

Dear customer,

Dear fellow modeller,

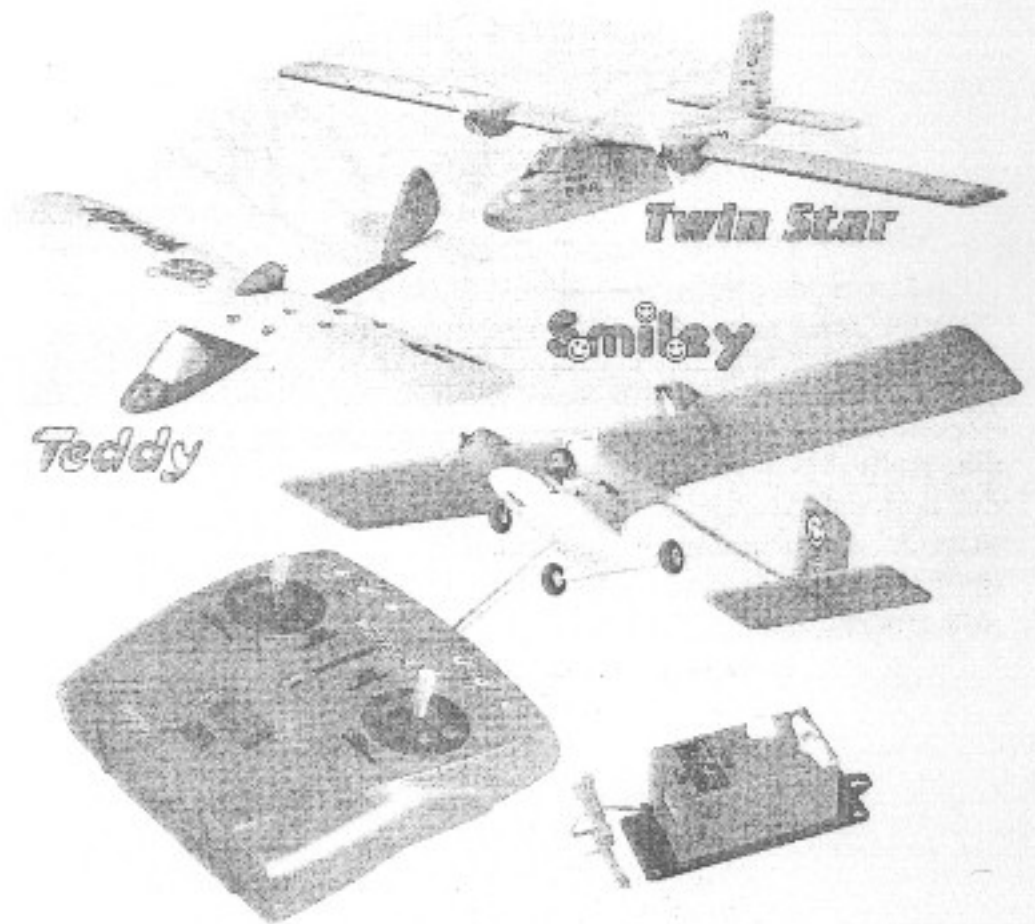
PICO-line is our name for a comprehensive range of products designed to offer the beginner everything he needs - from the radio control system at one end to a range of suitable models at the other, with an extensive range of accessories in-between.

The system you have purchased is designed to provide everything you need to operate a simple beginner's model. If, at a later stage, your modelling demands become more exacting and your models become more complex, the transmitter can still cope. It is a simple matter to activate the integral mixers and install supplementary controls.

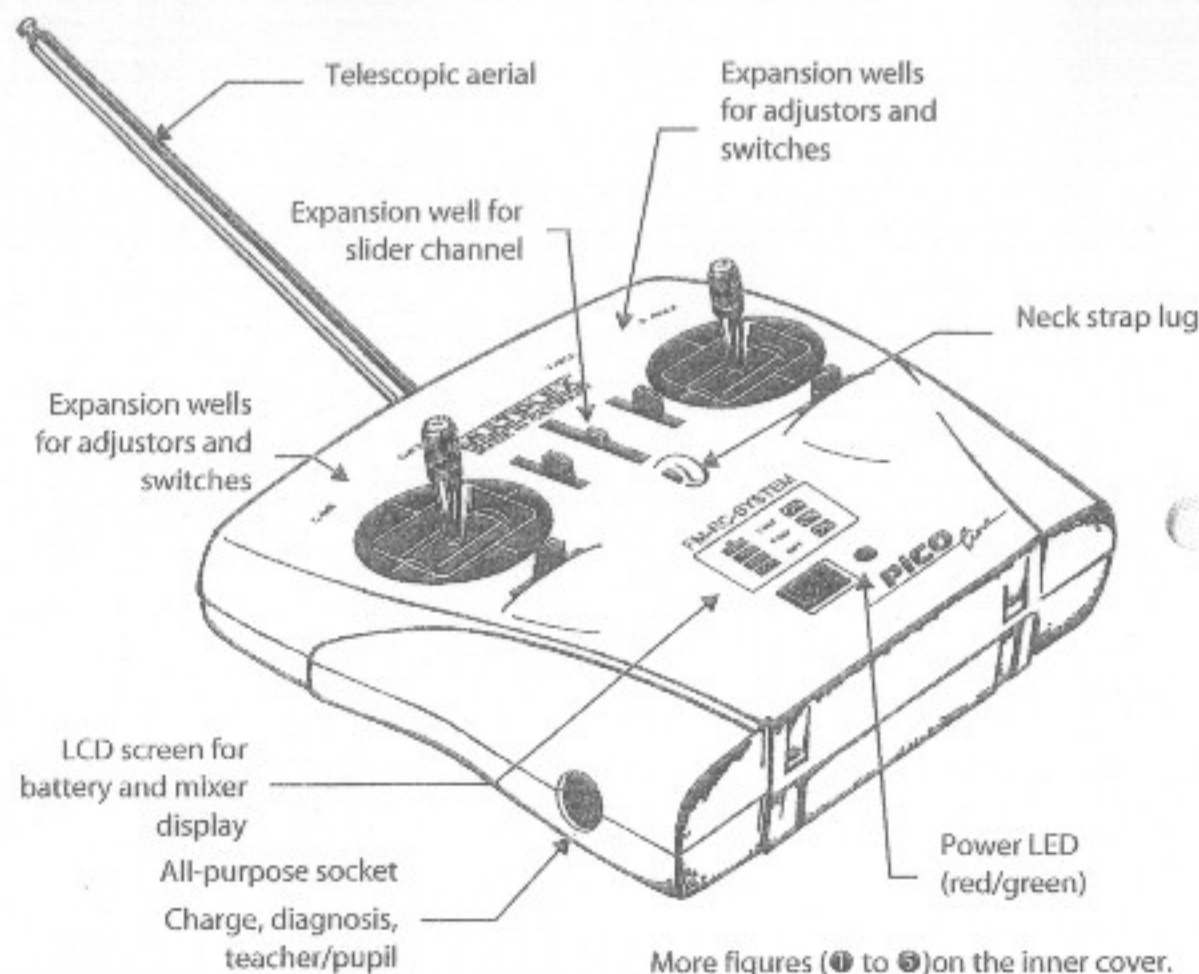
We sincerely hope you have many happy hours in our mutual hobby

Yours the **MULTIPLEX team**

PICO-line guaranteed modelling fun



PICO-line radio control system, models, accessories
... and everything matches!



Contents

Switching on for the first time	4
What is meant to happen?	5
What is meant to happen on the model?	6
Your transmitter in detail	7
The battery monitor	7
The sticks (ratchet, varying stick length)	7
„Stick mode“, or „what does each stick control?“	8
Changing the direction of servo rotation for servo 1 – 5	8
The mixers	9
V-MIX: for V-tail models	9
P-MIX: for throttle compensation	10
DIFF: for controlling models with two aileron servos	10
Combi-Switch (CS) for smoother turns	11
Channel-Check: peace of mind when you switch on	12
Extra items that can be installed	14
A few tips on installing the receiving system in the model	14
The system in use	15
Post Office regulations, teacher/pupil mode, diagnosis mode, range testing, care of transmitter, MULTIPLEX hotline	

About the PICO-line

Basic transmitter features

4 channels (proportional channels)		
Can be expanded to max. 7 channels (1 switched channel, 2 proportional channels) (stick configuration), switch-selectable		Page 8
4 mixers		
Combi-Switch	Switch required	Page 12
V-MIX	Adjustor required	Page 9
P-MIX	"	Page 10
DIFF	"	Page 12
Reversible direction of rotation for servos 1 to 5		Page 8
LCD with battery display and mixer indicator display		
6-cell transmitter battery for about 4 hours' use		
Battery monitor with audible and visual alarm		Page 7
Variable-length sticks		Page 7
Ratchet (e.g. for throttle stick), optionally right or left		Fig. 1
Holder for aerial and crystals in transmitter back panel		Fig. 1

Possible expansion

Channel-Check checks your frequency when you switch on	Page 12
Slider for channel 5	Page 14
Switch for channel 6	Page 11
Switches and adjustors for mixers and Combi-Switch	Page 14

Safety

Radio-controlled models are not toys!

You can make a major contribution to modelling safety yourself just by acting in a responsible manner and using your radio control system and model carefully.

- Check the electrical and mechanical connections in your model at regular intervals.
 - Carry out range checks regularly (Page 16).
 - Check with your fellow-modellers that your channel is free before you switch on.
 - Extend the transmitter aerial to full length before you start operating your model.
 - Carry out a **check of all working systems** before every flight.
Do the control surfaces move in the correct direction? Are the control travels correct? Are the mixers required for your model set up correctly and switched on?
 - Are the transmitter and receiver batteries fully charged?
 - Use **genuine MULTIPLEX crystals and accessories** exclusively.
- If you are in doubt about anything it is always best not to risk a flight. Check the system again, seek out the error and eliminate it. If you are still not sure ask your local model shop or the MULTIPLEX service (addr. p. 16) for help and advice.**
- Read the section „The system in use“ starting on page 15!**

Switching on for the first time

Preparations

1. Charging the transmitter battery

On the left-hand side of the transmitter you will find the MULTIPLEX universal socket. We call it universal because you can use this socket to:

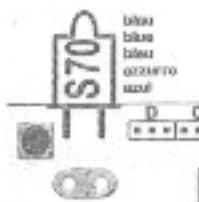
- charge the transmitter battery,
- carry out teacher/pupil operations (page 15), and
- connect the diagnosis (closed loop) cable (page 15).

Care when charging: always start by connecting the charge lead (if 8 6020) to your charger, and only then to the transmitter. If you do it the other way round the banana plugs may touch each other and cause a short-circuit in the transmitter.

Der Ladestrom darf maximal 600 mA betragen.

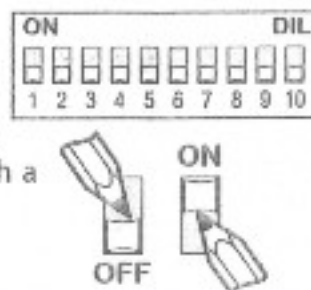
2. Fitting the transmitter crystal

To do this you must first open the transmitter (Fig. 1). Transmitter crystals are encased in a blue sleeve and bear the code letter „S“ in front of the channel number. Plug the transmitter crystal into the socket on the main circuit board as shown on the right and in Fig. 2.



3. Check the switch positions

Check that all ten DIL switches on the main circuit board are in the OFF position (the factory default), otherwise you cannot be sure that everything will work as described in these instructions. The best way to move the switches is to use a pointed instrument with a blunt tip (ball-point pen, pencil etc.).



4. Charging the receiver

Do not exceed the charge currents printed on the battery!

Alternative methods of charging:

Plug-top charger for 230 V~ Order No. 14 5535, for 110 V~ Order No. 14 5538

This charger can recharge the transmitter and receiver packs simultaneously at about 50 mA. Separate charge leads are not required.

Combiader 5/700 (Combi-charger) for 230 V~ Order No. 14 5541

Transmitter and receiver packs can be recharged simultaneously at up to about 700 mA. Charge leads are required: transmitter - Order No. 8 6020, receiver - Order No. 8 5106.

PICO-line AUTO charger, for connection to a 12 V car battery, Order No. 9 2526

This charger is designed for recharging drive batteries (flight packs) fitted with a green high-current socket, but can also recharge the transmitter battery. Charge lead: transmitter - Order No. 8 5163. Flight batteries can be connected directly to the charger.

Other chargers with 4 mm socket connectors

Transmitter charge lead: Order No. 8 6020, receiver charge lead: Order No. 8 5106

What is meant to happen?

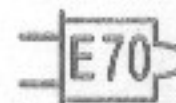
As soon as your new transmitter is charged, fitted with a transmitter crystal and switched on, you are bound to want to check that everything works properly. The easiest way to do this is to assemble a receiving system for test purposes.

Check first:

To ensure that the servos rotate as described below, all ten DIL switches on the main circuit board must be at the OFF position (factory default, see point 3, page 4).

If you have purchased the PiCO with an Ein-Stein unit,

first plug in the matching receiver crystal (same channel number as the transmitter crystal). Receiver crystals are encased in a yellow sleeve and are printed with the letter „E“ in front of the channel number.



Now all we have to do is connect the charged receiver battery to the Ein-Stein (or a „normal“ receiver; see next page), and we can get started.

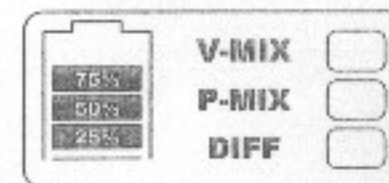
Always keep strictly to this sequence when switching on and off:

First switch on the transmitter, then the receiver (or the Ein-Stein).

First switch off the receiver, then the transmitter.

What happens at the transmitter?

- The power LED glows green.
- The screen shows the current state of charge of the transmitter battery. In the example on the right 75% of the full battery capacity is still available.



What should happen at the receiver?

Move the **left-hand** stick to the right, then pull it back towards you, and the servos in the Ein-Stein should rotate in the directions shown below.

stick movement

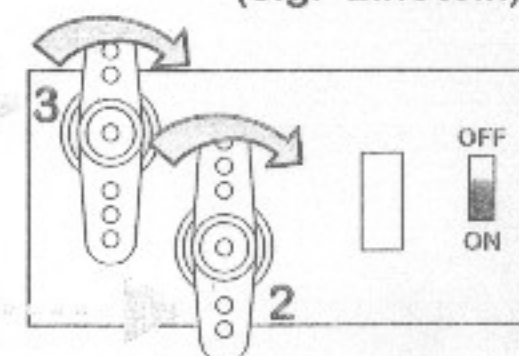
RUDDER stick:
right



ELEVATOR stick:
back
up-elevator = climb



Servo movement (e.g. EinStein)



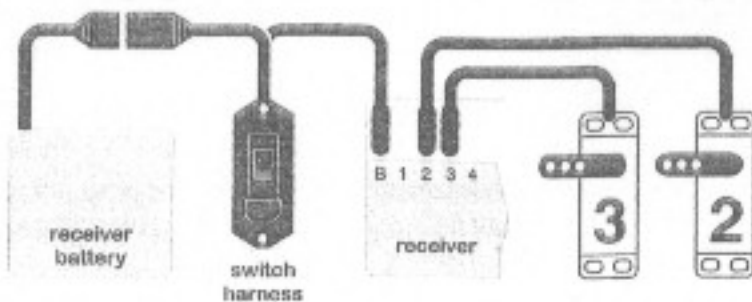
Nothing is working!? If this happens there are three possibilities:

- The transmitter and receiver frequency band and/or channel are not the same.
- Channels 2 and 3 are controlled by the right-hand stick (wrong stick mode: see page 8).
- The batteries are not sufficiently charged, or the Ein-Stein unit is not switched on.

If you have a conventional receiver instead of an Ein-Stein,

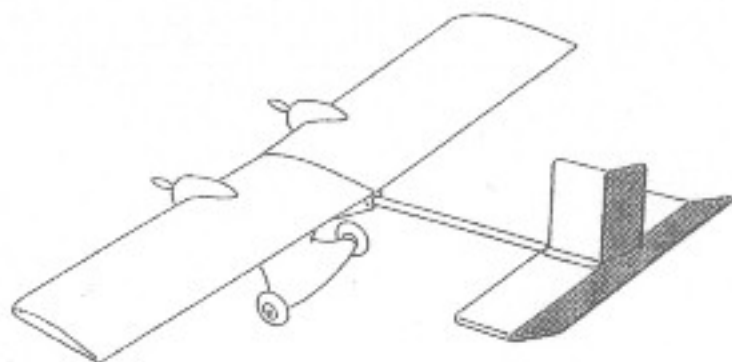
you must first connect a charged receiver battery to the switch harness, fit the receiver crystal and connect two servos to receiver outputs 2 and 3.

Now move the left-hand transmitter stick right or back (towards you), and the servos should rotate clockwise as already described.



What is meant to happen on the model?

For our example we have selected the „Smiley“ from the PiCO-line series. This model features rudder and elevator controls. In the transmitter's basic state (DIL switches 6 and 7 in the OFF position) both functions are controlled by the left-hand stick. If you wish or need to change the stick mode please turn to page 8 (Stick mode).



Rudder:

If you move the RUDDER stick to the right (i.e. you wish to fly a right turn), the rudder on the model should also deflect to the right. The terms right / left refer to the model as seen from the tail, looking forward.

Elevator:

If you pull the ELEVATOR stick back towards you, the elevator on the model should deflect up. If the model were in the air it would now climb. Model pilots call this „up-elevator“, or „pulling up“.

The opposite movement is called „down-elevator“. Move the elevator stick forward (towards the transmitter aerial) and the elevator should deflect down. The model would then put its nose down and descend.

What should I do if the control surfaces move in the wrong direction?

There are two ways of solving this problem: you can either disconnect the pushrod for the linkage in question and re-connect it on the other side of the servo output, or reverse the servo at the transmitter by means of one of the DIL switches (see also „Reversing servo direction“: page 8).

Always check the direction of servo rotation when you switch from one model to another!

It is a very good idea to note on the model itself (sticker or post-it note) which servos (if any) have to be reversed.

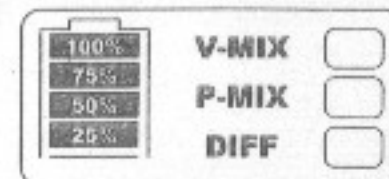
Your transmitter in detail ...

The battery monitor

The transmitter constantly monitors the voltage of the transmitter battery. The screen displays the remaining battery capacity in four stages: 100%, 75%, 50%, 25%.

When the display falls to 25%:

You can still use the transmitter for about a further 40 minutes.



If and when the battery alarm sounds (bleep and flashing display) you must land the model immediately and recharge the battery.

Note that the battery will not reach its full capacity until you have discharged it completely (i.e. flown a model until the battery is flat) and then recharged it several times.

The sticks

The sticks of the PiCO transmitter have the following features:

- selectable self-neutralising action or ratchet
- variable spring tension
- variable-length sticks: 3 alternative lengths

Activating the stick ratchet (Fig. 4)

As standard your transmitter's sticks are automatically pulled back to the centre position by springs. However, in some cases the self-neutralising action is not required (e.g. throttle or spoilers). To cater for these functions the sticks can be converted from „self-neutralising“ to „ratchet“ and vice versa.

The stick is converted as described below (see also Fig. 4):

1. Disengage the neutralising spring
Locate the M2 x 16 mm machine screw in the accessory pack and screw it fully into the loop „O“.
2. Attach the ratchet spring to the stick using the 2.2 x 6 mm self-tapping screw „R“. The harder you tighten this screw, the more pronounced the ratchet action.
Caution: don't over-tighten the screw as this could strip the thread in the plastic.

Replacing or adjusting the stick ends

The stick ends are a push-fit on the stick shafts, and are secured by a rotational movement.

1. To release a stick end rotate the moulded grip until you feel it disengage. The stick end can now be pulled off the shaft easily.
2. To attach a stick end, place it loosely on the shaft and rotate it until it slides easily onto the shaft. Set the stick at the desired height and then rotate the stick end through about 180° to secure it.

Adjusting the spring tension

You can set the tension of the centring springs to match the „feel“ you prefer by adjusting the screws R (see Fig. 4).

„Stick mode“, or „what does each stick control?“

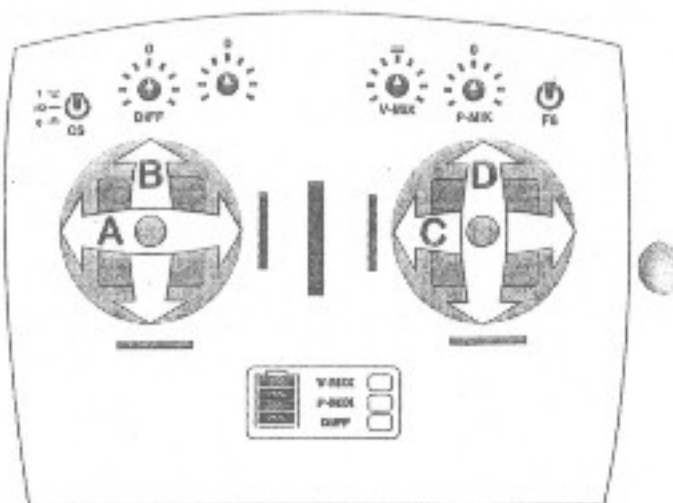
The term „STICK MODE“ is used by modellers to define the relationship between the transmitter sticks and the controlled functions in the model. If you don't yet know which mode is likely to suit you best we recommend that you ask your local fellow-modellers which mode they use. This applies in particular if you are likely to ask them for help in learning to fly.

Why do we need to set a stick mode?

If you wish to use the transmitter's integral mixers (see page 9) the transmitter has to „know“ which stick is responsible for which function. Only then can the correct mixed signals be produced and passed on to the receiving system in the model.

Selecting the STICK MODE:

DIL switches 6 and 7 on the main circuit board are used to select the stick mode. As standard both switches are in the OFF position, which means that the left-hand stick controls RUDDER (A) and ELEVATOR (B), and the right-hand stick controls AILERONS (C) and THROTTLE (D). Of course, you can also use the throttle channel to control an electronic or mechanical speed controller in an electric-powered model, and also for spoilers (airbrakes).



Switch 6 swaps over RUDDER (A) and AILERON (C)

6: OFF RUDDER left-hand stick (A) AILERON right-h. stick (C)
6: ON: AILERON left-h. stick (A) RUDDER right-h. stick (C)



Switch 7 swaps over ELEVATOR (B) and THROTTLE (D)

7: OFF ELEVATOR left-h. stick (B) THROTTLE right-h. stick (D)
7: ON THROTTLE left-h. stick (B) ELEVATOR right-h. stick (D)

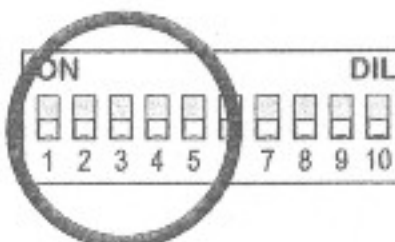
Changing the direction of rotation for the servos 1 to 5

In many models there is not enough internal space to allow you to connect the pushrod to the „correct“ side of the servo output arm. The control surface will then operate in reverse (e.g. right stick = left rudder). In such cases the only recourse is to reverse the servo channel at the transmitter.

The direction of rotation of servos 1 to 5 can be reversed inside the transmitter. The direction of servos 6 and 7 is fixed, and cannot be changed.

Switch assignment:

Switches 1 to 5 on the main circuit board are used to reverse the direction of rotation of servos 1 to 5 (see also Fig. 8).



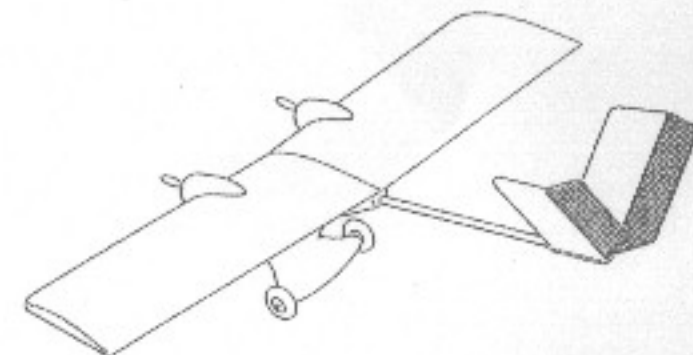
The mixers

In modelling terms a „mixer“ combines the signals produced by two separate transmitter controls. The PICO transmitter includes the following mixers:

1. V-MIX mixes RUDDER and ELEVATOR to control a V-tail
2. P-MIX mixes THROTTLE/SPOILER and ELEVATOR
3. DIFF sends the AILERON signal to **two** servos and enables you to set differential aileron travel
4. Combi-Switch (CS) mixes AILERON and RUDDER

V-MIX: for V-tail models

If you have a model aircraft with a V-tail the signals for the functions RUDDER and ELEVATOR have to be combined together. **V-MIX** does just that, and passes the mixed signals to servos 2 and 3 in the Ein-Stein (or to outputs 2 and 3 of a conventional receiver). The mixer ratio can be varied if you fit an adjustor (optional accessory - see under: „Switching on and using V-MIX“).



With V-MIX activated, operate the RUDDER stick and the two servos should rotate in opposite directions. Move the ELEVATOR stick and they should both move in the same direction.

If you switch on V-MIX but the transmitter is **not fitted with an adjustor**, RUDDER and ELEVATOR are mixed equally (50 : 50 ratio).

Installing and connecting the V-MIX adjustor

On the transmitter the expansion well for the adjustor is marked by the symbol printed on the right here. The „equals“ sign in the centre indicates that the mixer ratio of the ELEVATOR and RUDDER channels is equal (50 : 50) in this position.



Connect the adjustor to the socket V-MIX (see Fig. 8) on the main circuit board.

Switching on and using V-MIX

DIL switch No. 9 activates V-MIX. The display shows whether the mixer is switched on or not.

If you fit a V-MIX adjustor you can adjust the ratio of the ELEVATOR and RUDDER inputs for the V-tail servos to any setting within the range 20 : 80 to 80 : 20.

If **V-MIX is switched off**, this adjustor acts as the transmitter control for channel 7. It can then be used to control an additional proportional function on your model.



P-MIX: if the model climbs or descends when you open the throttle

The power system in your model - whether it is a glow motor or an electric one - must be installed at a particular thrust angle, otherwise the attitude of the aircraft will change when you open or close the throttle. If your model exhibits this problem you can eliminate it by using P-MIX.

P-MIX (Power-Mixer) combines a small part of the THROTTLE signal with the ELEVATOR signal. The size and direction of effect of the mixed-in input can be altered using the P-MIX adjuster, which is an optional accessory and has to be fitted by the user.

If you switch on P-MIX but the **transmitter is not fitted with an adjuster**, the mixer has **no effect**.

Installing and connecting the P-MIX adjuster

The expansion well for the adjuster is marked by the symbol printed on the right here. The „zero“ sign in the centre indicates that the mixer has no effect in this position.

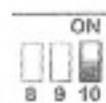
Connect the adjuster to the socket P-MIX (see Fig. ②) on the main circuit board.



Switching on and using P-MIX

DIL switch No. 10 activates P-MIX. The display shows whether the mixer is switched on or not.

You can set the magnitude of the mixed-in signal to any value in the range +50% to -50% by rotating the P-MIX adjuster. This means THROTTLE can be combined with up-elevator or down-elevator as required for your model.



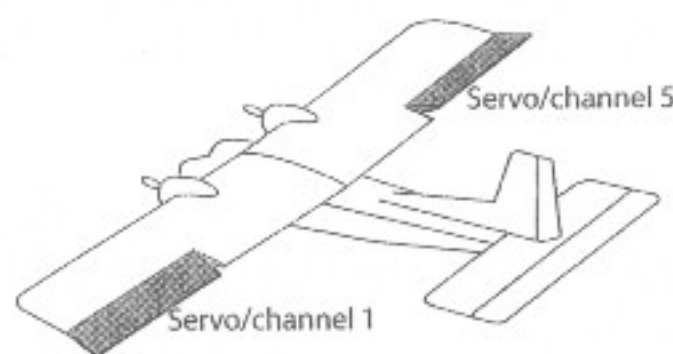
Incidentally: you can also use P-MIX with spoilers (airbrakes)

If you are using the THROTTLE stick to control spoilers (airbrakes) in your model instead of a power system (typically a glider), P-MIX can be used in the same way to correct an unwanted change in pitch trim when you extend the spoilers.

DIFF: for controlling models with two aileron servos

If the ailerons in your model are operated by two separate servos the signal from the AILERON stick has to be passed to two separate receiver outputs. In the PiCO these are outputs 1 and 5. When the ailerons deflect as shown in the drawing on the right, the model will turn to the right.

If your model has two separate aileron servos you must activate them by selecting the DIFF mixer. This is done by operating DIL switch No. 8.



When you switch on DIFF the aileron signal is passed to two channels, but at the same time it allows you to set differential travel for the two ailerons. Aileron differential means that the „down“ travel of the ailerons is smaller than the „up“ travel. In simple terms: when an aileron moves down, it tends to act against the turn you wish the model to fly. In extreme cases the „down“ travel has to be eliminated altogether (sometimes known as „split“ mode or 100% differential).

Installing and connecting the DIFF adjuster

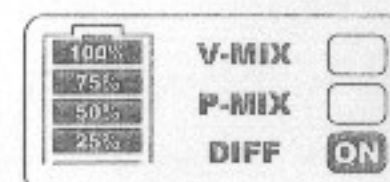
The expansion well for the adjuster is marked by the symbol printed on the right here. The „zero“ sign in the centre indicates that no differential travel occurs in this position, i.e. the ailerons move the same distance up and down.

Connect the adjuster to the socket DIFF (see Fig. ②) on the main circuit board.



Switching on and using DIFF

DIL switch No. 8 activates DIFF. The display shows whether this function is switched on or not.



You can adjust the extent of the differential travel within the range +100% to -100% by rotating the DIFF adjuster.

If you switch on DIFF and the transmitter is **not fitted with the adjuster**, the AILERON signal will be passed to servos 1 and 5, but aileron travel will be equal, i.e. **no differential**.

If **DIFF is switched off**, this adjuster acts as the transmitter control for channel 5. It can then be used to control an additional proportional function on your model.

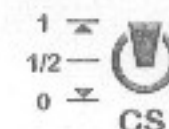
Combi-Switch (CS) for smoother turns

Controlling a model smoothly through turns requires the co-ordinated use of ailerons and rudder, and this applies to models and full-size aircraft alike. Co-ordinating the sticks is not that easy, especially for beginners. The Combi-Switch combines (couples) the ailerons and rudder, so smooth turns can be produced just by moving one stick.

In the PiCO the **rudder control „follows“ the ailerons**, which means that moving the aileron stick produces a rudder deflection too (AILERON -> RUDDER mixer).

The **degree of „following“** defines the extent of the rudder travel when the aileron stick is operated, and it can be selected using a 3-position switch.

100 %	(1)	100% AILER. produces 100% RUDDER
50 %	(1/2)	100% AILER. produces 50% RUDDER
0 %	(0)	No combined signal (= Combi-Switch OFF)



Installing and connecting the Combi-Switch switch

In its default setting the Combi-Switch is switched off by means of a jumper (small bridging connector). This is the procedure for installing the 3-position switch (# 7 5740):

- Open the transmitter case and remove the jumper from the Combi-Switch (CS) socket. Store the jumper carefully by taping it to the inside of the transmitter back panel.
- Carefully drill a 6.4 mm Ø hole from the inside of the case at the position marked „CS“.
- Install the switch and position it with the red wire pointing towards the stick unit; secure it with the locknut and knurled nut.

- Connect the plug to the Combi-Switch socket on the main circuit board with the red wire pointing towards the battery connector.

Checking and using the Combi-Switch

IMPORTANT: if the Combi-Switch is set to the ½ (50%) or 1 (100%) position the rudder stick no longer has any effect

Channel-Check: peace of mind when you switch on

The **Channel-Check** module is a monitor receiver which can be fitted in the transmitter to check before you fly that your frequency is free.

Every time you switch on the transmitter the monitor receiver is automatically activated and checks whether your channel is free. If your spot frequency is already in use or is encountering interference, the indicator LED on the transmitter glows red and the RF section remains switched off.

This means that you avoid the risk of flying your model in unsafe conditions, **and** you can be sure of not interfering with another model which is already in use on your channel (within a radius of about 300 m).

1. Installing Channel-Check and fitting the crystal

If you have purchased your PICO with the Channel-Check module already installed, all you have to do now is fit a receiver crystal in the module.

a. Removing the Channel-Check module

First open the transmitter case (Fig. v).

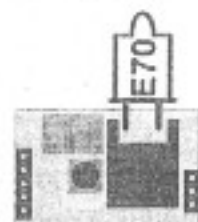
Grasp the module by both narrow sides and carefully pull it up vertically and away from the main circuit board.

b. Fitting a crystal in the Channel-Check module

Yellow sleeve, code letter „E“ before the channel number

c. Installing the module in the transmitter

Check that the two rows of sockets engage properly with all the projecting pins on the main circuit board (see Fig. ②).



Channel-Check modul

2. Using the transmitter with Channel-Check:

Once installed in the transmitter, Channel-Check carries out its work automatically every time you switch the transmitter on; you as user will hardly notice it.

However, it is your responsibility to ensure that Channel-Check monitors **the correct channel**. For this reason in the interests of safety please ensure every time you switch on that: **the crystal in the Channel-Check module is on the same frequency (same channel number) as the crystal in the transmitter.**

Only if the channel number of the transmitter crystal and the Channel-Check crystal are identical can the check procedure work correctly. If you are not sure, it is always better to check one more time than fail to do it at all.

This is the procedure for switching the system on:

1. Extend the telescopic aerial **fully**.
2. Check that you are about 10 m from any other radio control transmitter which is already switched on.
3. Switch the transmitter on.

LED glows **RED**: Your channel is already in use, or suffering interference
Your transmitter will not transmit an RF signal.

LED glows **green**: Channel-Check has detected no interference.
You are safe to operate your model.

CAUTION: if the transmitter detects that your channel is already in use or is suffering interference, the LED stays red and the transmitter **will not work**. To repeat the check you must switch the transmitter off, then on again.

What should I do if the LED glows RED?

First check amongst the other transmitter users whether anyone is already using your channel. It can easily happen; one common reason is that a modeller switched frequencies last time out, and simply forgot that he did so.

If you are unable to find another transmitter using your channel, wait a few minutes then repeat the switch-on procedure.

If the LED once glows red, you should not launch your model **until you have carried out several successful power-on checks (LED glowing green)**. Repeating the check, preferably walking to different locations between checks, improves the chances that the „channel free“ indication is correct.

What is Channel-Check's range and performance?

With the telescopic aerial fully extended ...

Channel-Check monitors radio activity over a **radius of about 300 m**. Of course the effective monitoring radius varies according to the ambient conditions in which your transmitter is operating. The terrain (flat or hilly), the ground quality, other radio control transmitters, different types of transmitter (commercial radio, television, direction-finding equipment etc.) may reduce the monitoring radius.

With the telescopic aerial collapsed ...

ambient influences become so powerful that it is **not possible to state a reliable range** for the monitoring receiver.



CAUTION:

„Channel free“ only applies to the moment when you switch the transmitter on. Once the transmitter has checked the channel, the RF module stays switched on permanently.

This applies even if interference arises during the flight, or if a modeller switches on another transmitter on your frequency.

Extra items that can be installed at any time

Detailed notes on installation are supplied with the adjustors, switches and slider.

V-MIX, P-MIX and DIFF adjustors (# 7 5719)

You can install up to three adjustors in the front panel of the transmitter, and these can be used to select and adjust the mixer ratios for V-MIX, P-MIX and DIFF. If you do not activate the mixers, the adjustors can be used as transmitter controls for channels 5, 6 or 7.

Installing the slider for channel 5 (# 7 5720)

A slider potentiometer can be fitted in the centre of the transmitter between the two stick units, and it then acts as the control for channel 5. This can be used, e.g., to control the electric motor in a model aircraft if all the stick channels are in use for other functions.

Installing switches

You can install switches in the front panel of the transmitter to act as the transmitter control for channel 6, and to switch the Combi-Switch mixer on and off.

- 3-position switch: # 7 5740 (for Combi-Switch or servo left/centre/right)
- 2-position switch: # 7 5742 (for servo left/right)

A few tips on installing the receiving system

Fig. 6 shows the optimum arrangement of the receiving system components in the model. You should work out where the system will be installed before you even start building it.

The following points are particularly important:

- Keep the receiver well clear of powerful electric motors and electrical ignition systems.
- **Deploy the receiver aerial in a straight line** (or as near as possible), and run it out of the model close to the receiver. It can be tensioned to the fin by a small rubber band.
- Never shorten, extend or coil up the aerial inside the model.
- Don't deploy the aerial inside or on top of any model component which is reinforced with carbon fibre (carbon screens the signal).
- Protect the receiver from vibration (pack it in soft foam).

If your model is fitted with an electric power system we recommend that the receiving system should be installed as shown in Fig. 6 b). Keep as much distance as possible between the receiving system and the motor and flight battery. The high currents which flow in electric power systems can produce interference.

Before the first flight of the session carry out a **very thorough range check** (see page 16) **with the motor stopped**, then repeat it **with the motor running**.

If you are obliged to use extension servo leads in the model the long wires may affect the reception characteristics. If the cable to any servo is 60 cm or longer, you must fit a separation filter in that lead. Also if servo leads run parallel to each other over a distance of 25 cm or more, separation filters may be needed to avoid interference problems. Please ask your local model shop for details of suppressors, or ask the MULTIPLEX service department (see page 16 and the back cover).

The system in use

Post Office regulations for the U.K.

Radio controlled models are of two types - those which operate on the ground or on water, known as „surface“ models, and those which operate in the air. The first group includes model cars, trucks and buggies, and also model boats of all types. The second encompasses fixed-wing model aircraft and rotary-wing machines (mainly helicopters).

The frequency bands available for radio controlled models are 26.960 to 27.280 MHz General use, **34.995 to 35.255 MHz (Channels 60 - 85 incl.) Air only**, **40.665 to 40.955 MHz (Channels 50 - 79 incl.) Surface only**, and 458.500 to 459.500 MHz General. Since the 26/27 MHz band is also allocated for Citizens Band radio and other users, and the 458/459 MHz band is also available for use by telemetry and other equipment, radio controlled models are generally operated on the 34/35 MHz band (usually known simply as „35 MHz“) and the 40 MHz band.

As of 1 January 1981 model control equipment was exempted from the licensing requirements of the Wireless Telegraphy Act 1949. This simply means that no licence is required to operate RC equipment in the U.K. If you need further information please contact:

The Low Power Radio Section, Radiocommunications Agency
Room 712, Waterloo Bridge House, Waterloo Road, London SE1 8UA

Teacher/pupil mode

The PiCO can be used as the **pupil transmitter** for what is known as „buddy box“ flight training. To use this system you will need a teacher/pupil cable (coiled cable # 8 5121) and one of the following transmitters as teacher transmitter:

PROFI mc 4000, PROFI mc 3010 and 3030, Commander mc 2010, 2015, 2020

The PiCO transmitter **cannot be used** with other MULTIPLEX transmitters and/or the old twin-core teacher/pupil cable (# 8 5045).

Please note the following if you wish to use the PiCO as a pupil transmitter:

- Connect the transmitters using the teacher/pupil lead.
CAUTION: do not disconnect the cable while you are using the teacher/pupil system.
- Switch on **both** transmitters.
The indicator LED on the PiCO should now glow RED, i.e. the RF section is not active. Note that this will remain so if you disconnect the teacher/pupil lead. The PiCO cannot start to transmit if you disconnect the teacher/pupil lead accidentally.
- **Check all functions and all trims**
Check the direction and travels of all control functions. Set the trims on the PiCO in such a way that the control surfaces on the model do not move when you switch between teacher and pupil transmitters.

Diagnosis mode

You can connect the transmitter directly to the receiver using a diagnosis cable (closed loop cable), in which case you can check and adjust your model directly, without transmitting a radio signal. Connecting the cable to the transmitter automatically switches off the transmitter RF section, and the indicator LED on the transmitter will glow RED. There are two types of diagnosis cable:

Diagnosis cable for the „EinStein“

Order No. 8 5162

Diagnosis cable to fit the socket on the switch harness

Order No. 8 5105

Range checking

Range checks are one of the most important procedures you can carry out if you want to maintain high standards of safety and reliability when operating your model. The following method is based on our experience and measurements, and if you follow it to the letter it should ensure that you are always on the safe side.

1. Collapse the transmitter aerial fully, and hold the transmitter horizontal at a height of about 1 m above the ground.
 2. Ask your assistant to hold the model about 1 m above the ground.
 3. Check that there are no major metal objects (cars, wire fence etc.) in the vicinity.
 4. Carry out the range check only when there are no other transmitters switched on - even if they are on different channels.
 5. Switch on the transmitter and receiver. At any distance up to about 80 m between transmitter and model the control surfaces should respond smoothly and cleanly to the transmitter, without any trace of jitter (unwanted movements).
- If your **model has a power system**, repeat the procedure **with the motor running**.

Care of the transmitter

Protect your transmitter from mechanical shock and pressure, temperatures above 60°C (direct sunshine inside a car), damp, solvents, fuel, exhaust residues and dust (e.g. in your modelling workshop). Remember too that your transmitter may suffer from condensation if subjected to a rapid change in temperature (e.g. when moved from a warm workshop into a cold car), as the condensation may impair the electronics. If you think this might have happened, be especially thorough with the range check and allow the transmitter plenty of time to warm up or cool down as appropriate. Check that the transmitter is completely dry, inside and out, before switching it on.

Cleaning the transmitter

The best way to remove dust is to use a soft paintbrush. Clean the case with a slightly moist cloth and a mild household cleaner.

- ⚠ Take great care to avoid any fluids getting inside the transmitter.

Maintenance

Your transmitter contains no parts which need to be maintained or serviced.

- ⚠ However, we strongly recommend that you carry out regular checks of effective radio range and all working systems.

What should I do if I have questions, or problems arise?

In the first instance direct any queries to your local model shop. If there is a fault with the transmitter you may prefer to turn directly to one of our Service Centres; their addresses are listed on the back cover. For technical questions or queries regarding the use of the transmitter the **MULTIPLEX hotline** is available: [0049] 7233-7343. We can also be reached by E-Mail on: multiplex.p4000@t-online.de

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