numbers so that when the range is small, the trim deflection is also small, and make sure that the preceding and following points are not exceeded when the range is moved to its maximum position.

PITCH TRIM (PTM)

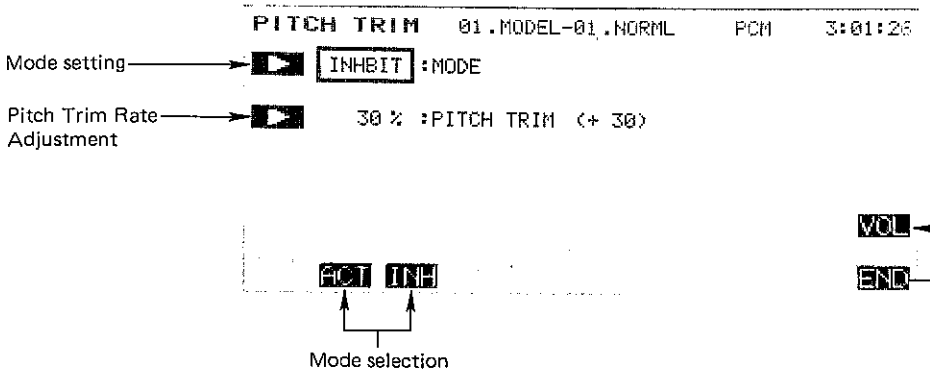
This function enables you to move the pitch trim (offset the trim) without changing the pitch curve. The amount of pitch trim can be adjusted, and may change for each condition.

At initial setting, the left side knob VR(A) is defined as the pitch trim volume control. However, the knob is not activated at initial setting.



Activation of command

In the Condition Menu, press the PTM key to get the PITCH TRIM menu shown below. Use the A (▶) key to activate mode setting, then press the ACT or INH keys (F and G) to activate or inhibit the function.

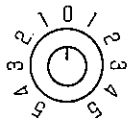


Rate setting

Press the B to input the rate to be set with the numeric keys F to M . The rate setting may range from 0 to 100%, and is initially programmed as 30%.

Volume selection

Enter the volume setting screen by pressing the O key. For a description of the volume setting method, see page 37. The left side knob is set as the volume control at initial setting, but is not activated. Be sure that you are setting for the desired condition by first turning on the condition switch and verifying the condition name.



VR(A)

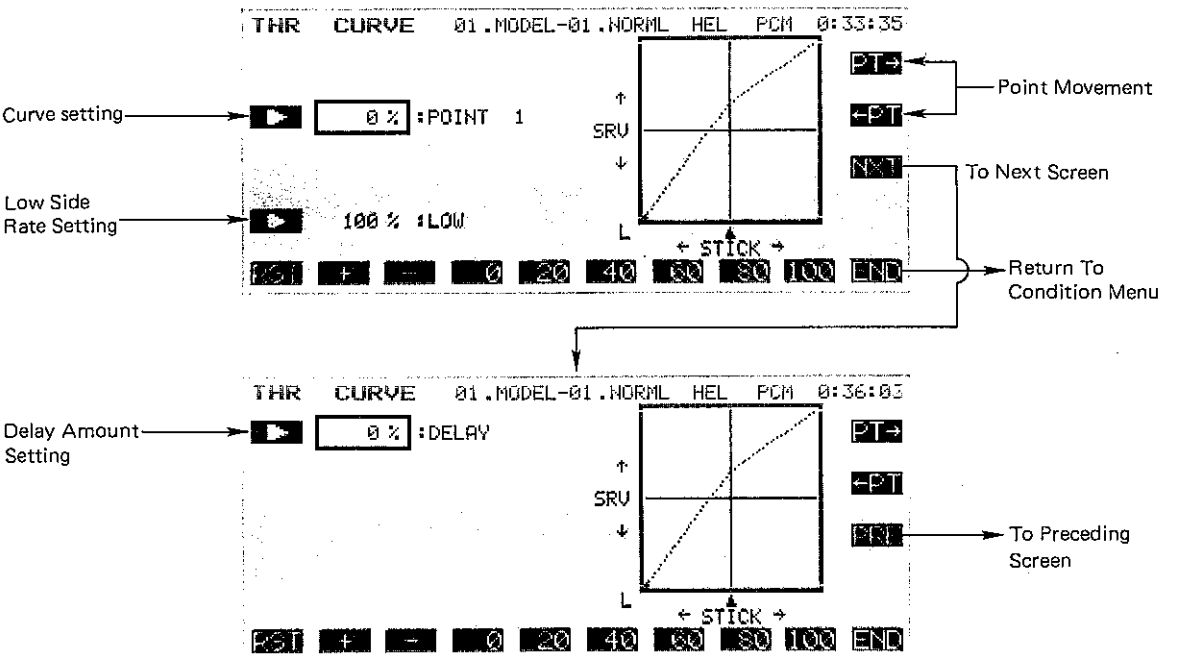
THROTTLE CURVE (TCV)

This function programs throttle curves to perform hovering, loops, rolls, and other aerobatics in the different flight modes. The throttle curve sets the servo response over the full stroke of the throttle stick by a 13-point curve. The low side rate can be input (point 7 is the reference). The servo delay at idle-up and other flight condition switching can be programmed.

Setting Up The Throttle Curve Function

Throttle Curve Inputting

In the Condition Menu, press the TCV key to get the THR CURVE menu shown in the upper portion of the figure below.



Setting Point Selection (Points 1 to 13)

Press the B (▶) key to turn on the curve inputting function. Use the movement keys Q and R to select the point whose value is to be set. The PT→ key increases the point number by one, and the ←PT key reduces the point number by one. The active point on the curve is shown as a black dot.

Once you have selected the desired point on the curve, you may input the rate with the rate setting keys E to M . The number keys 0 through 100 input the value directly. The + and − keys increase or decrease the value by 0.5 with each button pressing (so it takes two hits to see a number change because of numeric rounding).

You may set or reset each point on the curve by repeating these steps for each point.

Low-Side Rate Adjustment

Press the D key and you may input the rate with the numeric keys E to M . You may set anywhere in the range from 0 to 110% (initially the rate is set to 100%).

Delay setting

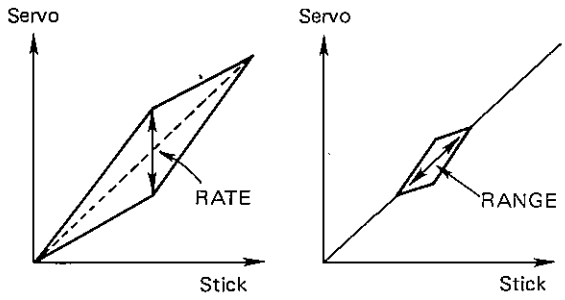
Shift to the next screen (the lower one in the figure) by pressing the NXT (P) key. Enter the delay with the rate setting keys E to M . The delay may be set from 0 to 100%, and is initially set to 0%.

Use the END (N) key to leave this menu.

HOVERING THROTTLE (THV)

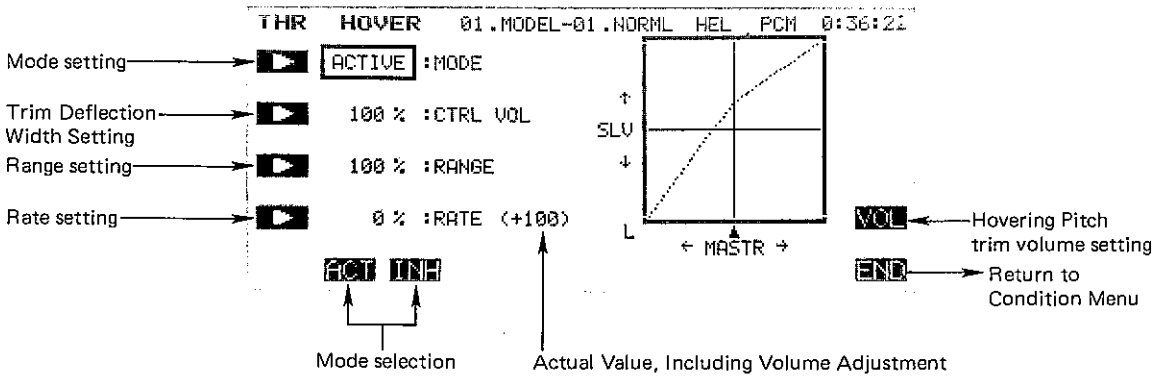
This function is used to trim the throttle around is hovering position. By setting a range, adjustment is possible without changing the high and low points. This Hovering throttle setting can be changed between the flight conditions, and ACT/INH may be set separately for each.

At initial definition, the right knob VR(B) controls hovering throttle trim.



Activation of command

In the Condition Menu, press the THV key to get the THR HOVER menu shown below. Use the A (▶) key to activate mode setting, then press the ACT or INH keys (F and G) to activate or inhibit the function.



Hovering Throttle Trim Deflection Setting

Press the B key to allow input to this setting, and input the rate with the numeric keys F to M . The deflection may be set from 0 to 100% (when activated, the initial value if this parameter is defined at 100%).

Setting of Range

Now you will set the Range of travel over which HIGH/LOW sides do not change. Press the C key and set the rate with the numeric keys F to M . The Range may be set from 0 to 100% (when activated, the initial value if this parameter is defined at 100%).

Offset Rate Setting

The offset amount is entered by pressing the D key, and input with the numeric keys E to M . This may be input from −100 to +100%, and the initial value is programmed to 0%.

Hovering Throttle Trim Selection and Operation Direction Setting

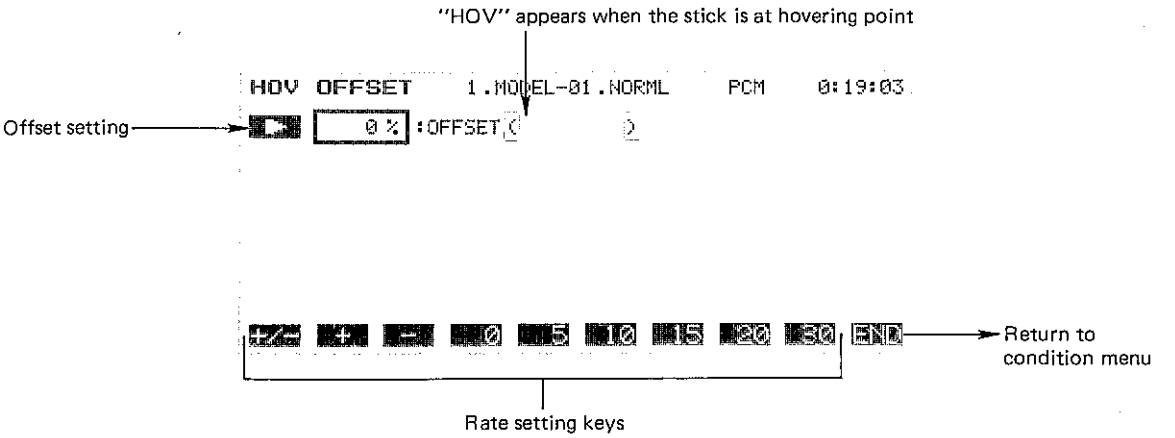
Call up the volume setting screen by pressing the VOL O key. Set the volume control as desired (the right-side knob VR(B) is set as the pitch trim volume control initially). For a description of the volume setting method, see page 37).

HOVERING OFFSET (HOF)

This function is used to program the pitch mixing hovering point. It is used to set the HIGH/LOW side switching point to the pitch hovering point when the pitch hovering point has drifted above or below the stick neutral position. The model should be adjusted so that hovering is performed around the mid-throttle position.

Activation of command

In the Condition Menu, press the HOF key to get the HOV OFFSET menu shown below.



Setting Method

Offset setting

During flight, make a note of where the throttle stick is positioned during hover. Set the throttle stick to the hovering position and adjust the offset with the F and G keys until "HOV" is displayed on the screen. This function has a range of −30 to +30%, and its initial value is 0%.

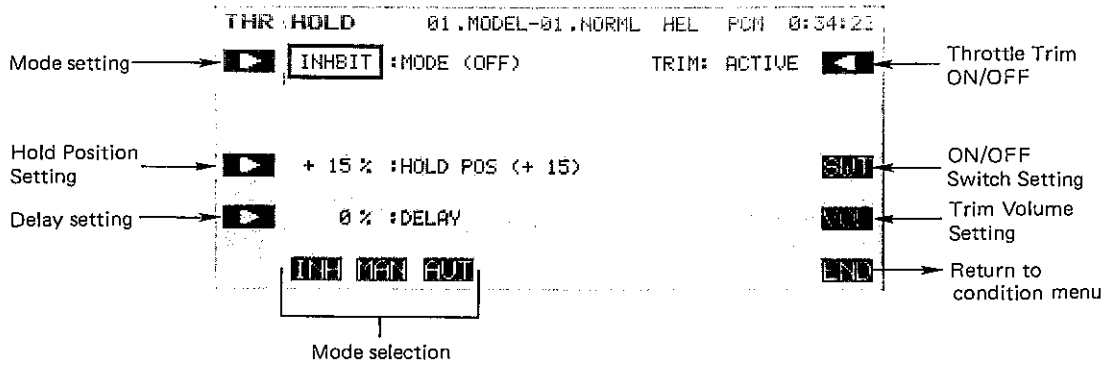
THROTTLE HOLD (HLD)

This function moves the throttle servo to idle during auto rotation. Either a Manual mode or an Auto mode can be selected. In the manual mode, the throttle servo is held by turning on the throttle hold switch. In the auto mode, the throttle servo is held when the throttle stick is moved past the set position on the low throttle side after the throttle hold switch is turned on.

A delay up to the servo hold position can be set. Throttle trim can be turned on and off during throttle hold, but it is usually turned on.

Activation of command

In the Condition Menu, press the HLD key to get the THR HOLD menu shown below.



Select Operation Mode

Use the A (▶) key to activate mode setting. Now you must decide on Manual or Auto operation.

Select the manual mode by pressing the MAN (G) key. Select the auto mode by pressing the AUT (H) key. You may deactivate the function by pressing the F (INH) key.

Throttle hold ON/OFF switch setting

Call the switch setting screen by pressing the SWT (P) key. At initial setting, SW (G) is defined as the control switch. You may choose another switch with this menu. For a description of the switch setting method, see page 37.

Stick Position Setting (Auto Mode Only)

For the Auto mode, you need to input the position at which the function will take effect. Press the B key, then move the throttle stick to the desired position, and press the SET (E) key to memorize the position. If the throttle stick is near half-throttle position for hovering, this should be around 20% throttle position.

Servo Hold Position Setting

Press the C key and set the Idling position with the rate setting keys F to M . This setting may vary from 0 to 100%, and is initially set to 15% by the system. At the set position, the carburetor should be fully closed.

Delay setting

Press the D key and set the delay with the rate setting keys F to M . The setting range is 0 to 100%, and the initial value loaded is 0%.

Throttle trim ON/OFF at throttle hold

Press the R key to enter the throttle trim activation menu. The function may be activated by pressing the ACT (F) key, and deactivated by pressing the INH (G) key.

Servo Hold Position Trim Volume Selection and Operating Direction Setting

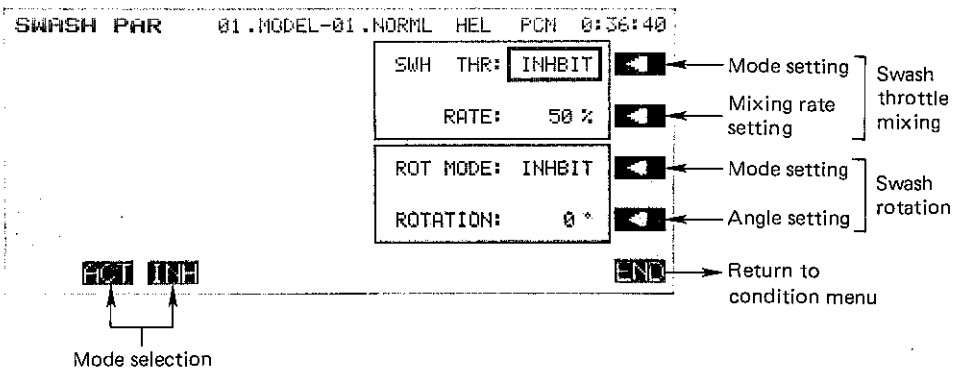
You may set a control to adjust the trim volume during flight. For a description of the volume setting method, see page 37. This volume is not loaded at initial setting, but may be adjusted ±10% by the volume control.

SWASHPLATE TYPE (SWP)

The SWP function has two built-in functions: Swash→Throttle mixing, and Swash rotation. These functions can be set for each flight condition. Swash→Throttle mixing is used to correct the tendency of the model to change altitude when the rotor is tilted by aileron, elevator, and other controls. The Swash Rotation function is used when the swash plate connections are shifted a fixed angle from the reference position.

Using the Swashplate Menu

In the Condition Menu, press the SWP key to get the SWASH PAR menu shown below.



Activation of Swash-Throttle Mixing command

Use the R key to activate mode setting, then press the ACT or INH keys (F and G) to activate or inhibit the aileron differential function.

Swash-Throttle Mixing Rate Setting

Press the Q key and enter the desired mixing rate with the rate setting numeric keys F to M . Mixing may be set from 0 to 100%; the system enters an initial value of 50%.

Swash Rotation Setting

Press the P to turn the swash rotation setting menu on. You may activate the offset mixing by pressing the ACT (F) key, and deactivate by pressing the INH (G) key.

Swash Rotation Angle Inputting

Press the Q key and set the angle with the angle setting numeric keys E to M . This value may be set anywhere between −30° to +30°, and its initial value is set to 0°.

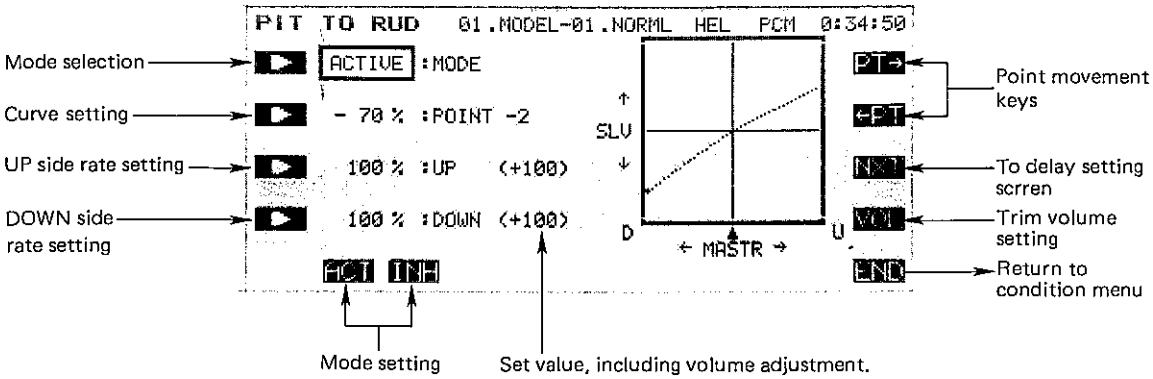
PITCH→RUDDER (P→R)

This mixing, also called Revolution Mix, mixes pitch commands into rudder in order to suppress the torque generated by changes in the main rotor's pitch angle. A five-point curve can be used to control the shape of the mixing curve for each flight condition. The up-side and down-side mixing rates can be set, using Point 0 as the reference. A trim volume can be input for each direction, and a time delay to transition smoothly between flight conditions may also be set.

Setting Up Pitch→Rudder Mixing

Pitch Mixing Activation

In the Condition Menu, press the P→R key to get the PIT TO RUD menu shown below.



Use the A (▶) key to activate mode setting, then press the ACT or INH keys (F and G) to activate or inhibit the function.

Setting Points –2, –1, 0, +1, +2

Press the B (▶) key to turn on the curve inputting function. Use the movement keys Q and R to select the point whose value is to be set. The PT→ key increases the point number by one, and the ←PT key reduces the point number by one. The active point on the curve is shown as a black dot.

Once you have selected the desired point on the curve, you may input the rate with the rate setting keys E to M . The number keys 0 through 100 input the value directly. The + and – keys increase or decrease the value by 0.5 with each button pressing (so it takes two hits to see a number change because of numeric rounding). The +/– key changes the sign of the entered number.

You may set or reset each point on the curve by repeating these steps for each point.

Up-Side Rate Adjustment

Press the C key and you may input the rate with the numeric keys E to M . You may set anythere in the range from 0 to 100% (initially the rate is set to 100%).

Down-Side Rate Adjustment

Press the D key and you may input the rate with the numeric keys E to M . You may set anywhere in the range from 0 to 100% (initially the rate is set to 100%).

Up & Down Sides Trim Volume selection

Enter the volume setting screen by pressing the O key. For a description of the volume setting method, see page 37. The volume control has an adjustment range of ±25% of the rates input above. No control is set as the volume control at initial setting. Be sure that you are setting the desired condition by verifying the condition name.

Delay setting

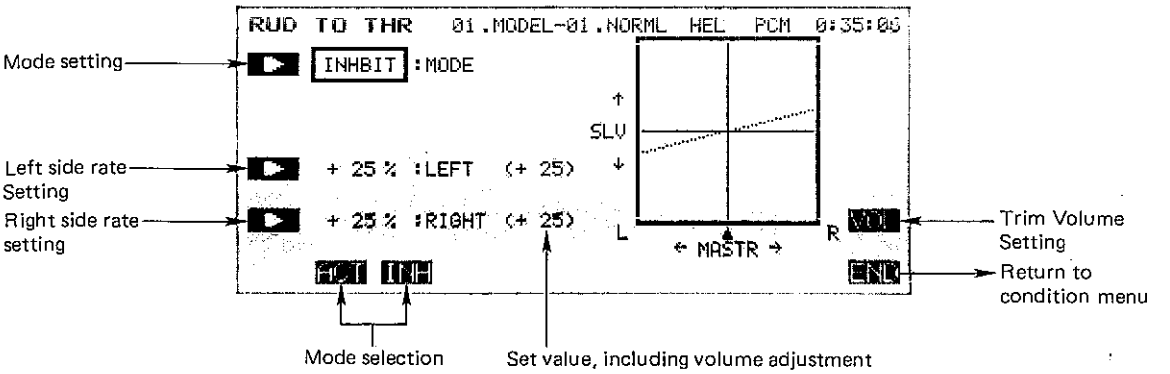
Call the delay setting screen by pressing the NXT (P) key. Now press the key and set the delay with the rate setting keys E to M . The setting range is 0 to 100%, and the initial value loaded is 0%.

RUDDER→THROTTLE (R→T)

This mixing adjusts the throttle setting to account for the changes in power required when rudder commands are made. The amount of mixing can be set for each condition, and the left and right rates may be set separately. Trim volumes may also be set.

Setting Up Rudder→Throttle Mixing

In the Condition Menu, press the R→T key to get the RUD TO THR menu shown below.



Activation of Rudder-Throttle Mixing command

Use the A key to activate mode setting, then press the ACT or INH keys (F and G) to activate or inhibit the Rudder-Throttle function.

Left-Side Rate Adjustment

Press the C key and you may input the rate with the numeric keys E to M . You may set anywhere in the range from –50 to +50% (initially the rate is set to +25%, but a rate between 0 and 20% is recommended). Use the +/– key to change the sign if necessary.

Right-Side Rate Adjustment

Press the D key and you may input the rate with the numeric keys E to M . You may set anywhere in the range from –50 to +50% (initially the rate is set to +25%; again a rate from 0–20% is recommended).

Trim Volume Selection and Operating Direction Setting

You may set a control to adjust the trim volume ıring flight. Call the volume setting screen by pressing VOL (O) key. For a description of the volume ıg method, see page 37. This volume may be adjusted ıy the volume control.

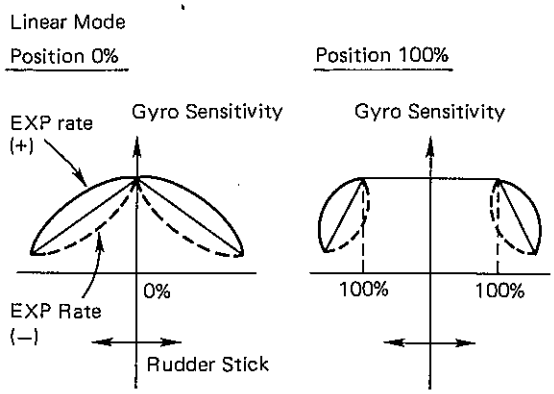
GYRO SENSITIVITY (GYR)

This function switches the gyro sensitivity. The mode depends on the gyro used. Usually, sensitivity 1 or 2 is switched in the normal mode.

The Normal mode is used with gyros having two-step switching. The sensitivity is pre-adjusted at two values and is selected by means of this function.

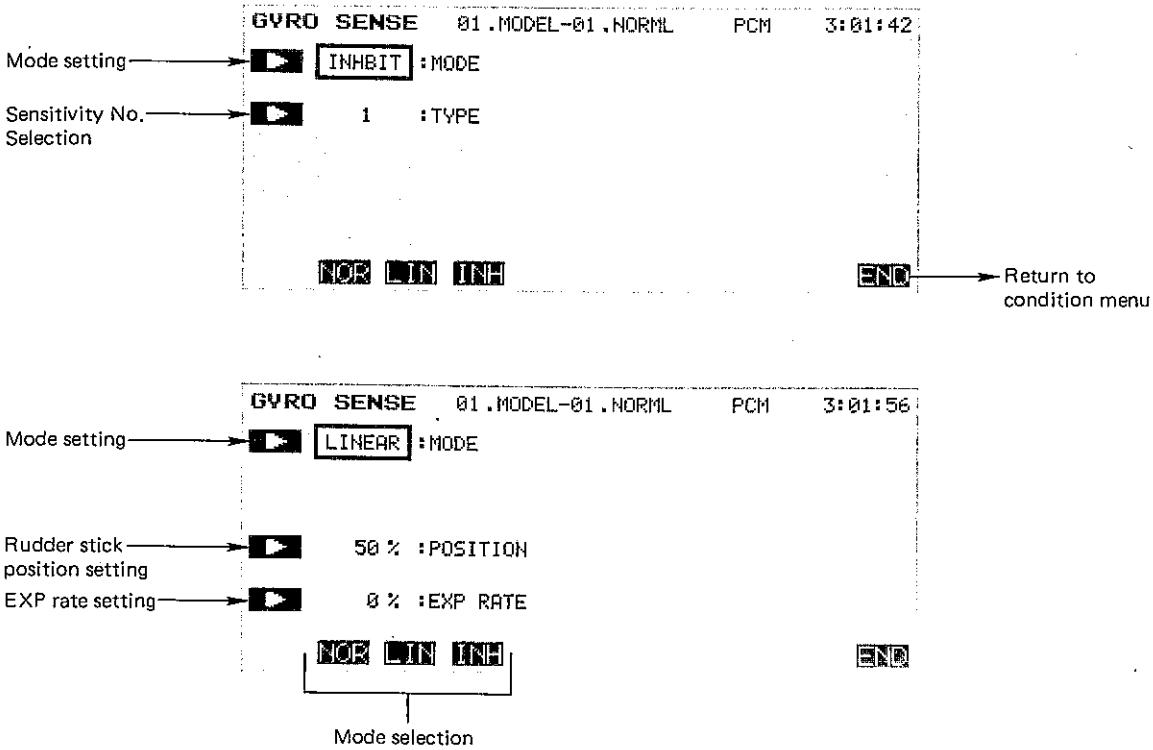
The Linear mode is used with gyros whose sensitivity can be switched linearly. The sensitivity can be lowered according to the rudder travel by means of this function.

An EXP mixing curve may also be input. The sensitivity remains constant (maximum sensitivity) up to the point at which gyro sensitivity is suppressed according to rudder operation. However, the maximum and minimum sensitivities are set at the gyro.



Using the Gyro Sensitivity Menu

In the Condition Menu, press the GYR key to get the GYRO SENSE menu shown below.



Select the Gyro Mode

Press the A key to enter the mode selection menu.
Select the normal mode by pressing the NOR (F) key.
Select the linear mode by pressing the LIN (G) key.
Deactivate the function by pressing the INH (H) key.

Normal mode	Linear mode
Select the sensitivity number by pressing the F (1) or G (2) key.	Set Rudder Stick Position Press the C key and set the rudder stick position with the numeric keys F to M . You may input from 0 to 100% (initially 50% is entered). The numeric keys input the number; (+) and (−) change the inputted value by +/− 1, and the +/− key changes the sign. Set EXP rate Press the D key and set the curve rate with the numeric keys F to M . The numeric keys work the same as given in the previous paragraph.

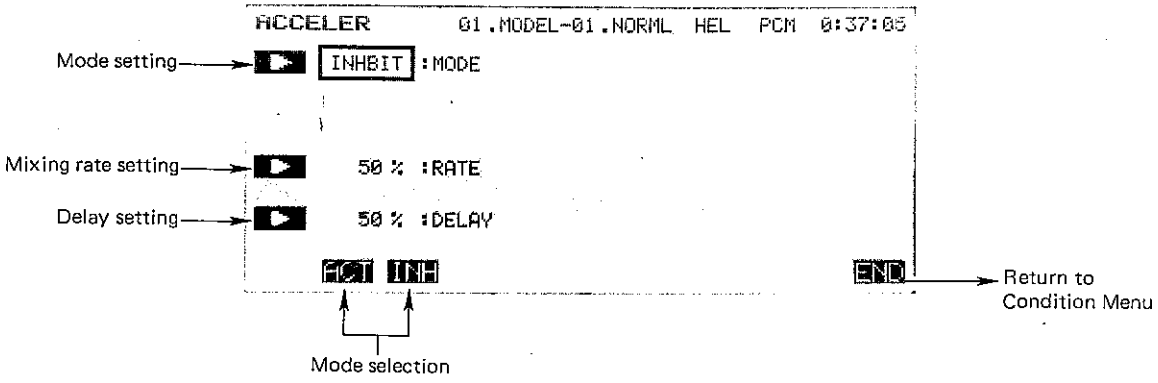
Press the END (N) key to exit this menu.

ACCELERATION (ACC)

This mixing function is used to cancel the reaction torque generated by sudden throttle changes. The amount of mixing and the rudder servo return delay can both be programmed.

Using the Acceleration Function

In the Condition Menu, press the ACC key to get the ACCELER menu shown below.



Activation of Acceleration Command

Use the A key to activate mode setting, then press the ACT or INH keys (F and G) to activate or inhibit the Acceleration function.

Mixing rate setting

To input the mixing rate, press the C key and set the mixing rate with the rate setting keys F to M. The mixing rate is initially set to a value of 50%, but may be set from 0 to 100% using the numeric keys.

Delay setting

Call the delay setting screen by pressing the D key. Now set the delay with the rate setting keys F to M. The setting range is 0 to 100%, and the initial value loaded is 50%.

Exiting

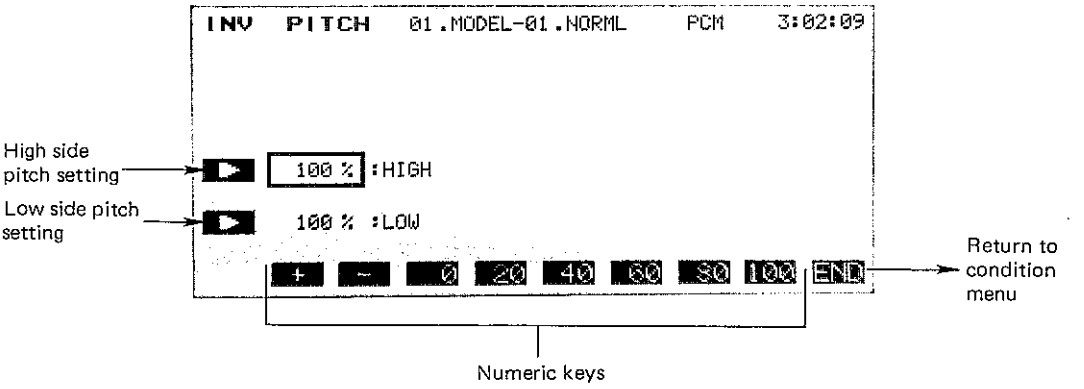
To exit the Acceleration Mix function, use the END N key.

INVERTED PITCH (INV)

This function sets the inverted pitch high-side and low-side rates during inverted flight. All linkages should be set up for inverted flight. Inverted flight function activation and cross position setting are performed with the Inverted Pitch (INV) function in the model menu (page 57).

Setting Up The Inverted Pitch Function

In the Condition Menu, press the INH key to get the INV PITCH menu shown below.



Inverted Flight High Pitch Rate Setting

Press the C key and you may input the rate with the numeric keys F to M . You may set anywhere in the range from 0 to 110% (initially the rate is set to 100%).

Inverted Flight Low Pitch Rate Adjustment

Press the D key and you may input the rate with the numeric keys F to M . You may set anywhere in the range from 0 to 100% (initially the rate is set to 100%).

Exiting

To exit the Acceleration Mix function, use the END N key.

SAILPLANE SECTION

This section contains information on the commands that apply to sailplanes only. Each of these functions can be set independently for different flight conditions. The sailplane model types are grouped into 2-S type, 4-S type, and 5-S type by number of servos in the wing. The Condition menus for these three sailplane types are shown on the next page.

In this manual, speed flaps are controls that can move together (as flaps) or differentially (as ailerons), and are commonly found on most high-performance models. Brake flaps move together only, and are used for landing. Brake flaps are sometimes found on scale models. Butterfly is a high drag configuration used for landings, referred to as "Crow" elsewhere.

If you plan to use the PCM 1024Z system primarily for sailplanes and would like to have a three position switch on the left-hand side, we recommend you purchase a Mode I airplane radio (and convert to Mode II) or a Mode II helicopter radio.

For conditions that apply to all models (ATV, AFR, D/R, PMX, STM, TOF, CNA, and TRM functions), refer to the Common Conditions section. For instructions on Helicopters and Airplanes, refer to the sections pertaining to those aircraft.

Sailplane Section Table of Contents

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Sailplane Setup Example. 122

Control Setup Definitions

ADF	Aileron Differential (2-S/4-S/5-S)	Sets different aileron up & down throws	125
A→R	Aileron → Rudder (2-S/4-S/5-S)	Mixing for low-drag, coordinated turns	126
ASF	Aileron → Speed flap (4-S/5-S)	Increased roll authority for 4-S & 5-S	127
VTL	V-Tail	Mixes rudder & elevator for V tail	128
ABE	Air Brake → Elevator (2-S/4-S/5-S)	Trims pitch change due to airbrakes	129
EBF	Elevator → Brake Flap (5-S)	High lift for better turning capability, 5-S	130
ESF	Elevator → Speed Flap (4-S)	High lift for better turning capability, 4-S	131
BKF	Brake Flap (5-S)	Special flap mixing functions, 5-S	132
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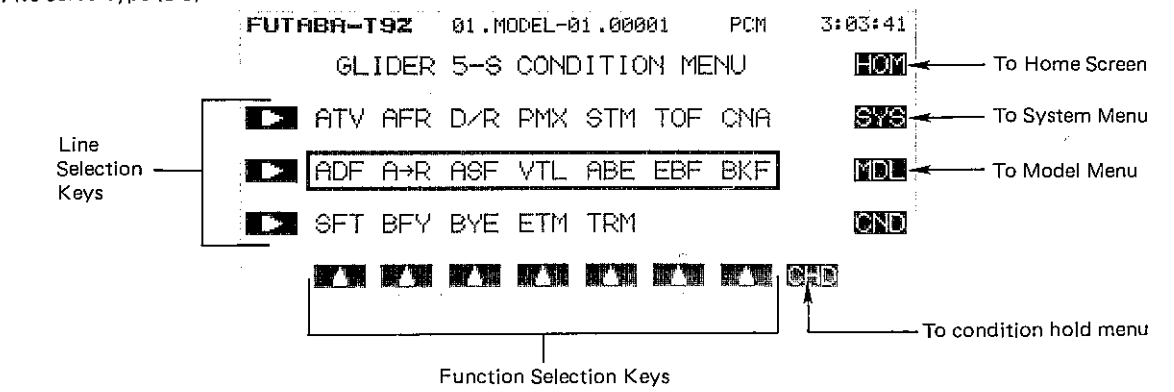
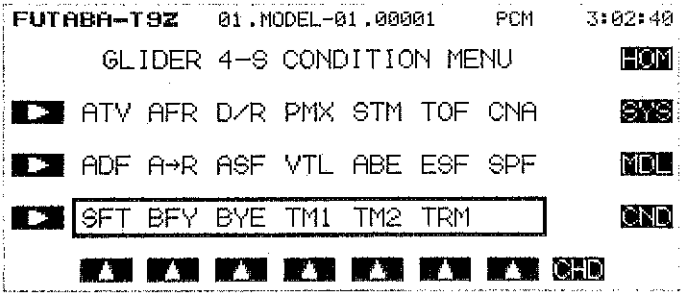
SFT	Speed Flap Trim (4-S/5-S)	Use to change wing camber on 4-S & 5-S	139
BFY	Butterfly (4-S/5-S)	High drag for predictable landings	140
BYE	Butterfly → Elevator (4-S/5-S)	Compensates for butterfly trim change	142
ETM	Elevator Trim (2-S/5-S)	Elevator Presets for flight conditions	143
TM1&2	Trim Mix 1 & 2 (4-S)	Two presets for different flight conditions	145
F→E	Flap → Elevator (2-S)	Corrects trim change due to flap motion	147
E→F	Elevator → Flap (2-S)	High lift for better turning, 2-S	148
FPN	Flaperon (2-S)	Combined flap & aileron functions, 2-S	149

SAILPLANE CONDITION MENUS

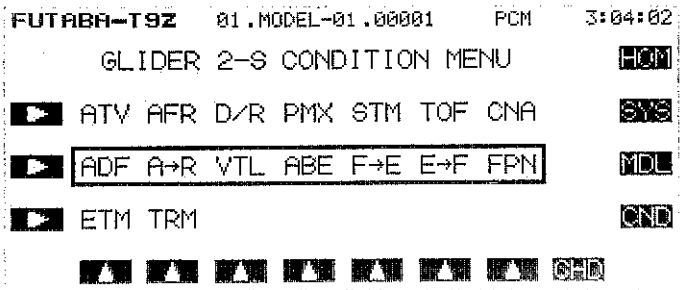
Five Servo Type (5-S)



Four Servo Type (4-S)



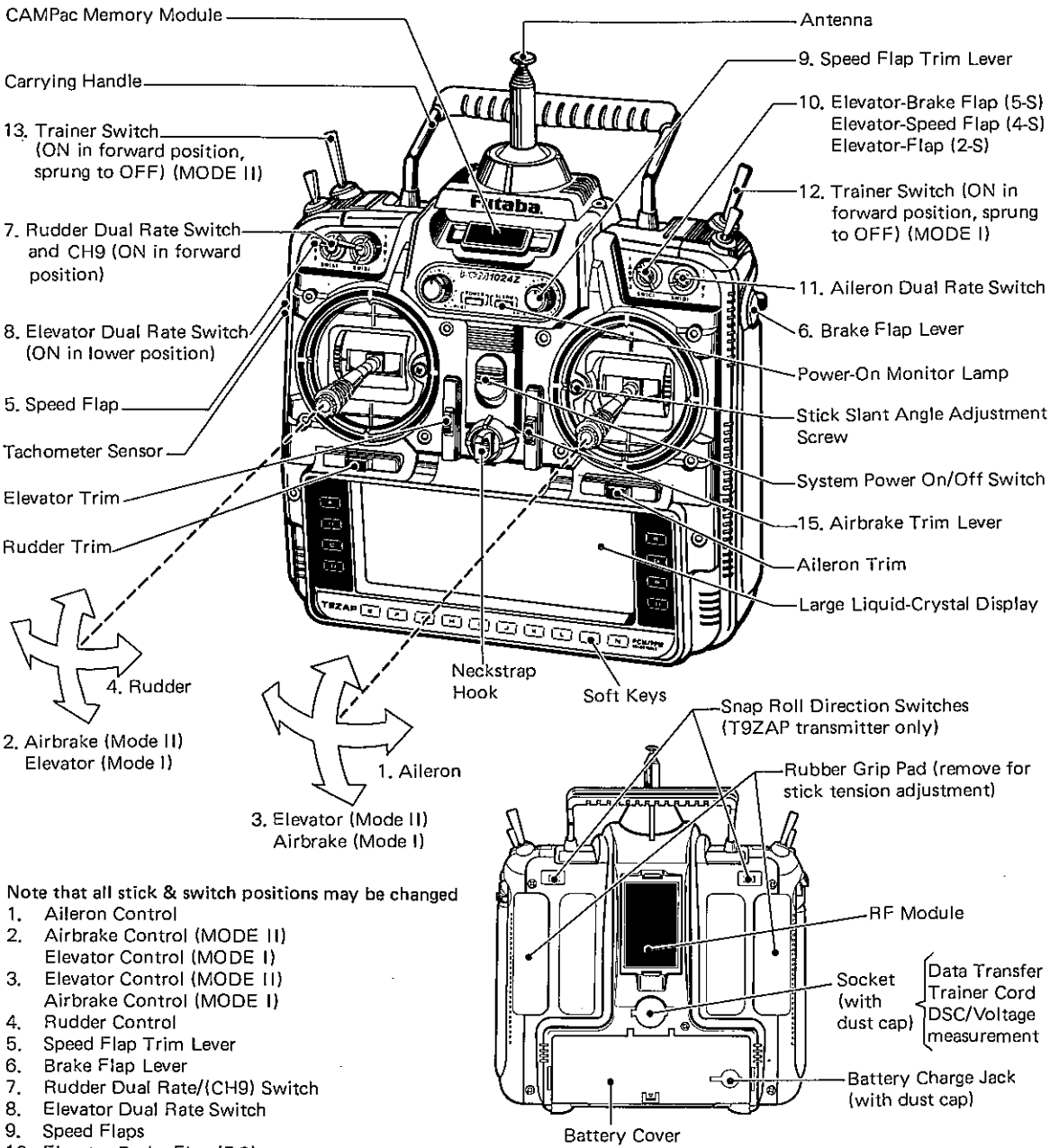
Two Servo Type (2-S)



To get to these settings, press the MDL key from any menu in an Sailplane setup. To select one, first select the line containing the desired function with the B , C , or D keys. Then use the F to L keys to select the function to be entered.

SAILPLANE TRANSMITTER CONTROLS AND FUNCTIONS

Functions and locations given in this drawing are the factory default positions. Each setting can be easily changed as the owner desires. The Function Change menu [FNC] may be used for this purpose.



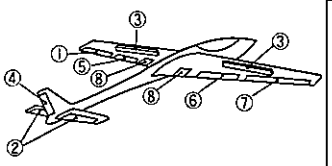
Note that all stick & switch positions may be changed

1. Aileron Control
2. Airbrake Control (MODE II)
   Elevator Control (MODE I)
3. Elevator Control (MODE II)
   Airbrake Control (MODE I)
4. Rudder Control
5. Speed Flap Trim Lever
6. Brake Flap Lever
7. Rudder Dual Rate/(CH9) Switch
8. Elevator Dual Rate Switch
9. Speed Flaps
10. Elevator-Brake Flap (5-S)
    Elevator-Speed Flap (4-S)
    Elevator-Flap (2-S)
11. Aileron Dual Rate Switch
12. Trainer Switch (MODE I)
13. Trainer Switch (MODE II)

SAILPLANE RECEIVER AND SERVO CONNECTIONS

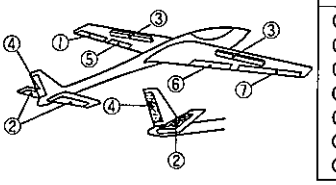
The order for connecting the servos depends on the selected number of wing servos (two, four, or five wing servos). When dual aileron or flap servos are not required, the receiver output channels are available for other uses. V-tail connections = * The receiver output order is shown below:

GLIDER 5-S



Glider 5-S
Ch 1 = Ail 1
Ch 2 = Elevator*
Ch 3 = Airbrake
Ch 4 = Rudder*
Ch 5 = Flap 1
Ch 6 = Flap 2
Ch 7 = Ail 2
Ch 8 = Brake flap

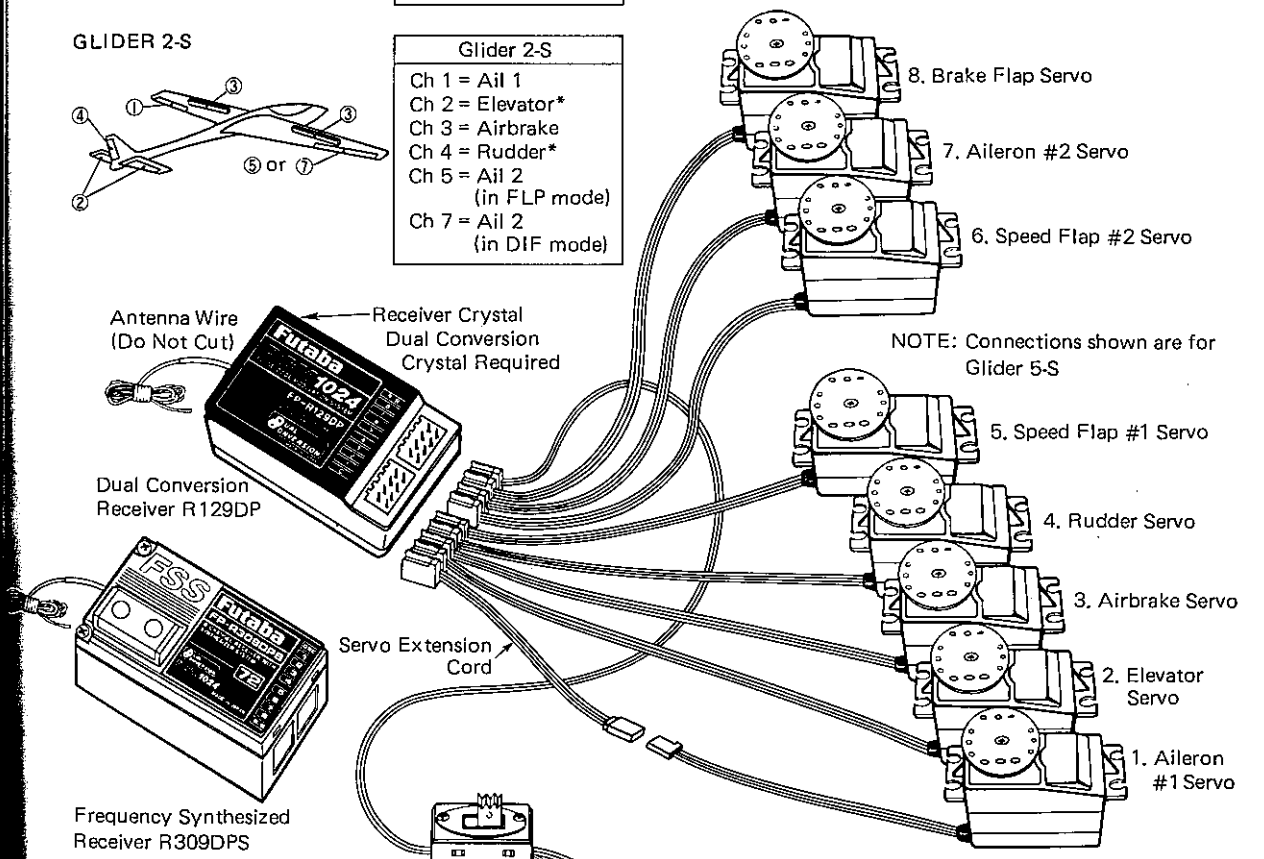
GLIDER 4-S

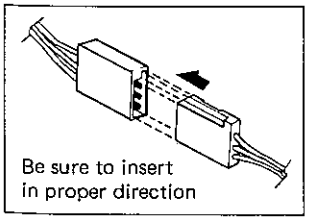


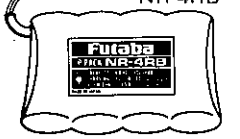
Glider 4-S
Ch 1 = Ail 1
Ch 2 = Elevator*
Ch 3 = Airbrake
Ch 4 = Rudder*
Ch 5 = Flap 1
Ch 6 = Flap 2
Ch 7 = Ail 2

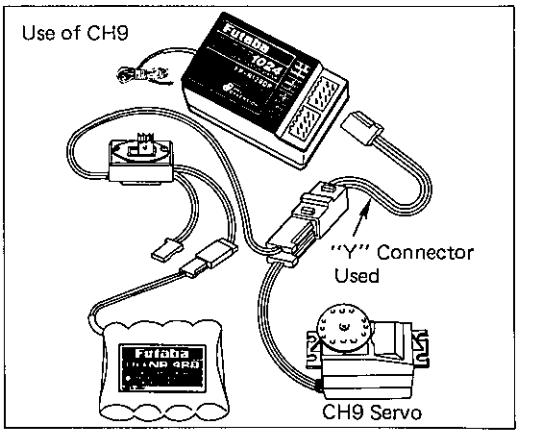
GLIDER 2-S

Glider 2-S
Ch 1 = Ail 1
Ch 2 = Elevator*
Ch 3 = Airbrake
Ch 4 = Rudder*
Ch 5 = Ail 2 (in FLP mode)
Ch 7 = Ail 2 (in DIF mode)









EXAMPLE SAILPLANE SETUP INSTRUCTIONS

The following example shows how the PCM 1024Z may be programmed for a sailplanes with two, four, or fice wing servos. The settings presented here are for typical models of the three types. Your model's settings are likely to vary somewhat from these, but the procedures given will still be applicable. To make things easier, be sure that the horns and linkages are all at the same angles and of the same length. This will make it so identical servo motion produces identical control surface movement on both sides.

This manual refers to ailerons, speed flaps, and brake flaps. Here are the definitions of each: Ailerons are control surfaces located nearest the tips of the sailplane's wings. Speed flaps are controls that can move together (as flaps) or differentially (as ailerons), and are commonly found on most high-performance models. Brake flaps move together only, and are used for landing. Brake flaps are sometimes found on scale models. Additionally, any sailplane can have airbrakes or spoilers, and electrics will of course have a motor control.

1	Use the Model Select function **MSL** to select a vacant model memory, and choose desired sailplane type using the Type **TYP** function from Model menu.	Two Wing Servos [2-S] Flaperons, Delta Wing, Electrics. Optional airbrakes or spoilers	Four Wing Servos [4-S] F3B, multitask, scale. Optional airbrakes or spoilers	Five Wing Servos [5-S] Multitask or Scale with Optional Airbrakes and/or spoilers
2	Be sure to select a vacant memory. Choose the desired sailplane type. RENAME model now using the Model Name **MNA** function in the model menu. Switch to the Condition menu **CND** and name the default flight condition (we recommend NORML). Later you may add Launch, Speed, Distance, Landing, etc. (Step 16).			
3	Set Control Order using the Function Control **FNC** in the model menu. Here you may choose what sticks and sliders control the different functions.	Set Flaperon **FPN** (recommended). Aileron differential **ADF** doesn't allow Flaperon mixing. You can get differential in **FPN** by setting endpoints.	To get Butterfly control on the throttle stick, change the SF2 control to J3. If you will want full-span camber changing, assign SF1 to LS (for left slider control) or whatever device you want (LS is the default). Be sure to cut its authority down in all flight modes using AFR; around 10% is plenty for most models. Check direction of travel.	

	Instruction	2-S	4-S	5-S
4	Set V-Tail (if needed). Choose motor control channel from spares (if used).			
5	Plug Servos into Correct Channel Numbers * = V-Tail outputs Unnumbered receiver outputs are spares.	Ch 1 = Ail 1 Ch 2 = Elevator* Ch 3 = Airbrake Ch 4 = Rudder* Ch 5 = Ail 2 (in FLP mode) Ch 7 = Ail 2 (in DIF mode)	Ch 1 = Ail 1 Ch 2 = Elevator* Ch 3 = Airbrake Ch 4 = Rudder* Ch 5 = Flap 1 Ch 6 = Flap 2 Ch 7 = Ail 2	Ch 1 = Ail 1 Ch 2 = Elevator* Ch 3 = Airbrake Ch 4 = Rudder* Ch 5 = Flap 1 Ch 6 = Flap 2 Ch 7 = Ail 2 Ch 8 = Brake flap
6	Use Reversing Function REV in the Model menu to set proper throw directions. Reverse channels as necesary to correct throws.			
7	If you will use multiple flight modes, choose and set switch for default flight mode. We recommend using the center position of the 3-position switch E.		Typically down is used for launch presets, and up is used for speed presets. These conditions are set in step 16.	
8	Set Aileron Differential ADF . More up (reflex) than down helps make coordinated low-drag turns.		Approximately 2:1 up:down ratio is a good starting point. At high speeds less or none is needed.	
9	Set Aileron→Rudder coupling A→R if desired. Only a small percentage is needed, around 10—15%. This reduces drag of fuselage yawing to make low-drag turns. Be sure that rudder moves in correct direction.		Little or no coupling is needed for high speeds. Use the switch SWT command to define the ON position of SW-E.	
10	Glide path control activation. Set these up for steeper descent and more precise landings.	Set flap travel (usually as much as you can get and still have roll control). Spoilers will help steepen approach.	Set Butterfly BFY . Be sure Aileron go up equal amounts, speed flaps go down equal amounts. Lots of flap (90°) is better.	Set Butterfly BFY . Be sure Ailerons go up equal amounts, Brake Flaps may be coupled to speed flaps BKF for more drag.
11	Couple Flaps to elevator for tighter pylon turns ("Nobler" mixing). Most models don't need much (1/16"—1/8" at wing trailing edge)	Set Elev→Flap E→F	Set Elev→Speed Flap ESF mixing. Add Speed Flap→Aileron Mixing SPF at 100% for uniform wing camber change.	Set Elev→Brake Flap EBF mixing. Brake Flaps may be coupled to speed flaps using BKF for more lift capability if desired.
12	Faster roll rate mixing (have the speed flaps move as ailerons)	—	Aileron→Speed Flap mixing ASF . Suggest 50% for thermalling, 80—100% for speed.	Aileron→Speed Flap mixing ASF . Suggest 50% for thermalling, 80—100% for speed.
13	Trim inboard flaps	—	Set speed flap trim SFT . This might be used for landing or cruise preset positions.	
14	Switchable elevator trim (make small changes)	Set Elev trim offset ETM for different flight conditions.	—	Set Elev trim offset ETM for different flight conditions.
15	Set Throw Volumes ATV to prevent binding. Check each servo at each extreme of motion in all flight modes.			

	Instruction	2-S	4-S	5-S
16	After a few flights to trim the model, you may set different flight modes. You may trim for launch flap/aileron droop, speed camber reflex, or other desired flight modes. You can have different subtrims, rudder coupling, differential, aileron/speed flap mixing. In fact you may change EVERY parameter between flight modes. Use the Condition Select **CSL** button in the Model Menu. This function allocates the necessary number of flight conditions to the model memory. Note the condition number next to the D (default) in the display. This is the set of conditions that will be copied into a new condition and modified. Also note the number after the next display. You will copy to this condition. Now use the Copy Condition **CPC** from the System menu to copy the contents of the default condition into another. Choose the default flight condition number, press the **SET** button, then choose the second condition number in the lower box "TO CONDITION." Give the command to copy. The switch that calls the flight conditions should be selected. Return to the Condition Select **CSL** function, press the desired flight condition number, and use the **SWT** button to choose the desired switch location. Once you have selected a condition, use the **CNA** (Condition NAme) button to label the new condition (you may have to flip the chosen switch to the correct position to get the desired condition). Now,		you may go through the Condition menu items to get the desired settings in the new mode. Read the condition name after the model name to be sure you are changing the condition you want. Now, you may go through the Condition menu items (i.e. ADF, A→R, etc.) to get the desired settings in the new mode. Read the condition name after the model name to be sure you are changing the condition you want. As an example, for NORML we use approximately 50% ASF mixing, 50% differential, and 10% A→R coupling. In the speed mode, we use 100% ASF for better roll rate, 0% differential, and turn A→R down to zero because adverse yaw is very small at high speeds. Subtrims and Trim Mixes 1&2 may be used to offset controls for different conditions, like flap droop for launch. You can modify all of the settings and adjust each as you like. You can add a time delay on many of the menus: look for a DELAY setting. You can also have the mixing ratio vary with the motion of another slider or knob: look for the **VOL** key on the **O** button in some menus. (Note: In the 4-servo model, if you don't mind having the same differential, mixing, etc. settings for all modes, you can easily set Trim Mix 1 & Trim Mix 2 **TM1** , **TM2** to droop flaps and ailerons, and trim elevator for both launching and speed. Then you do not have to use any other flight condition settings.)	

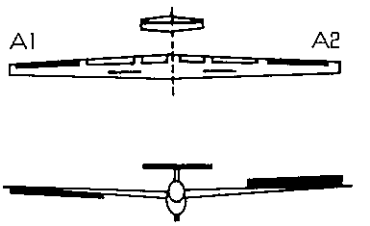
After test flying, change compensation for glide path commands reacting & changing trim:

	Instruction	2-S	4-S	5-S
17	Set elevator presets for launch and speed, or other flight conditions as desired. Make small changes.			
18	Reduce rudder coupling **A→R** if fuselage points inward to center of turns, and increase if the fuse points outwards during turns. Turn it off for speed.			
19	Glidepath trimm correction (Caution: make only small changes in elevator mixing)	For flap actuation trim change: Set Flap→Elev **F→E**	For Butterfly trim change: Set Butterfly-Elev **BYE**	Set Butterfly-Elev **BYE** . Brake Flap→Elev **BKF**
20	Airbrake or spoiler trim correction	Use Airbrake→Elevator **ABE** mixing to correct trim change due to airbrake/spoiler. Make small changes as trim is very sensitive to this.		

AILERON DIFFERENTIAL (ADF)

This applies to all three sailplane types, 5-S, 4-S, and 2-S. The aileron differential function is used to provide more deflection for the up aileron than for the down aileron. Depending on the model design, anywhere from 5 to 30% more up deflection is used. The up and down travel of each servo may be set separately. If desired, the amount of down aileron deflection may be trimmed in flight with a knob or trimmer.

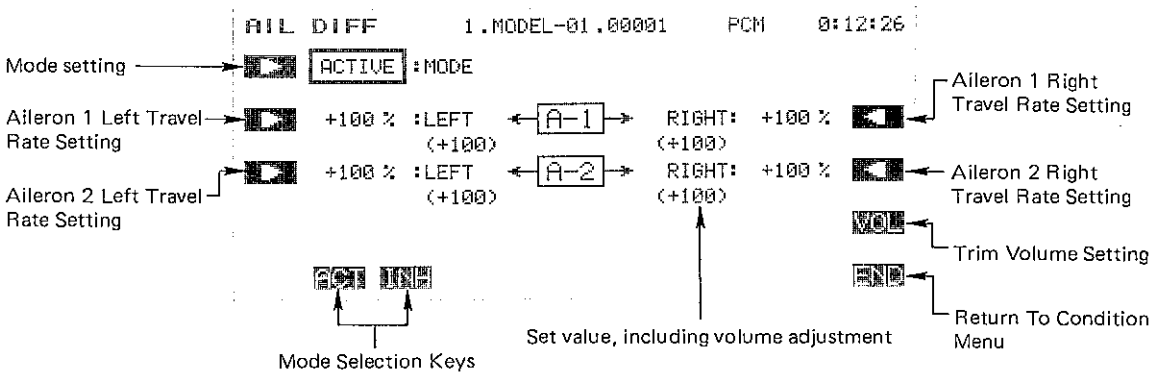
When this function is defined, the required two servos plug into receiver output channels CH1 (aileron 1) and CH7 (aileron 2).



Setting Up Aileron Differential

Activation of command

In the Condition Menu, press the ADF key to get the AIL DIFF menu shown below. Use the A (▶) key to activate mode setting, then press the ACT or INH keys (F and G) to activate or inhibit the aileron differential function.



Aileron 1 Travel Setting

You now set the amount of servo throw for Aileron 1. Press the B key to activate travel setting for the Left direction and set the throw with the numeric keys. The number keys 0 through 100 input the value directly. The + and − keys increase or decrease the value by 1. The +/− key may be used to reverse the throw direction.

If you are not sure what you are changing, hold the stick to one side and press different keys — if there is no effect, move the aileron stick to the other side and continue. Your setting may vary from −120 to +120%, the initial value is +100%.

Now set the travel for the Right throw on Aileron 1. Press the Q key to activate travel setting for the Right direction and set the throw with the numeric keys as before.

Aileron 2 Travel Setting

The setting process given above is repeated for Aileron 2. Press the C key to activate travel setting for the Left direction and set the throw with the numeric keys.

Finally, set the travel for the Right throw on Aileron 2. Press the P key to activate travel setting for the Right direction and set the throw with the numeric keys as before.

Trim volume setting

You may set up the Aileron Differential function so that its effect may be changed in flight by moving a trim control. The trim control adjusts the volume within ±25% of the set differential rate. This option is not activated at initial setup.

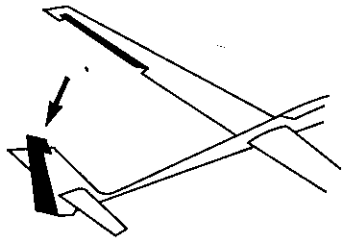
Call the volume setting screen by pressing the VOL O key, and select the desired control using the screen menus (for a description of the volume setting method, see page 37).

Use the END (N) key to leave this menu.

AILERON→RUDDER MIXING (A→R)

This function is used to mix rudder operation with aileron operation automatically, to make realistic, coordinated turns. It is especially effective when turning and banking scale models or large models that resemble full-sized aircraft. This mixing keeps the fuselage aligned into the wind, reducing drag, and helps to make what are called "coordinated turns."

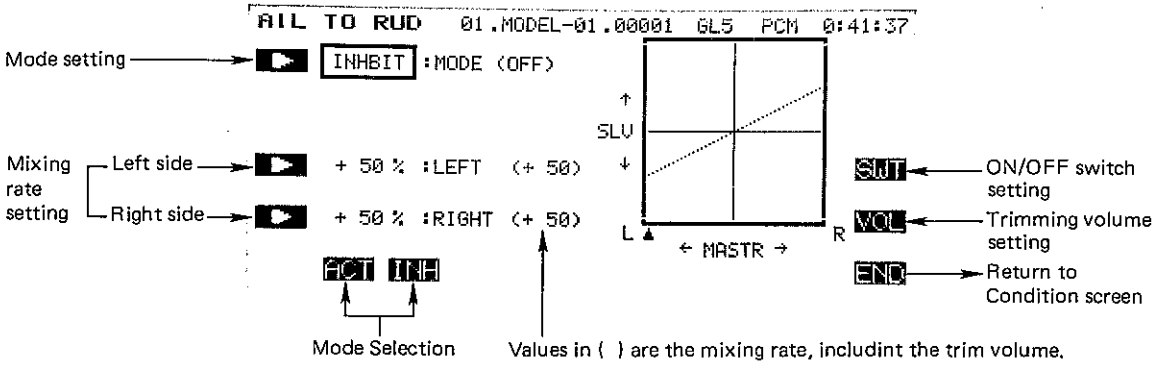
The function allows you to set up the left and right mixing rates independently. Furthermore, mixing can be turned on and off during flight by setting a switch, or it may be set to stay on all the time if the function is activated (ACT) without setting an ON/OFF switch. Also, it is possible to adjust the amount of rudder coupling in-flight, by setting a volume control.



Setting Up Rudder Coupling

Activation of command

In the Condition Menu, press the A→R key to get the AIL TO RUD menu, as shown below. Use the A (▶) key to activate mode setting, then press the ACT or INH keys (F and G) to activate or inhibit rudder coupling.



Setting the Mixing Ratio — Left and Right

First set the amount of mixing for left aileron command. Press the C key to activate mixing ratio for the Left direction and set the value with the numeric keys E to M . The number keys 0 through 100 input the value directly. The + and − keys increase or decrease the value by 1. The +/− key may be used to reverse the throw direction.

If you are not sure what you are changing, hold the stick to one side and press different keys — if there is no effect, move the aileron stick to the other side and continue. Your setting may vary from −100 to +100%, the initial value is +50%.

Now set the amount of mixing for the Right aileron command. Press the D key to activate mixing ratio for the Right direction and set the throw with the numeric keys as before.

On/Off Switch Setting

On initial setting, an activation switch for rudder coupling is not set, meaning that once activated, it is on all the time. If you would like to set a switch to turn it on and off, call the Switch Setting screen by pressing the SWT P key. Then use the keys to choose the desired switch location and on direction. For more information on the switch setting method, see page 37).

Trim Volume setting

You may set up the Rudder coupling function so that its effect may be changed in flight by moving a trim control. The trim control adjusts the volume within ±25% of the set mixing rate. This option is not activated at initial setup.

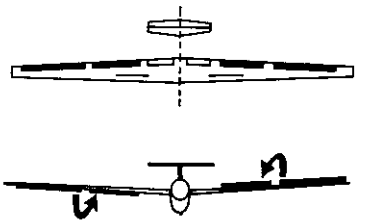
Call the volume setting screen by pressing the VOL O key, and select the desired control using the screen menus (see page 37 for a description of the volume setting method.

Use the END (N) key to leave this menu.

AILERON-SPEED FLAP COUPLING (ASF)

This function may be used to control mixing from the ailerons to the speed flaps, making the entire wing act as ailerons. When the aileron stick is moved, the aileron and speed flap servos operate simultaneously, which improves the model's roll rate.

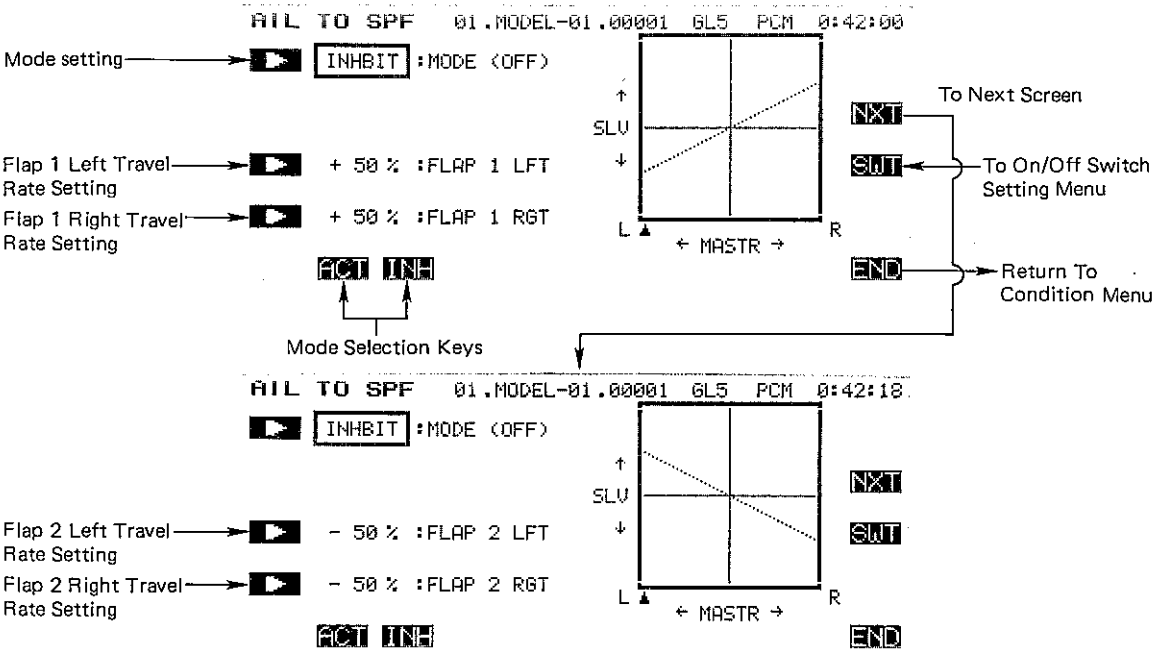
The left and right deflection angles of the speed flap servos can be adjusted. Speed Flap mixing can be made to turn on and off during flight by setting a switch. Initially, an ON/OFF switch is not defined, so mixing remains on all the time.



Setting Up Speed Flap Coupling

Activation of command

In the Condition Menu, press the ASF key to get the AIL TO SPF menu, as shown below. Use the A (▶) key to activate mode setting, then press the ACT or INH keys (F and G) to activate or inhibit speed flap coupling.



Flap 1 Left Travel Setting

First set the amount of mixing throw for Flap 1. Press the C key to activate travel setting for the Left direction and set the throw with the numeric keys E to M . The number keys 0 through 100 input the value directly. The + and − keys increase or decrease the value by 1. The +/− key may be used to reverse the throw direction.

If you are not sure what you are changing, hold the stick to one side and press different keys — if there is no effect, move the aileron stick to the other side and continue. Your setting may vary from −100 to +100%, the initial value is +50%.

Now set the travel for the Right throw on Flap 1. Press the D key to activate travel setting, and set the throw with the numeric keys as before.

Flap 2 Left Travel Setting

You now set the amount of mixing throw for Flap 2. Press the NXT Q key to get to the flap 2 menu, then press the C key to activate travel setting for the Left direction and set the throw with the numeric keys E to M as you did for Flap 1.

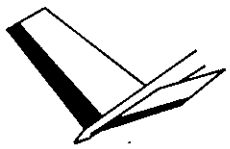
Now set the travel for the Right throw on Flap 2. Press the D key to activate travel setting, and set the throw with the numeric keys as before.

On/Off Switch Setting

On initial setting, an activation switch for speed flap mixing is not set, meaning that once activated, it is on all the time. If you would like to set a switch to turn it on and off, call the Switch Setting screen by pressing the SWT P key. Then use the keys to choose the desired switch location and on direction. For more information on the switch setting method, see page 37).

V-TAIL (VTL)

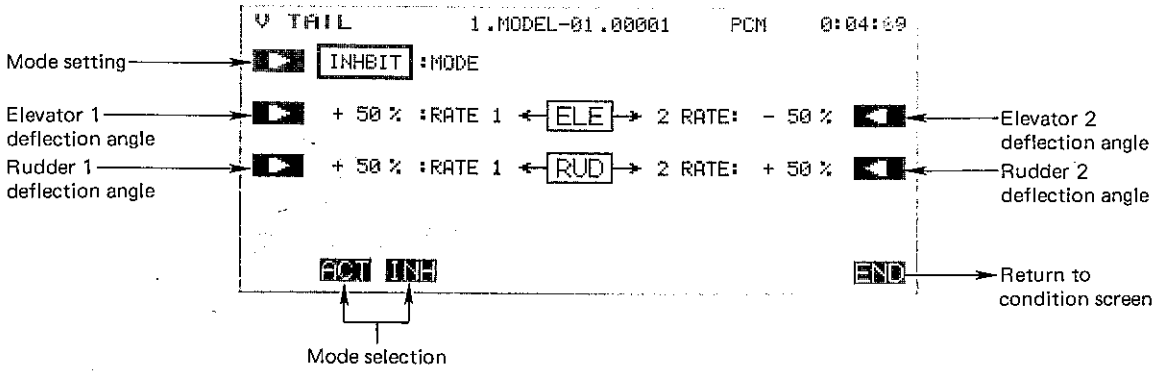
This function automatically sets up the PCM 1024Z to control a V-tail sailplane with combined elevator and rudder functions. It requires two servos, one hooked up to receiver output CH2 (elevator 1/rudder 2) and the second plugged into CH4 (elevator 2/rudder 1). The elevator and rudder deflections can be adjusted independently.



Setting Up V-Tail Mixing

Activation of command

In the Condition Menu, press the VTL key to get the V-TAIL Mixing menu shown below. Use the A (▶) key to activate mode setting, then press the ACT or INH keys (F and G) to activate or inhibit V-Tail Mixing.



Setting the Elevator Rates — 1 and 2

Begin by setting the rate for Elevator 1. Press the B key to activate rate setting for Elevator 1 and set the rate with the numeric keys E to M. The number keys 0 through 100 input the value directly. The + and − keys increase or decrease the value by 1. The +/− key may be used to reverse the throw direction.

If you are not sure what you are changing, hold the stick to one side and press different keys — if there is no effect, move the elevator stick to the other side and continue. Your setting may vary from −100 to +100%, the initial value is set to +50%.

Now set the rate for Elevator 2. Press the O key to activate Elevator 2 rate setting and set the rate with the numeric keys as before.

Setting the Rudder Rates — 1 and 2

You now set the rate for Rudder 1. Press the C key to activate rate setting for Rudder 1 and set the rate with the numeric keys E to M as before.

If you are not sure what you are changing, hold the rudder stick to one side and press different keys ← if there is no effect, move the rudder stick to the other side and continue. The initial value is +50%, but your setting may vary from −100 to +100%.

Now set the rate for Rudder 2. Press the P key to activate Rudder 2 rate setting and set the rate with the numeric keys as before.

Checking Your Work

After you have set up the V-Tail rates, be sure that they move the correct directions. For up elevator command, both V-tails should move upward. For right rudder command, the trailing edge of both surfaces should move to the right. If they do not, use the +/− to reverse the direction as needed.

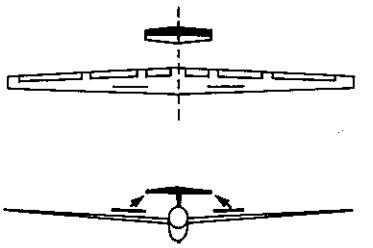
Use the END (N) key to leave this menu.

AIRBRAKE/SPOILER/GEAR TRIM COMPENSATION (ABE)

This mixing is used to compensate for trim changes when airbrakes, spoilers, or landing gear are operated. It may be used to correct dropping or raising of the nose by adding suitable elevator compensation.

The mixing rate to elevator can be adjusted independently at the high and low sides of the stick operation. If desired, the mixing neutral position can be offset from the air brake neutral position.

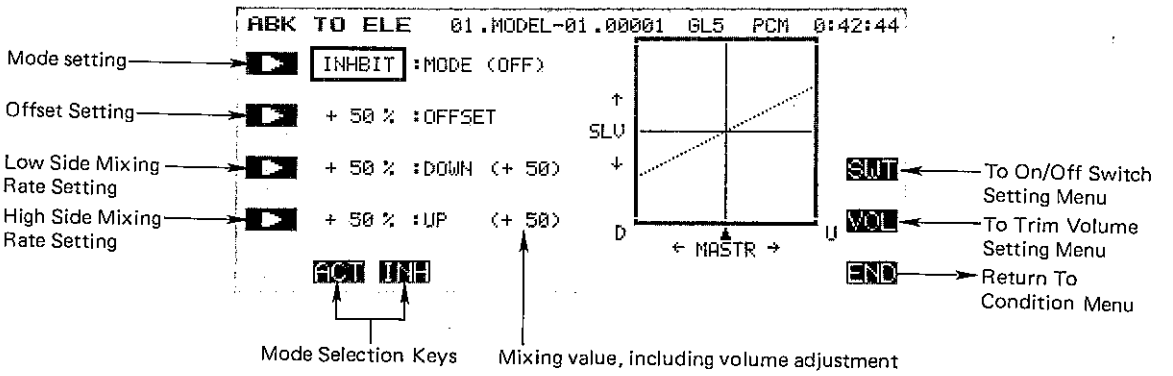
Airbrake compensation mixing can be turned on and off during flight if a switch is defined, otherwise, if activated it remains on always. The amount of mixing can also be trimmed by setting a volume control.



Setting Up Airbrake Mixing

Activation of command

In the Condition Menu, press the ABE key to get the ABK TO ELE menu as shown below.



Mode Setting

Use the A (▶) key to activate mode setting, then press the ACT or INH keys (F and G) to activate or inhibit airbrake mixing.

Offsetting the Mixing Neutral Location

Press the B key. Then set the airbrake control to the desired offset position and press the SET F key.

Setting the Low-Side Mixing Rate

Press the C key, and then set the low-side mixing rate with the numeric keys E to M . The setting range may vary from −100 to +100% and the initial value is +50%.

High Side Mixing Rate Setting

Press the D key and set the rate with the numeric keys E to M . The setting range may vary from −100 to +100% and the initial value is +50%.

ON/OFF Switch Setting

An ON/OFF switch is not defined initially. To define one, display the switch setting screen by pressing the SWT P key. Use the keys to choose the switch and ON direction you want. For a description of the switch setting method, see page 37.

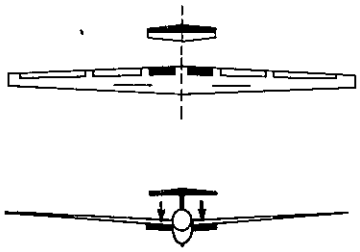
Mixing Rate Trim Volume Selection and Operating Direction

A mixing rate volume control is not defined initially. To define one, display the volume setting screen by pressing the VOL O key. For a description of the volume setting method, see page 37. The volume control adjusts ±25% of the set mixing rate.

ELEVATOR→BRAKE FLAP MIXING (EBF)—5-S

This mixing is used to command the lowering of the brake flaps when up elevator is given. This coupling increases the lift that the wing can deliver, resulting in tighter turns and better maneuverability.

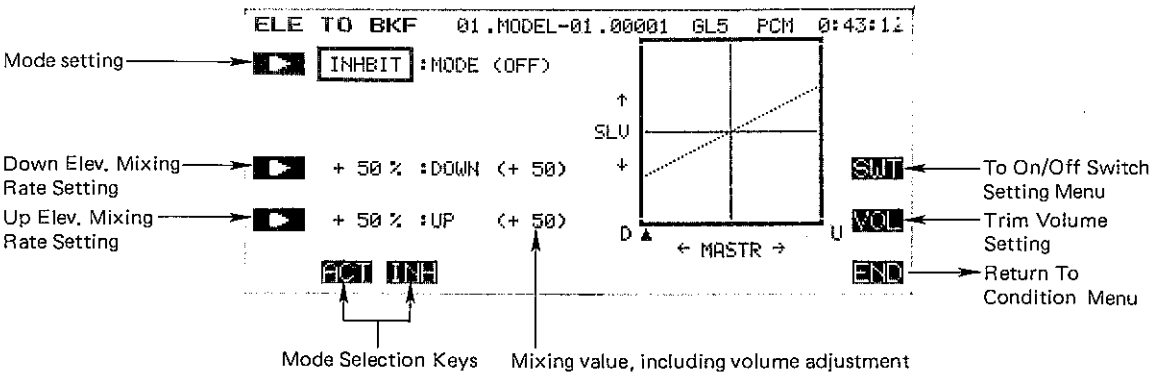
The mixing rates for elevator up and down deflections can be set independently (for many airfoils, down elevator to up flap mixing is not recommended because of a large drag increase). Mixing can be turned on and off during flight by setting a switch, and the amount of mixing may also be trimmed in flight by moving a volume control.



Setting Up Elevator-Brake Flap Coupling

Activation of command

In the Condition Menu, press the EBF key to get the ELE TO BKF menu, as shown below.



Use the A (▶) key to activate mode setting, then press the ACT or INH keys (F and G) to activate or inhibit brake flap coupling.

Setting the Down Elevator Mixing Rate

Press the C key, and then set the down elevator mixing rate with the numeric keys E to M . The setting range may vary from —100 to +100% and the initial value is +50%.

Up Elevator Mixing Rate Setting

Press the D key and set the up elevator mixing rate with the numeric keys E to M . The setting range may vary from —100 to +100% and the initial value is +50%.

ON/OFF Switch Setting

Display the switch setting screen by pressing the SWT P key. Initially, SW (C) is set to be ON at 1 position, but you may use the keys to choose the switch and ON direction you want. For a description of the switch setting method, see page 37.

Mixing Rate Trim Volume Selection and Operating Direction

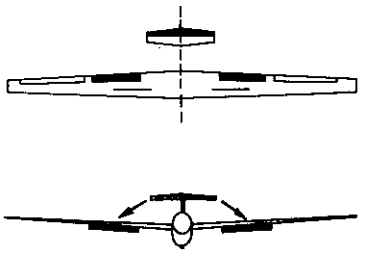
A mixing rate volume control is not defined initially. To define one, display the volume setting screen by pressing the VOL O key. For a description of the volume setting method, see page 37. The volume control adjusts ±25% of the set mixing rate.

Use the END (N) key to leave this menu.

ELEVATOR→SPEED FLAP COUPLING (ESF)—4-S

This mixing is used to command the lowering of the speed flaps when up elevator is given. This coupling increases the lift that the wing can deliver, resulting in tighter turns and better maneuverability.

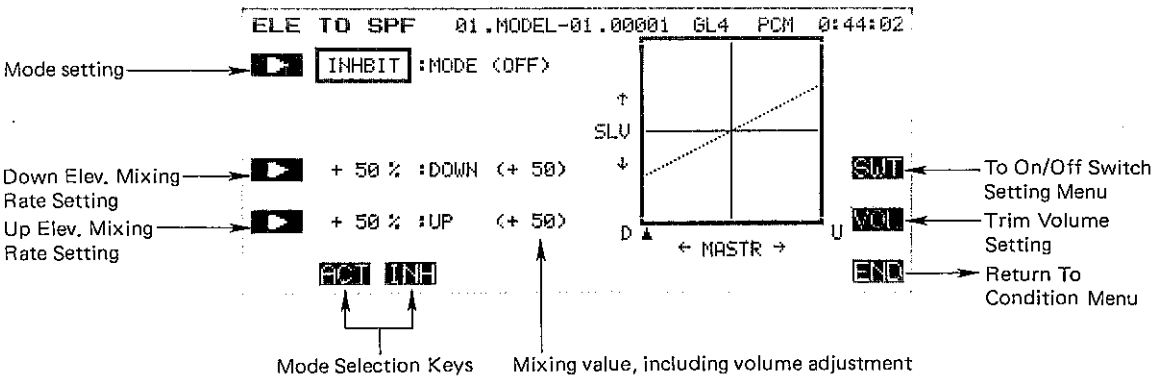
The mixing rates for elevator up and down deflections can be set independently (for many airfoils, down elevator to up flap mixing is not recommended because of a large drag increase). Mixing can be turned on and off during flight by setting a switch, and the amount of mixing may also be trimmed in flight by moving a volume control.



Setting Up Elevator-Speed Flap Coupling

Activation of command

In the Condition Menu, press the ESF key to get the ELE TO SPF menu, as shown below.



Use the A (▶) key to activate mode setting, then press the ACT or INH keys (F and G) to activate or inhibit speed flap coupling.

Setting the Down Elevator Mixing Rate

Press the C key, and then set the down elevator mixing rate with the numeric keys E to M . The setting range may vary from −100 to +100% and the initial value is +50%.

Up Elevator Mixing Rate Setting

Press the D key and set the up elevator mixing rate with the numeric keys E to M . The setting range may vary from −100 to +100% and the initial value is +50%.

Choosing An ON/OFF Switch

Display the switch setting screen by pressing the SWT P key. Initially, SW (C) is set to be ON at 1 position, but you may use the keys to choose the switch and ON direction you want. For a description of the switch setting method, see page 37.

Mixing Rate Trim Volume Selection and Operating Direction

A mixing rate volume control is not defined initially. To define one, display the volume setting screen by pressing the VOL O key. For a description of the volume setting method, see page 37. The volume control adjusts ±25% of the set mixing rate.

Use the END (N) key to leave this menu.

BRAKE FLAP MIXING (BKF)—5-S

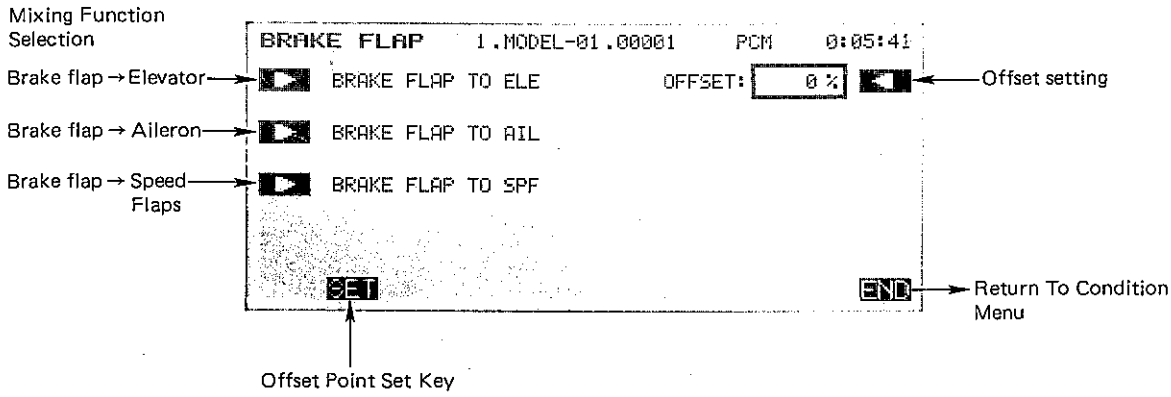
This function is used to define the following types of brake flap mixing:

Brake flap → elevator mixing
Brake flap → aileron mixing
Brake flap → speed flaps mixing

These mixing functions are useful for compensating for flap actuation trim changes, increasing the lift capability of the wing, making tighter turns, and increasing maneuverability. The mixing neutral position can be offset from the brake flaps neutral position.

Activation of Brake Flap Mixing

In the Condition Menu, press the BKF key to get the BRAKE FLAP menu, as shown below.



Offsetting the Mixing Neutral Location

Press the R key. Then set the brake control to the desired offset position and press the SET F key.

Mixing Selection

Brake Flap → Elevator Mixing may be set up by pressing the A key. For a description of the setting method, see page 133 follwoing.

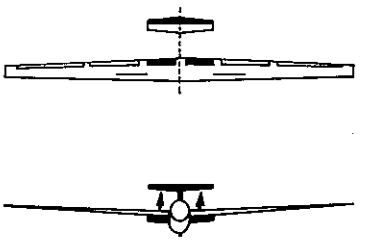
Brake Flap → Aileron Mixing: use the B key to call the setting screen. For a description of the setting method, see page 134.

Brake Flap → Speed Flaps Mixing: call the setting screen by pressing the C key. A description of the setting method may be found on page 135.

BRAKE FLAP→ELEVATOR MIXING —5-S

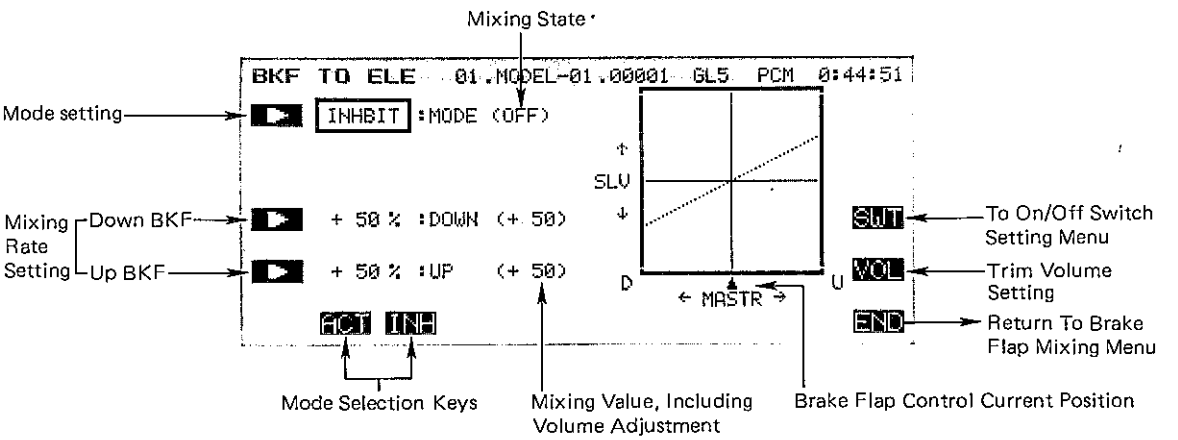
This function is used to correct the trim change that occurs when the brake flaps are moved by applying a small amount of elevator. For example, if the fuselage pitches up when the brake flaps are actuated, the elevator is commanded down simultaneously.

The mixing rates for up and down brake flap commands can be set independently. Mixing can be turned on and off during flight by setting a switch, and you may also define a volume control to change the mixing rate in flight. Brake flap mixing remains on all the time unless an ON/OFF switch is defined.



Activation of Brake Flap→Elevator Mixing

In the Condition Menu, press the BKF key to get the BRAKE FLAP menu. Press the A key to get the BKF TO ELE menu shown below.



Use the A (▶) key to activate mode setting, then press the ACT or INH keys (F and G) to activate or inhibit brake flap coupling.

Setting the Down Brake Flap Mixing Rate

Press the C key, and then set the down elevator mixing rate with the numeric keys E to M. The setting range may vary from –100 to +100% and the initial value is +50%.

Up Brake Flap Mixing Rate Setting

Press the D key and set the up elevator mixing rate with the numeric keys E to M. The setting range may vary from –100 to +100% and the initial value is +50%.

ON/OFF Switch Setting

On initial setting, an activation switch for brake flap-elevator mixing is not set, meaning that once activated, it is on all the time. If you would like to set a switch to turn it on and off, display the switch setting screen by pressing the SWT P key, and use the keys to choose the switch and ON direction you want. For a description of the switch setting method, see page 37.

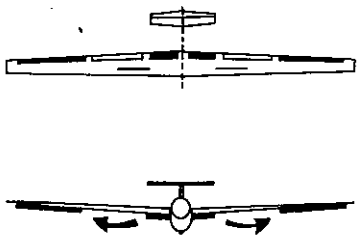
Mixing Rate Trim Volume Selection and Operating Direction

Display the volume setting screen by pressing the VOL O key. For a description of the volume setting method, see page 37. The volume control adjusts ±25% of the set mixing rate.

BRAKE FLAP→AILERON MIXING—5-S

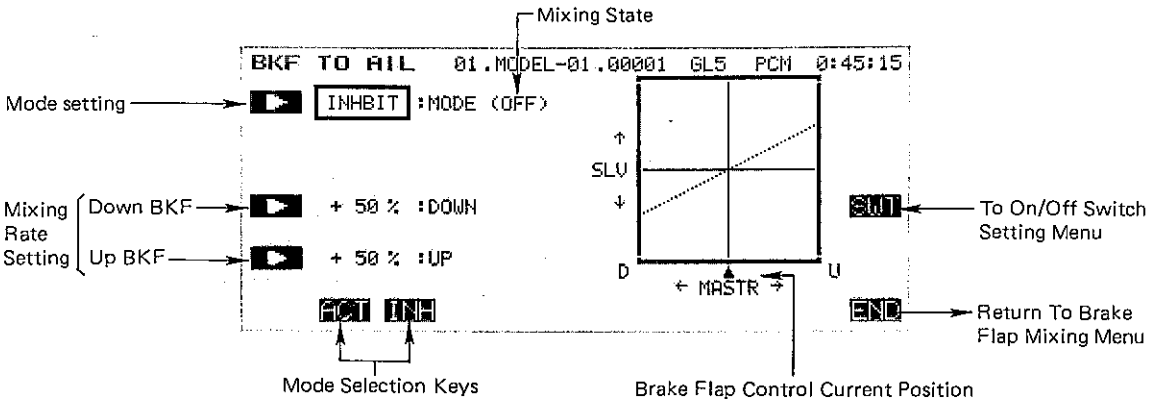
This mixing is used to make the ailerons operate together as brake flaps. When the brake flaps are deployed, the brake flaps and ailerons all perform the brake flap operation simultaneously.

The mixing rates for up and down brake flap movement can be set independently. You may also set up a switch for switching this mixing on and off during flight. If this mixing is activated without defining an ON/OFF switch, mixing remains on all the time.



Activation of Brake Flap→Aileron Mixing

In the Condition Menu, press the BKF key to get the BRAKE FLAP menu. Press the B key to get the BKF TO AIL menu shown below.



Use the A (▶) key to activate mode setting, then press the ACT or INH keys (F and G) to activate or inhibit brake flap coupling.

Setting the Down Brake Flap Mixing Rate

Press the C key, and then set the down aileron mixing rate with the numeric keys E to M . The initial value is +50% and the setting range may vary from −100 to +100%.

Up Brake Flap Mixing Rate Setting

Press the D key and set the up aileron mixing rate with the numeric keys E to M . The setting range may vary from −100 to +100% and the initial value is +50%.

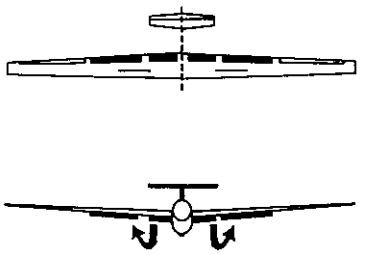
ON/OFF Switch Setting

On initial setting, an activation switch for brake flap-aileron mixing is not set, meaning that once activated, it is on all the time. If you would like to set a switch to turn it on and off, display the switch setting screen by pressing the SWT P key, and use the keys to choose the switch and ON direction you want. For a description of the switch setting method, see page 37.

BRAKE FLAP→SPEED FLAP MIXING—5-S

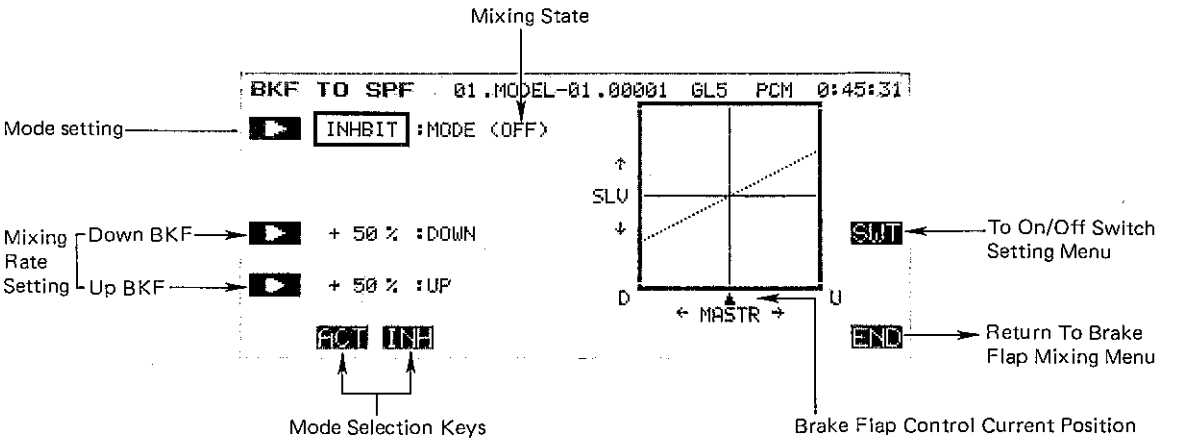
This mixing is used to make the speed flaps operate together as brake flaps. When the brake flaps are deployed, the brake flaps and speed flaps all perform the brake flap operation simultaneously.

The mixing rates for up and down brake flap movement can be set independently. You may also set up a switch for switching this mixing on and off during flight. If this mixing is activated without defining an ON/OFF switch, mixing remains on all the time.



Activation of Brake Flap→Speed Flap Mixing

In the Condition Menu, press the BKF key to get the BRAKE FLAP menu. Press the C key to get the BKF TO SPF menu shown below.



Use the A (▶) key to activate mode setting, then press the ACT or INH keys (F and G) to activate or inhibit brake flap coupling.

Setting the Down Brake Flap Mixing Rate

Press the C key, and then set the down speed flap mixing rate with the numeric keys E to M . The initial value is +50% and the setting range may vary from −100 to +100%.

Up Brake Flap Mixing Rate Setting

Press the D key and set the up speed flap mixing rate with the numeric keys E to M . The setting range may vary from −100 to +100% and the initial value is +50%.

ON/OFF Switch Setting

On initial setting, an activation switch for brake flap-speed flap mixing is not set, meaning that once activated, is on all the time. If you would like to set a switch to turn it on and off, display the switch setting screen by pressing the SWT P key, and use the keys to choose the switch and ON direction you want. For a description of the switch setting method, see page 37.

SPEED FLAP MIXING (SPF)—4-S

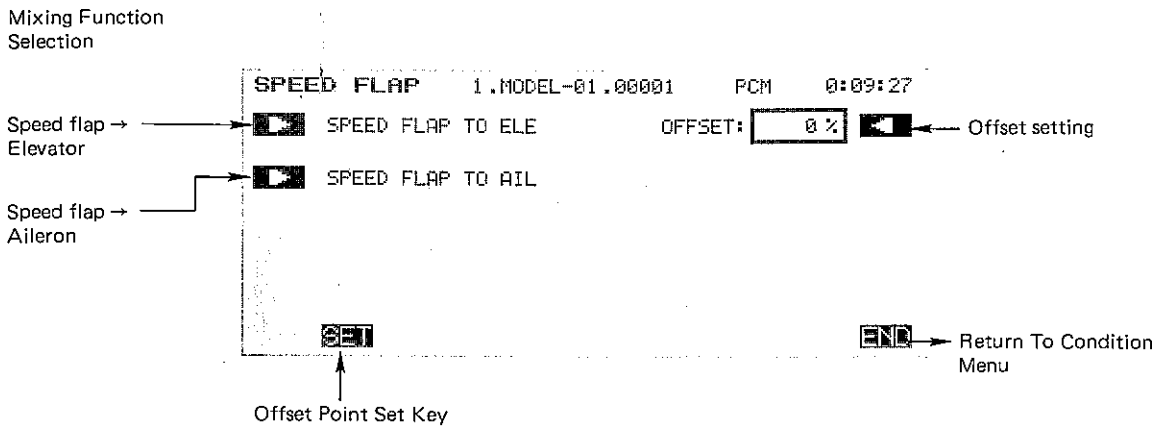
This function is used to define the following types of speed flap mixing:

Speed flap → elevator mixing
Speed flap → aileron mixing

These mixing functions are useful for compensating for flap actuation trim changes, increasing the lift capability of the wing, making tighter turns, and increasing maneuverability. The mixing neutral position can be offset from the speed flaps neutral position.

Activation of Speed Flap Mixing

In the Condition Menu, press the SPF key to get the SPEED FLAP menu, as shown below.



Offsetting the Mixing Neutral Location

Press the R key. Then set the speed flap control to the desired offset position and press the SET F key.

Mixing Selection

Choose from the two types of mixing as given below.

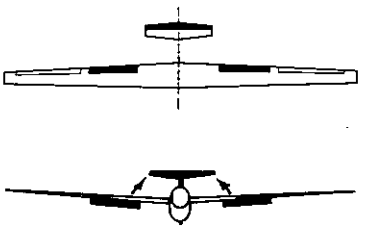
To set Speed Flap → Elevator Mixing, call up the setting screen by pressing the A key. For a description of the setting method, see page 137 following.

Speed Flap → Aileron Mixing: use the B key to call the setting screen. For a description of the setting method, see page 138.

SPEED FLAP→ELEVATOR MIXING—4-S

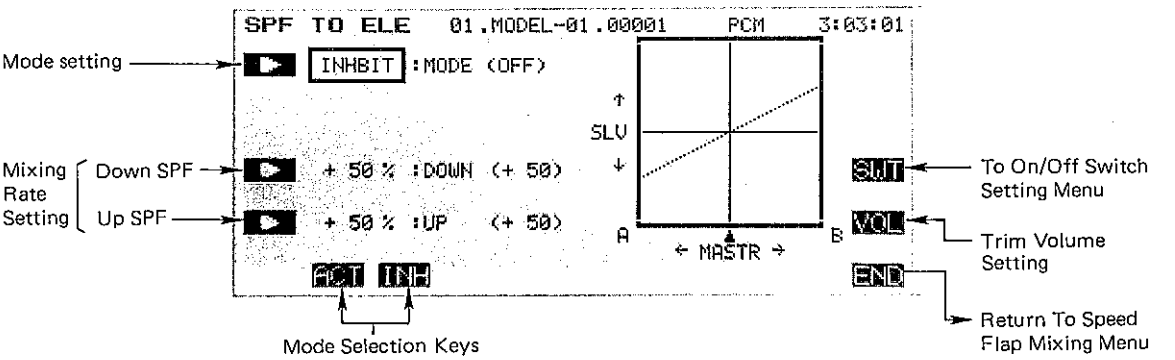
This function is used to correct the trim change that occurs when the speed flaps are moved by applying a small amount of elevator. For example, if the fuselage pitches up when the speed flaps are actuated, the elevator is commanded down simultaneously.

The mixing rates for up and down speed flap commands can be set independently. Mixing can be turned on and off during flight by setting a switch, and you may also define a volume control to change the mixing rate in flight. Speed flap mixing remains on all the time unless an ON/OFF switch is defined.



Activation of Speed Flap→Elevator Mixing

In the Condition Menu, press the SPF key to get the SPEED FLAP menu. Press the A key to get the SPF TO ELE menu shown below.



Use the A (▶) key to activate mode setting, then press the ACT or INH keys (F and G) to activate or inhibit speed flap coupling.

Setting the Down Speed Flap Mixing Rate

Press the C key, and then set the down elevator mixing rate with the numeric keys E to M . The setting range may vary from −100 to +100% and the initial value is +50%.

Up Speed Flap Mixing Rate Setting

Press the D key and set the up elevator mixing rate with the numeric keys E to M . The setting range may vary from −100 to +100% and the initial value is +50%.

ON/OFF Switch Setting

On initial setting, an activation switch for speed flap-elevator mixing is not set, meaning that once activated, it is on all the time. If you would like to set a switch to turn it on and off, display the switch setting screen by pressing the SWT P key, and use the keys to choose the switch and ON direction you want. For a description of the switch setting method, see page 37.

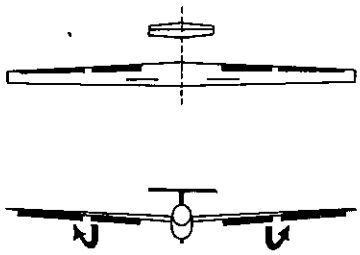
Mixing Rate Trim Volume Selection and Operating Direction

Display the volume setting screen by pressing the VOL O key. For a description of the volume setting method, see page 37. The volume control adjusts ±25% of the set mixing rate.

SPEED FLAP→AILERON MIXING—4-S

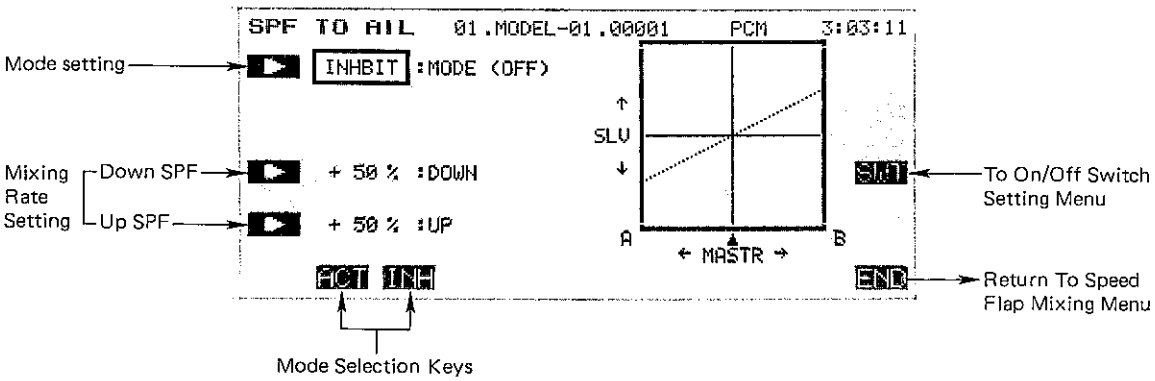
This mixing is used to make the ailerons operate together as speed flaps. When the speed flaps are deployed, the speed flaps and ailerons all perform the speed flap operation simultaneously.

The mixing rates for up and down speed flap movement can be set independently. You may also set up a switch for switching this mixing on and off during flight. If this mixing is activated without defining an ON/OFF switch, mixing remains on all the time.



Activation of Speed Flap→Aileron Mixing

In the Condition Menu, press the SPF key to get the SPEED FLAP menu. Press the B key to get the SPF TO AIL menu shown below.



Use the A (▶) key to activate mode setting, then press the ACT or INH keys (F and G) to activate or inhibit speed flap coupling.

Setting the Down Speed Flap Mixing Rate

Press the C key, and then set the down aileron mixing rate with the numeric keys E to M . The initial value is +50% and the setting range may vary from −100 to +100%.

Up Speed Flap Mixing Rate Setting

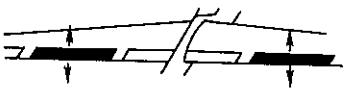
Press the D key and set the up aileron mixing rate with the numeric keys E to M . The setting range may vary from −100 to +100% and the initial value is +50%.

ON/OFF Switch Setting

On initial setting, an activation switch for speed flap-aileron mixing is not set, meaning that once activated, it is on all the time. If you would like to set a switch to turn it on and off, display the switch setting screen by pressing the SWT P key, and use the keys to choose the switch and ON direction you want. For a description of the switch setting method, see page 37.

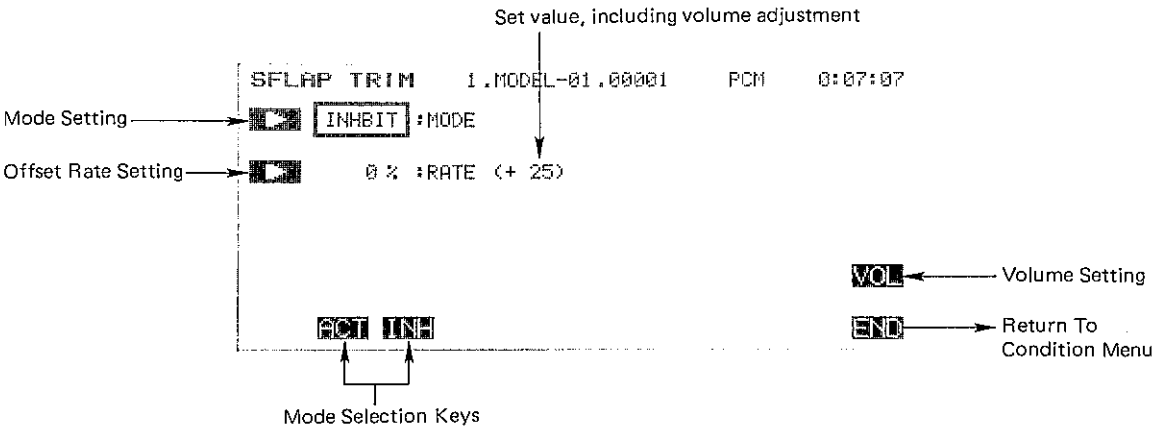
SPEED FLAP TRIM SETTING (SFT)—4-S/5-S

The Speed Flap Trim Setting function may be used to adjust the speed flap neutral position. The offset can be trimmed by setting a volume. However, the right knob RD is set at initial setting.



Activation of Speed Flap Trim

In the Condition Menu, press the SFT key to get the SFLAP TRIM menu.



Mode Setting

Use the A (▶) key to activate mode setting, then press the ACT or INH keys (F and G) to activate or inhibit speed flap trim setting.

Offsetting the Mixing Neutral Location

Press the B key, then set the rate with the numeric keys E to M . The initial value is 0%, but the setting may vary from −100 to +100%.

Offset Rate Trim Volume Selection and Operating Direction Setting

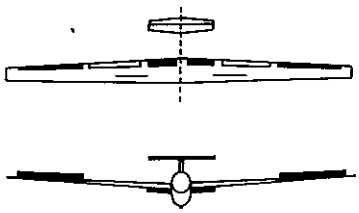
At initial setup, the right knob RD is defined as the trim volume control, and the adjustment rate is ±25%. To change this, call the volume setting screen by pressing the VOL O key. For a description of the volume setting method, see page 37.

BUTTERFLY MIXING (BFY)—4-S/5-S

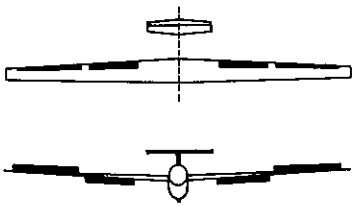
Butterfly mixing, sometimes canned "crow" mixing, is a way to get effective glide path control without using spoilers. The butterfly action simultaneously raises the left and right ailerons and lowers the speed flaps (brake flaps for 5-S).

The total travel can be adjusted by CH6 volume. The butterfly neutral position can be offset from the center position. Butterfly mixing can be turned on and off during flight by setting a switch. If a switch is not set, mixing remains on all the time.

5-S BUTTERFLY OPERATION



4-S BUTTERFLY OPERATION



Setting Up Butterfly Mixing

Butterfly is often controlled with the throttle stick, but at initiation the control is assigned to the left knob VR(A). The FNC command in the Model menu may be used to change the assignment. In that menu, select SF2 with the J key, then press CTR. Select the throttle stick by choosing J3 with the K key (null the CTR for airbrake ABK if you want). At this time, be sure that both ailerons and speed flaps (or brake flaps for 5-S) move the proper directions. The default speed flap control is the left slider. If you use speed flap-aileron mixing, this will become the camber control.

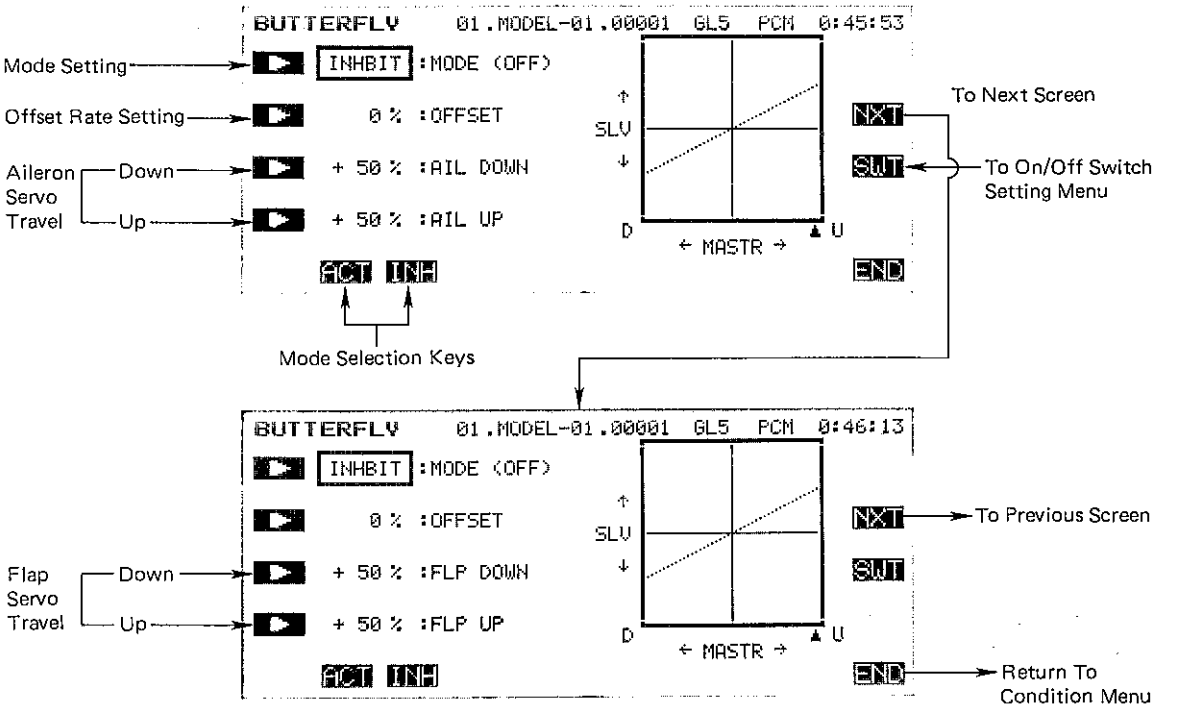
Activation of command

In the Condition Menu, press the BFY key to get the BUTTERFLY menu, as shown in the figure.

Mode Setting

Press the A key to activate mixing, then press the ACT or INH key (F or G) to activate or inhibit the butterfly function. When you activate, you will notice two things: first, all four wing servos move, unless the throttle stick happens to be at center. Second, the Alarm light begins flashing. The alarm light is on whenever BFY is active. This is OK, except the transmitter will beep if it is on when first powered up. This is annoying, because you can't stop it!

In just a moment, you will set the offset position for the butterfly stick. The alarm light and beeping at startup may be taken care of two ways: either an activation switch may be defined, or the on position may be set slightly away from the zero-butterfly position. In the latter case, the function is off until the stick is moved slightly.



Offset Position Setting

This sets the position where butterfly begins working. Press the B key, then set the butterfly control (throttle stick or left side knob) to the position to be set and press the F (SET) key. We recommend one or two clicks down from the high throttle position.

Aileron Servo Down Side Travel Setting

Press the C key and set the rate with the numeric keys E to M . The setting range may vary from −100 to +100% and the initial value is +50%. If you set the BFY to be activated with the throttle stick moving down from the top (full throttle) position, this setting has no effect because motion is all on the Up side.

Aileron Servo Up Side Travel Setting

Press the D key and set the rate with the numeric keys E to M . The setting range may vary from −100 to +100% and the initial value is +50%. If you set the BFY with the throttle stick, this setting is the important one.

Flaps Servo Down Side Travel Setting

Press the NXT Q key to get to the flap setting menu. Then press the C key and set the rate with the numeric keys E to M . The setting range may vary from −100 to +100% and the initial value is +50%. If you set up with throttle stick, this setting has no effect.

Flaps Servo Up Side Travel Setting

Press the D key and set the rate with the numeric keys E to M . The setting range may vary from −100 to +100% and the initial value is +50%. This is the effective setting to make if throttle stick is used as mentioned before.

ON/OFF Switch Setting

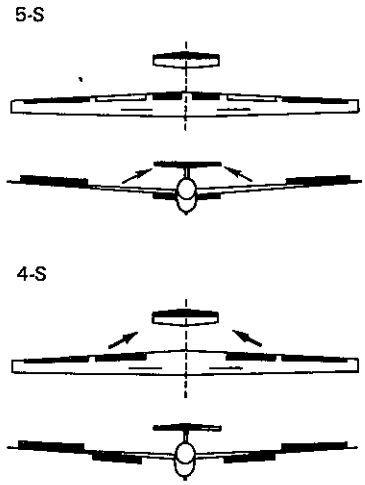
An ON/OFF switch is not defined initially. To define one, display the switch setting screen by pressing the SWT P key. Use the keys to choose the switch and ON direction you want. For a description of the switch setting method, see page 40.

If you want BFY on all the time but don't like the alarm, press the SWT P key, then press the STK O key, to get to the stick setting menu. Choose the throttle stick J8 and set it just above the offset position. Press the SET Q button to input the On position, then move the throttle stick to be sure. You may need to switch direction with the +/− P key.

BUTTERFLY TRIM MIX (BYE)—4-S/5-S

Butterfly trim mixing uses elevator motion to correct any change in model attitude when butterfly is activated. The CH6 volume up side and down side correction rates can be set independently.

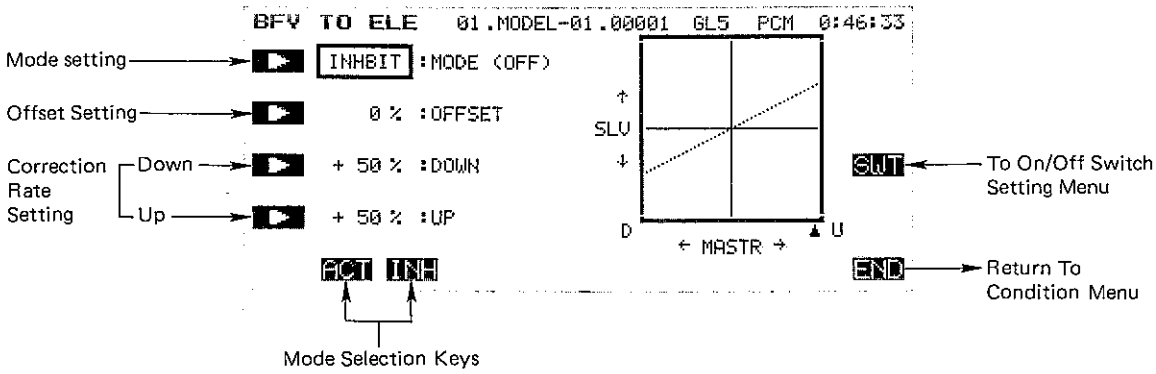
The correction neutral position can be offset to a point different from the butterfly neutral position, but it should be matched to the butterfly mixing offset point. Butterfly trim mixing can be turned on and off during flight by setting a switch.



Setting Up Butterfly Trim Mixing

Activation of command

In the Condition Menu, press the BYE key to get the BFY TO ELE menu as shown below.



Mode Setting

Use the A (▶) key to activate mode setting, then press the ACT or INH keys (F and G) to activate or inhibit batterfly trim mixing.

Offsetting the Mixing Neutral Location

Press the B key. Then set the butterfly control to the desired offset position (usually where it begins working) and press the SET F key.

Down Side Correction Rate Setting

Press the C key and set the rate with the numeric keys E to M . The setting range may vary from −100 to +100% and the initial value is +50%. If you use BFY on throttle as described previously, this may not do anything.

Up Side Correction Rate Setting

Press the D key and set the rate with the numeric keys E to M . The setting range may vary from −100 to +100% and the initial value is +50%.

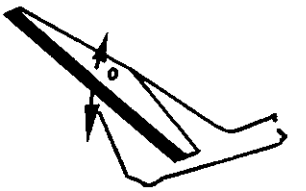
ON/OFF Switch Setting

An ON/OFF switch is not defined initially, so the mixing will be on all the time. To define one, display the switch setting screen by pressing the SWT P key. Use the keys to choose the switch and ON direction you want. For a description of the switch setting method, see page 37.

ELEVATOR TRIM (ETM)—2-S/5-S

The two Elevator Trim functions program an elevator offset position which may be called by a switch, for example to set the elevator position for thermalling or cruising. The two offsets may be set independently. Elevator trim 2 has priority.

To prevent a sudden trim change when the elevator trim is switched, a delay time can be entered. The amount of offset may be changed in flight by moving a volume control.



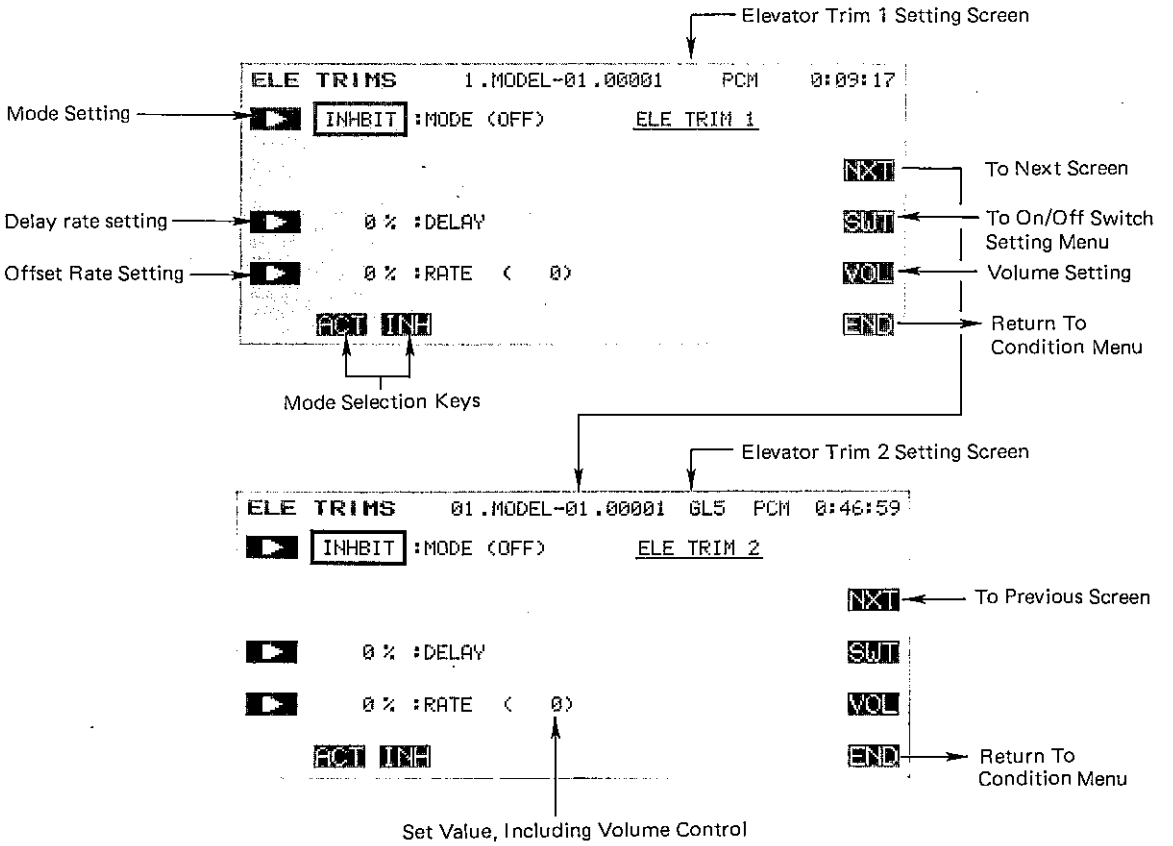
Activation of command

In the Condition Menu, press the ETM key to get the ELE TRIMS menu, as shown in the figure.

Mode Setting

The same procedure is used to program both Trim 1 and Trim 2 settings. To switch between the elevator trim 1 and 2 setting screens, press the NXT O key.

Press the A key to activate mixing, then press the ACT or INH key (F or G) to activate or inhibit the elevator trim function.



Delay Rate Setting

Press the C key and enter the rate with the numeric keys F to M . The delay may vary from 0 to 100% (the initial value is 0%). A 100% delay takes about five seconds to move full travel.

Entering the Preset Position

Press the D key and set the rate with the numeric keys E to M . The setting range may vary from −100 to +100% and the initial value is 0%. Press the number you want. Caution: use small numbers as elevator trim changes are very effective!

ON/OFF Switch Setting

An ON/OFF switch is not defined initially. To define one, display the switch setting screen by pressing the SWT P key. Use the keys to choose the switch and ON direction you want. For a description of the switch setting method, see page 37.

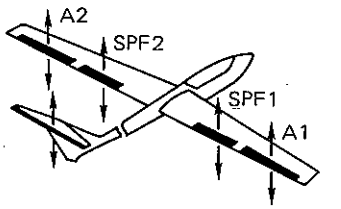
Mixing Rate Trim Volume Selection and Operating Direction

A mixing rate volume control is not defined initially. To define one, display the volume setting screen by pressing the VOL O key. For a description of the volume setting method, see page 37. The volume control adjusts ±25% of the set mixing rate.

TRIM MIX 1 (TM1) & TRIM MIX 2 (TM2) — 4-S
TRIM PRESETS CALLED BY A SWITCH

The Trim Mix 1 & 2 function are used to program a preset position of the ailerons, elevator, and speed flaps with the use of a switch. They can be used to program setting for different flight conditions. For example, Trim mix 1 could be set up for launching, with speed flaps and ailerons drooped, and a slight amount of up elevator. Trim mix 2 might be used for high speed flying, with both ailerons and speed flaps reflexed slightly, and a bit of down elevator.

The Trim Mix functions can be activated during flight by setting a switch (trim mix 2 has priority). To prevent sudden trim changes when switching flight conditions, a delay can be set to provide a smooth transition between the two. This might be used during launch, so the flaps don't suddenly come back to neutral position and dump the lift all at once.

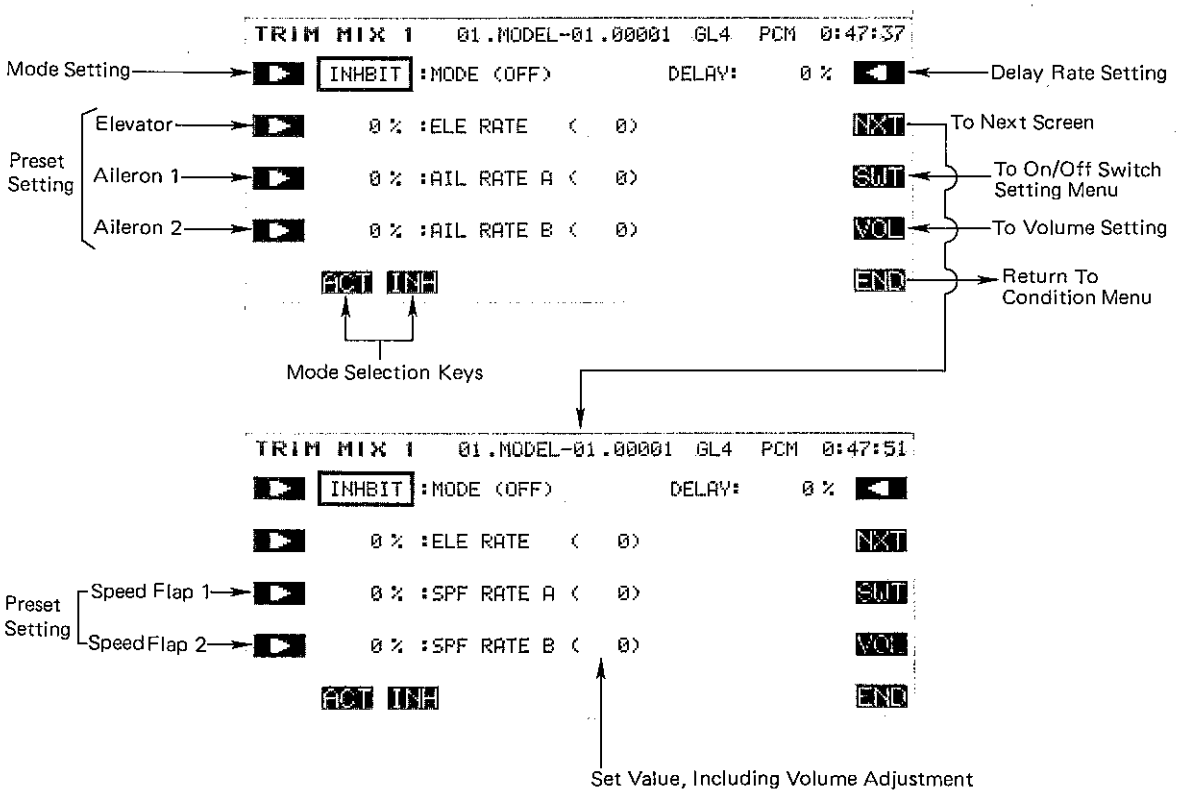


The presets as a group can be adjusted by moving a volume control. When this is done, each servo is adjusted at the same rate.

Setting Up Trim Mixing

Activation of command

In the Condition Menu, press the TM1 (or TM2) key to get the TRIM MIX 1 (or 2) menu (Trim Mix 1 is shown in the figure).



Mode Setting

Press the A key to activate mixing, then press the ACT or INH key (F or G) to activate or inhibit the trim mix 1 (or 2) function. Now you will input the desired presets for the elevator, ailerons, and speed flaps.

Setting the Elevator Preset Amount

Press the B key and set the rate with the numeric keys E to M . The initial preset value is set to 0%, but may vary from −100 to +100%.

Entering the Aileron 1 Servo Preset Amount

Press the C key and set the rate with the numeric keys E to M . The setting range may vary from −100 to +100% and the initial value is 0%.

Aileron 2 Servo Preset Inputting

Press the D key and set the rate with the numeric keys E to M , as before. If your linkages and horns are identical, this setting should be the same as for Aileron 1.

Speed Flap 1 Preset

To get to the Flap preset inputting menu, press the NXT Q key. Then press the C key and set the rate with the numeric keys E to M . As with the ailerons, the initial value is set to 0%, but may vary from −100 to +100%.

Speed Flap 2 Preset

Press the D key and set the rate with the numeric keys E to M , as before. If your linkages and horns are identical, this setting should be the same as for Speed Flap 1.

Delay Rate Setting

Press the R key and set the rate with the numeric keys F to M . The initial delay is set to 0%, but may vary from 0 to 100%. A 100% delay takes about five seconds to complete changing.

ON/OFF Switch Setting

An ON/OFF switch is not defined initially. To define one, display the switch setting screen by pressing the SWT P key. Use the keys to choose the switch and ON direction you want. For a description of the switch setting method, see page 37.

We recommend using the three-position switch for Trim Mix activation. The lower position is usually defined to be the launch mode (use TM1), middle position is normal, and the upper position is used for the speed settings (use TM2).

If you use the three position switch, you will want to activate Trim mix on the middle position also. This will give the delay in switching both to and From the trim mix.

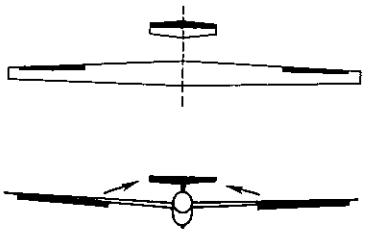
Trim Volume Control and Direction Setting

You may adjust all the presets as a group, but a volume control is not defined initially. Call the volume setting screen by pressing the VOL Q key. The volume setting method is described on page 37. The volume control adds or subtracts ±25% from all the preset positions.

FLAP-ELEVATOR MIX (F→E)—2-S

This function is used to compensate for trim changes when flaps are deployed for slow flight or landing by mixing in a small movement of elevator. The elevator should be adjusted to move only a small deflection amount: too much elevator can make the model difficult to control.

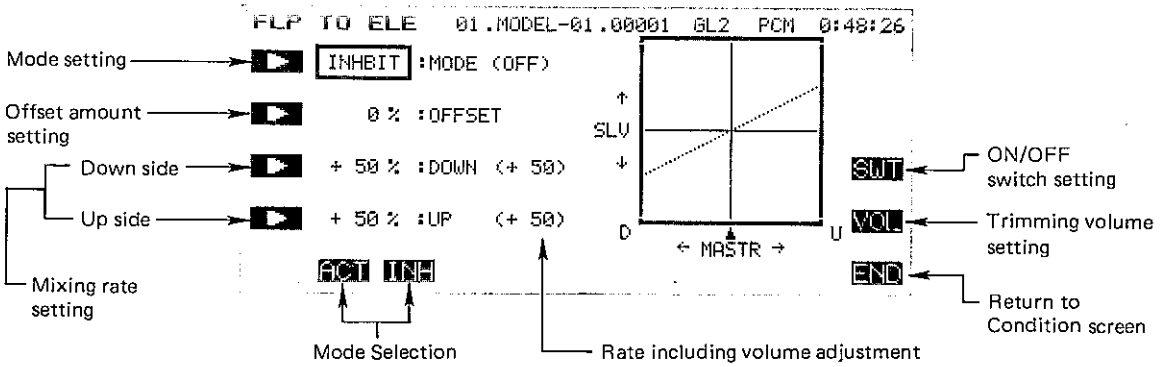
The amount of correction can be adjusted separately for both positive and negative flap inputs, and the neutral mixing position can be offset from the flap neutral position. Flap-to-elevator mixing can be turned on and off during flight by setting a switch, but if an ON/OFF switch is not set, it remains on all the time. The amount of mixing can be changed by setting a volume control.



Setting Up Flap-to-Elevator Mixing

Activation of command

In the Condition Menu, press the F→E key to get the FLP TO ELE menu shown below.



Use the A (▶) key to activate mode setting, then press the ACT or INH keys (F and G) to activate or inhibit flap-to-elevator coupling.

Offset Position Setting

Use the B (▶) key to activate offset setting mode. Then set the flap control to the offset position, and press the SET key F to store the desired position in memory.

Setting the Mixing Ratio – Down and Up Side

You now set the amount of mixing for down flap command. Press the C key to activate mixing ratio for the down direction and set the value with the numeric keys E to M . The number keys 0 through 100 input the value directly. The + and − keys increase or decrease the value by 1. The +/− key may be used to reverse the throw direction. Your setting may vary from −100 to +100%, the initial value is set to +50%.

Now set the amount of mixing for the up flap command. Press the D key to activate mixing ratio for the Up direction and set the throw with the numeric keys as before.

On/Off Switch Setting

Initially an activation switch for is not set, meaning that once activated, this function is on all the time. If you would like to set a switch to turn it on and off, call the Switch Setting screen by pressing the VOL 0 key. Then use the keys to choose the desired switch location and on direction. For more information on the switch setting method, see page 37.

Trim volume setting

You may set up the Flap-to-Elevator mixing so that its effect may be changed in flight by moving a trim control. The trim control allows you to adjust the volume within ±25% of the set mixing rate, which can be handy for getting the best value while flying the model. This option is not activated at initial setup.

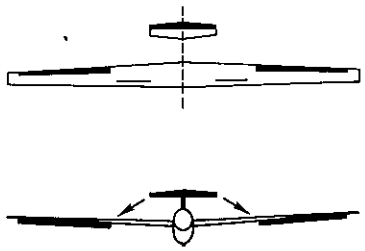
Call the volume setting screen by pressing the key, and select the desired control using the screen menus (for a description of the volume setting method, see page 37).

Use the END (N) key to leave this menu.

ELEVATOR-FLAP MIX (E→F)—2-S

This mixing is used to droop the flaps whenever an up elevator command is given (and may be set up for down elevator as well, helpful during 'outside' maneuvers). It helps aerobatic aircraft to make tight, square corners in maneuvers.

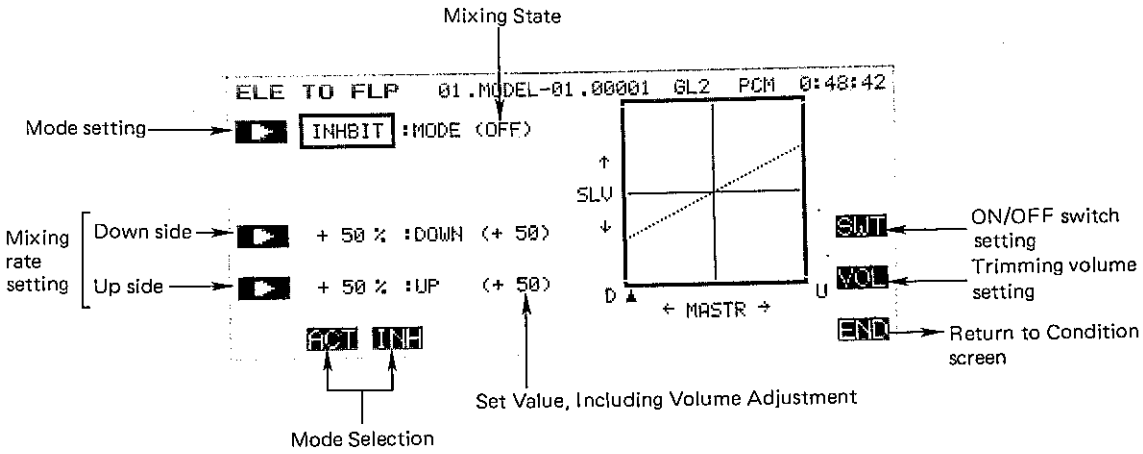
Elevator-to-flap mixing can be set up to be turned on and off during flight by a switch (if no switch is activated, this mixing remains on all the time). You can also set the flap trim rate in this function. If the flaperon function is activated, the elevators are mixed with the ailerons, otherwise, the mixing is with the flaps only.



Setting Up Elevator-to-Flap Mixing

Activation of command

In the Condition Menu, press the E→F key to get the ELE TO FLP menu shown below. Use the A (▶) key to activate mode setting, then press the ACT or INH keys (F and G) to activate or inhibit Elevator-to-Flap.



Setting the Mixing Ratio — Down and Up Side

You now set the amount of mixing for down elevator command. Press the C key to activate mixing ratio for the Down direction and set the value with the numeric keys E to M . The number keys O through 100 input the value directly. The + and − keys increase or decrease the value by 1. The +/− key may be used to reverse the throw direction. Your setting may vary from −100 to +100%, the initial value is set to +50%.

Now set the amount of mixing for the up elevator command. Press the D key to activate mixing ratio for the Up direction and set the throw with the numeric keys as before.

On/Off Switch Setting

On initial setting, the activation switch for Elevator-to-Flap mixing is set as SW C on at the upper position. If you would like to change the switch or turn mixing on all the time, call the Switch Setting screen by pressing the SWT P key. Then use the keys to choose the desired switch location and on direction. For more information on the switch setting method, see page 37).

Mixing Rate Trim Volume Selection and Operating Direction

A mixing rate volume control is not defined initially. To define one, display the volume setting screen by pressing the VOL O key. For a description of the volume setting method, see page 37. The volume control adjusts ±25% of the set mixing rate.

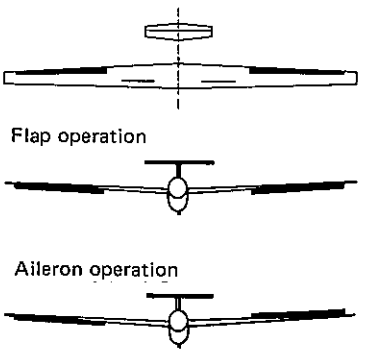
Use the END (N) key to leave this menu.

FLAPERON MIXING (FPN)—2-S

This function allows you to program the ailerons to work in the same direction, giving a flap response as well as aileron control (see figure). For good square maneuvers, and landing, both ailerons can be raised and lowered simultaneously. While this function is on, regular aileron operation is always present.

The Flaperon function requires two separate channels: Receiver CH1 (aileron 1/flap 2) and CH5 (aileron 2/flap 1) are the operating channels. The Aileron 1 and Aileron 2 left and right deflection angles can be adjusted independently, making it easy to apply differential to the ailerons. With differential, the up side travel is set to around 5% larger than the down travel.

You may also adjust the Flap 1 and Flap 2 throws independently, and you can set the flap trim rate as large or small as you like. Also, the flap trim offset can be adjusted, allowing you to freely change the flap neutral angle.



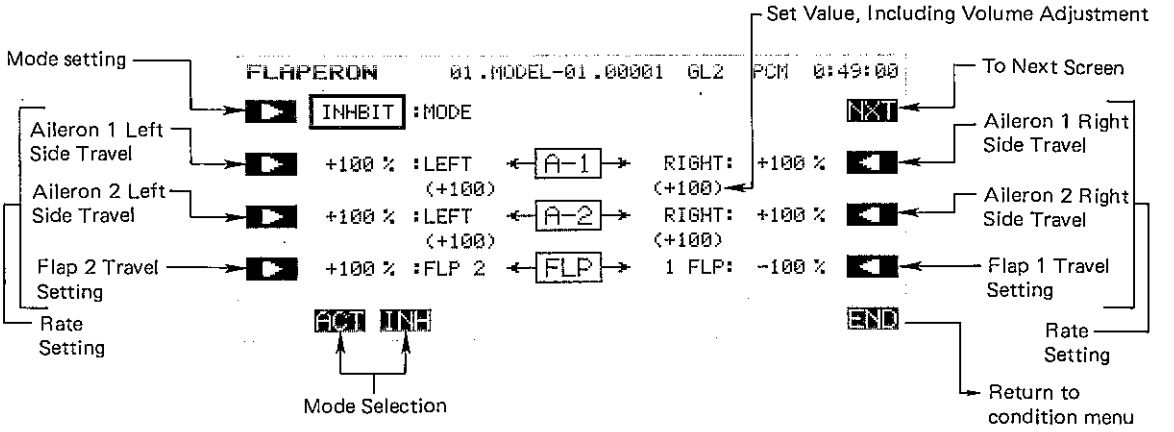
When setting aileron differential with this function, set the trim volume at the aileron differential (ADF) function setting screen.

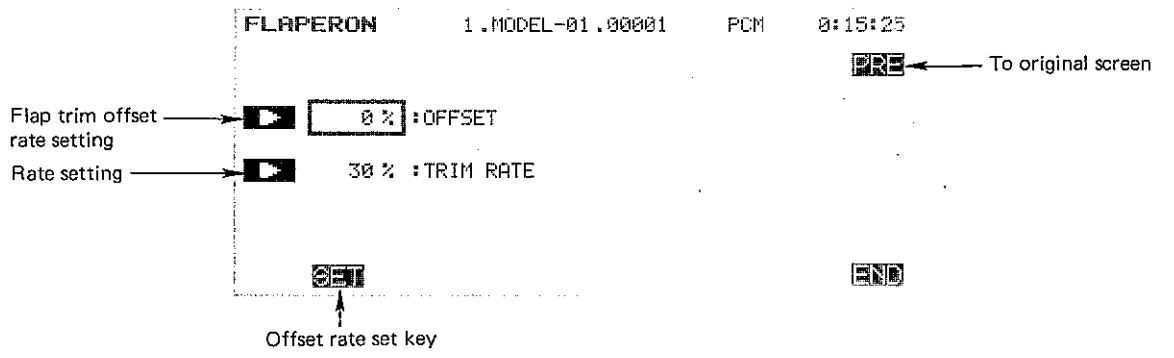
Setting Up Flaperons

Activation of command

In the Condition Menu, press the FLP key to get the FLAPERON menu as shown below. Use the A (▶) key to activate mode setting, then press the ACT F key to activate. Next, press the E (YES) key. This automatically deactivates (INH) the aileron differential (ADF) function.

Deactivate mixing by pressing the INH key G to inhibit the function.





Setting the Aileron 1 Travel

You now set the left-side travel for Aileron 1. Press the B key to activate left travel setting for Aileron 1 and set the travel with the numeric keys E to M . The number keys 0 through 100 input the value directly. The + and − keys increase or decrease the value by 1. The +/− key may be used to reverse the throw direction.

If you are not sure what you are changing, hold the stick to one side and press different keys — if there is no effect, move the aileron stick to the other side and continue. Your setting may vary from −120 to +120%, with an initial value of +100%.

Now set the right-side travel for Aileron 1. Press the O key to activate Aileron 1 right travel setting and set the travel with the numeric keys as before.

Setting the Aileron 2 Travels

This procedure is repeated for Aileron 2. Press the C key to activate left travel setting for Aileron 2 and set the travel with the numeric keys E to M as before.

Now set the right-side travel for Aileron 2. Press the P key to activate Aileron 2 right travel setting and set the travel as before.

Setting the Flap Travels — 1 and 2

You now set the travel for Flap 2. Press the D key to activate travel setting for Flap 2 and set the travel with the numeric keys E to M . Your setting may vary from −100 to +100%, with an initial value of +100%.

Now set the travel for Flap 1. Press the O key to activate Flap 1 travel setting and set its travel with the numeric keys. Its initial value is −100%.

Flap Trim Offset Setting

Flap trim offset sets the flap position from which motion occurs. To input the flap trim offset amount setting, move to the next screen by pressing the NXT R key. Next, press the B key, then set the flap trim (left-side lever, LS) to the position to be set and press the F (SET) key.

Flap Trim Authority Setting

In the Flaperon mode, Flap Trim moves both ailerons upwards or downwards together. To input the Flap Trim Authority. Press the C key and set the rate with the numeric keys E to M . You may choose any value from 0% to 100% for the Flap Trim Authority. The initial setting is 30%, but a smaller number is recommended.

FUTABA PCM1024ZA/ZH MENU GLOSSARY

Home Screen [HOM]

S/S . . . . .Start/Stop Timer
RST . . . . .Reset timer
TRM. . . .Show trim menu
CHD . . . .Condition Hold
TIM . . . .To timer menu
VLT . . . .To voltmeter menu
TAC . . . .To tach menu
T/R. . . . .Timer reset
SYS . . . .To system menu
MDL. . . .To model menu
CND . . . .To condition menu

Other Commands

ACT . . . .Activate
AUT. . . .Auto
END . . . .Return to prev. menu
INH . . . .Inhibit
LIN . . . .Linear
LST . . . .Last part of list
MAN. . . .Manual
NXT. . . .Next menu
PRE . . . .Previous menu
PT→ . . . .Next point to right
←PT . . . .Next point to left
RST . . . .Reset menu
SEL . . . .Select
SET . . . .Yes, command is ok
SRV . . . .Servo
SWT . . . .To switch set menu
VOL. . . .To volume set menu
[+/–]. . . .Change sign
[+] . . . . .Add 1
[–] . . . . .Subtract 1
[nnn]. . . .Inputs number 'nnn'

Transmitter Abbreviations

J1. . . . . .Right stick horizontal
J2. . . . . .Right stick vertical
J3. . . . . .Left stick vertical
J4. . . . . .Left stick horizontal
RS . . . . . .Right slider
LS . . . . . .Left slider
RD . . . . . .Right dial VR(A)
LD . . . . . .Left dial VR(B)
SW(n) . . . .Switch No. (n)

System Menu [SYS]

MSL . . . .Model Selection
VLT . . . .Voltmeter
OFF . . . .No load
250. . . . .250 mA load
500. . . . .500 mA load
TAC . . . .Tachometer
DSP . . . .Display on/off
SRV . . . .Servo Test & Bar Graph Display
ON. . . . .Activate function
OFF . . . .switch off
TRN. . . .Trainer System/Cmd.
MIX . . . .Mix trainer commands
DTN. . . .Data Transfer
TRN. . . .Transmit model data
RCV. . . .Receive model data
CPM . . . .Copy Model
CPC . . . .Copy Condition
PAR . . . .Parameters
UNA. . . .User Name Def.
ENT . . . .Enter letter at cursor
FRQ. . . .Transmitter Frequency Setting (Syn. only)
ABT . . . .Abort setting

Model Menu [MDL]

CSL . . . .Condition Select
TIM . . . .Timer Function
UP . . . .Set timer count up
DWN. . . .Set timer countdown
S/S. . . .Start/Stop timer
RST . . . .Reset timer
F/S. . . . .Failsafe Function
BFS . . . .Battery Failsafe
NOR. . . .Hold last command
PMD. . . .Pulse Mode
PCM . . . .Pulse code modulation
PPM . . . .Pulse position modulation (FM)
REV. . . .Servo Reversing
Rev. selected servo
FNC . . . .Function Change
TRM. . . .Trim tab
CTR . . . .Control stick/knob
RST . . . .Data Reset
CUT . . . .Engine Cut
CHD . . . .Condition Hold
TYP . . . .Model Type Selection
CH9 . . . .Channel 9 Switch
MNA. . . .Model Name Def:
ALT . . . .Alternate Switch
THR . . . .Throttle Curve
SWH. . . .Swashplate Type
S-1 . . . .Normal swash
S-2,4. . . .Mixed swash type 2, 4
SN3 . . . .Swash type SN3
SR3 . . . .Swash type SR3

RDR. . . . .Rotor Direction
CW. . . . .Clockwise
CCW. . . .Counterclockwise
INV . . . . .Inverted Pitch
PIT. . . . . .Pitch Curve

Common Conditions [CND]
CSL . . . . .Condition Select
ATV . . . . .Adjustable travel volume/Chanel delay
NOR. . . .Normal
LIM . . . .Limited
AFR. . . . .Adjustable function rate
D/R . . . . .Dual rate
PMX. . . . .Programmable mixing
STM . . . . .Sub trim
TOF . . . . .Trim offset
CNA. . . . .Condition naming
TRM. . . . .Digital trim
T1-4 . . . .Trims 1-4
C-M . . . .Current to memory
M-C . . . .Memory into current
ATL . . . .Trim at low end only
CMB. . . .Combined all conds.
SEP . . . .Trim this cond. only

Model Type Labels
AIR . . . . .Airplane type
HEL . . . . .Helicopter type
GL2 . . . . .Sailplane 2 wing servos
GL4 . . . . .Sailplane, 4 wing servos
GL5 . . . . .Sailplane, 5 wing servo

Airplane Menu
ADF. . . . .Aileron Differential
A→R. . . . .Aileron→Rudder Mixing
VTL. . . . .V-Tail
R→A. . . . .Rudder→Aileron Mixing
EVN. . . . .Elevon
E→F. . . . .Elevator→Flap Mixing
F→E. . . . .Flap→Elevator Mixing
CPT . . . . .Collective Pitch
ALV . . . . .Ailevator
FPN . . . . .Flaperon
ABK. . . . .Air brake
SPO . . . .Spoiler control
AUT. . . .Automatic mode
MAN. . . .Manual mode
SNP . . . . .Snap Roll
TCV . . . . .Throttle curve

Sailplane Menu
ADF. . . . .Ail. Differential
A→R. . . . .Rudder Coupling
ASF . . . . .Ail.-Speed Flap Mixing
VTL. . . . .V-tail Mixing
ABE. . . . .Airbrake
EBF . . . . .Elevator→Brake Flap Mixing
ESF . . . . .Elevator→Speed Flap Mixing
BKF. . . . .Brake flap
SPF . . . . .Speed Flap
SFT . . . . .Flap Trim Setting
BFY. . . . .Butterfly
BYE. . . . .Butterfly Trim Mix
ETM. . . . .Elevator Trim Sets
TM1. . . . .Trim set 1
TM2. . . . .Trim Set 2
F→E. . . . .Flap-Elevator mixing
E→F. . . . .Elevator-Flap Mixing
FPN . . . . .Flaperon Mixing

Helicopter Menu
PCV . . . . .Pitch Mixing
PHV . . . . .Hovering Pitch
PTM . . . . .Pitch Trim
TCV . . . . .Throttle Curve
THV. . . . .Hovering Throttle
HOF. . . . .Hovering Offset
HLD. . . . .Throttle Hold
SWP . . . . .Swashplate Type
P→R. . . . .Pitch→Rudder
R→T. . . . .Rudder→Throttle
GYR. . . . .Gyro Sensitivity
ACC. . . . .Acceleration
INV . . . . .Inverted Pitch

Model Control Abbrevs.
AIL . . . . .Aileron
AU1 . . . . .Aux Channel 1
AU2 . . . . .Aux Channel 2
BKF. . . . .Brake flap
CH9 . . . . .Channel 9
ELE . . . . .Elevator
FLP . . . . .Flap
GEA. . . . .Gear
GYR. . . . .Gyro
PIT. . . . . .Pitch
RUD. . . . .Rudder
SF1 . . . . .Speed flap 1
SF2 . . . . .Speed flap 2
SPO . . . . .Spoiler
THR. . . . .Throttle

Misc. Abbreviations
Syn. . . . . .Synthesized
Indented listings are subcommands

Futaba®

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FUTABA CORPORATION OF AMERICA
4 STUDEBAKER
IRVINE, CA 92718

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