

PCM10Sx

USER MANUAL



JR REMOTE CONTROL
RADIO CONTROL SYSTEMS

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Using This Manual

JR's PCM-10SX offers the ultimate in programming capability while still retaining the "user friendliness" for which JR's original PCM-10 and PCM-10S are known. While many of the screens are similar to the previous generation PCM-10 and PCM-10S, it's important that you read and understand this manual to fully appreciate and take advantage of the capabilities of the features available with the PCM-10SX.

Refer to the Table of Contents below to find out where to look for answers to your particular questions. The features are discussed in the same order as they appear on the LCD of your screen (numerically). An explanation of the use and purpose of each feature is provided, followed by a labeled illustration of its LCD display. Additionally, a step-by-step example is included to clarify the set-up procedure of the feature.

You will find a blank data sheet at the end of this manual. Once you have entered all data for a particular model, we recommend that you also record it on the data sheet. If you should experience a memory battery failure or wish to make changes to the current settings, this extra step will save you a lot of time.

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1

Features

1.1

Transmitter

- The programming of the PCM-10SX allows up to five flight modes with independent throttle and pitch curves, tail rotor mixing, and stunt trims.
- An exponential function is available on the throttle and pitch curves that automatically “smoothes out” the curve.
- When using the PCM-10SX in conjunction with the JR Piezo Gyro, three gyro rates are available and can be selected in the seven types of flight modes (N, 1, 2, 3, 4, Hold, Inv).
- Electronic swashplate timing allows the selection of program swashplate timing changes to compensate for flight inaccuracies. Swashplate timing can be programmed to be activated in any of the flight modes.
- Trim rates are adjustable in 1% increments from 100 to 0% on aileron, elevator, and rudder trims.
- The micro computer system employs an extra large and clearly visible LCD touch display that makes the PCM-10SX the fastest and easiest radio control transmitter system in the world to program.
- Soft rubber side panel and adjustable rear rubber grips allow you to customize the transmitter to your feel.
- The plug-in 700 mAh NiCad battery pack allows for a quick change at the field. Replacement battery packs are available from your local JR dealer.
- Adjustable stick tension enables you to customize the feel of the gimbals for more precise flying. Refer to Section 3.5 of this manual for instructions on adjusting stick tension.
- The new central processing unit (CPU) in the PCM-10SX allows for compatibility never before available in any radio system. This transmitter can broadcast in two types of PCM— the new S-series (1024) PCM and the well-known Z-series (512) PCM — as well as PPM. This enables you to use virtually all of your current FM JR receivers.
- The PCM-10SX is capable of storing ten (10) models in its memory. The new ten (10) model memory allows you to completely program 10 models into the PCM-10SX. Or, by using more than one program for a single aircraft, you are able to have different set-ups available.
- The PCM-10SX is equipped with a five-year lithium battery back-up to prevent memory loss if your transmitter battery pack should discharge completely or if the transmitter battery pack should inadvertently be removed from the transmitter.
- The PCM-10SX has automatic fail-safe “set” and information update in the PCM mode (both S- and Z-series PCM) when

you use the fail-safe feature. There is no need to re-set the fail-safe prior to each flight — the computer does this for you.

- A new fail-safe feature when modulating in the S-series PCM allows you to select hold or fail-safe preset positions for the first eight channels individually.
- Direct Servo Control (DSC) permits operation of all controls and servos without generating a radio signal.
- The graphic multi-point pitch and throttle curve means you can set the pitch for 7 selectable stick positions.
- The PCM-10SX offers a choice of dual rate, exponential or variable trace rate (VTR) movement for the aileron, elevator and rudder channels.
- The PCM-10SX has eight free programmable mixes, four of which allow the programming of up to a seven point curve that can be turned on/off in any flight mode. This is useful for tail rotor mixing.
- Direct control swashplate mixing and adjustable differential allow you to set up for virtually any type of mechanics/rotor head available, while eliminating the need for mechanical mixers.
- The PCM-10SX features memory trim and trim offset. Trim adjustments are entered into the model memory and are automatically recalled each time the radio is powered up.
- Standard PCM-10S radios can be updated to PCM-10SX technology with new software and faceplates through Horizon Service Center.

1.2

Receiver

- The NER-D940S receiver is a high performance PCM-FM dual conversion receiver with 10 KHz super narrow band ABC&W circuitry.
- The latest “S” type central processing unit (CPU) is used in the PCM receiver. It has the highest degree of resistance to electro-mechanical “noise.”
- A narrow band ceramic filter for high signal selectivity also assists in rejecting cross modulation from other common radio frequency difficulties — i.e., R/C transmitters, local paging systems.
- The receiver features direct servo control (DSC) for control of surfaces without radio frequency output.
- The Central Processing Unit (CPU) improves signal reception and integrated fail-safe feature.
- The new NER-D940S offers the highest resolution available in any receiver.
- The receiver has low current consumption.

1.3 Servos

517

- Single ball bearing for precise movement of your helix' control outputs.
- A zero dead band amplifier which assures accurate neutral centering.
- Low current drain.
- An indirect drive feedback potentiometer which gives additional protection from vibrations.
- 3-Pole ferrite cored motor

4131

- Dual ball bearing design to endure the high vibration environments commonly associated with radio control helis.
- Newly re-designed circuitry and motor which offer higher shock resistance than ever before available.
- High resolution and unsurpassed smoothness.
- Precise neutral response repeatability.
- A zero deadband amplifier which assures precise neutral centering.
- High speed, high torque coreless motor.
- Indirect drive feedback potentiometer which gives additional protection from vibration.
- Dust and moisture resistant construction.
- Low current drain.

4721

- Dual ball bearing design to endure the higher vibration environments commonly associated with radio control helis.
- High resolution and unsurpassed smoothness with precise neutral response repeatability.
- A zero dead band amplifier which assures precise neutral centering.
- High speed, ultra-high torque coreless motor.
- An indirect drive feedback potentiometer which gives additional protection from vibration.
- Dust and moisture resistant construction.
- Low current drain.

4000

- New technology, high-frequency amplifier which pulses at 220 times per second.
- High-centering torque precisely holds servo in desired position even under heavy loads.
- True zero dead band for exact centering.
- High speed, high torque coreless motor.
- Dual ball bearings on the output shaft.
- 16% increase in revolution in PCM mode.
- Highest performance available in a standard size servo.

Note: The NES-4000 high-frequency Super Servos offer a higher performance level than standard servos. They do, however, consume more power to operate than standard servos. It's important to reduce the flight time between recharges. We recommend reducing the flight time by 10% per high frequency servo (e.g., if three servos are used, reduce flight time by 30%). Or, use a higher capacity battery. In either case it is important to check the condition of the battery between flights. JR's Model Beaucon (JRPA480) is recommended.

2.1 System Specifications

System Name	A220HS Computer Helicopter System
Transmitter (Main Body)	NET-A220HS
(RF Module)	NET-J72P, NET-J50P, NET-J53P
Receiver	NER-D940S
Servos	NES-517X5, NES-4721X5 or NES-4131X5
Charger	NEC-222
Airborne Battery	4N-1000
Accessories	Deluxe switch harness, grommets, servo arms, DSC cord, aileron extension, rear rubber grip set, hex wrench, neck strap instruction book, and warranty card

2.2 Transmitter Specifications

Model No.	NET-A220HS
Encoder	10-channel computer system
RF Module	50/53/72 MHz
Modulation	PCM (S&Z) or PPM
Output Power	Approximately 750 mw
Current Drain	200 ma (70 ma w/DSC)
Power Source	1.2V x 8 NiCad (9.6V) 700mAh
Output Pulse (in microseconds)	1000-2000 (1500 neutral)

2.3 Servo Specifications

Servo	NES-517
Torque (oz/in)	40.34
Speed (S/60°)25
Input Pulse	1.5 ms ±600µs
Power Source	4.8v DC (Ni-Cd)
Motor	3 Pole Ferrite
Weight (oz)	1.45
Size (W/L/H)73" x 1.52" x 1.32"

Servo	NES-4131
Torque (oz/in)	90.42
Speed (S/60°)23
Input Pulse	1.5 ms ±600µs
Power Source	4.8v DC (Ni-Cd)
Motor	Coreless
Weight (oz)	1.50
Size (W/L/H)73" x 1.52" x 1.32"

Servo	NES-4721
Torque (oz/in)	119.63
Speed (S/60°)22
Input Pulse	1.5 ms ±600µs
Power Source	4.8v DC (Ni-Cd)
Motor	Coreless
Weight (oz)	1.55
Size (W/L/H)73" x 1.52" x 1.32"

Servo	NES-4000
Maximum Starting Torque (oz/in) . .	73.7
Speed (S/60°)17
Input Pulse	1.5 ms ±600µs
Power Source	4.8v-6.0v DC (Ni-Cd)
Motor	Coreless
Weight (oz)	1.83
Size (W/L/H)73" x 1.52" x 1.32"

2.4 Receiver Specifications

Model Number	NER-D940S
Type	10 Channel, FM-ABC&W, ACI PCM
Frequency	50/53/72 MHz
Sensitivity (in microseconds)	5 minimum
Selectivity	8 KHz/50dB
Weight (oz)	1.69
Size83" x 2.09" x .75"
Receiver Antenna	39" for all aircraft frequencies.

2.5 Charger Specifications

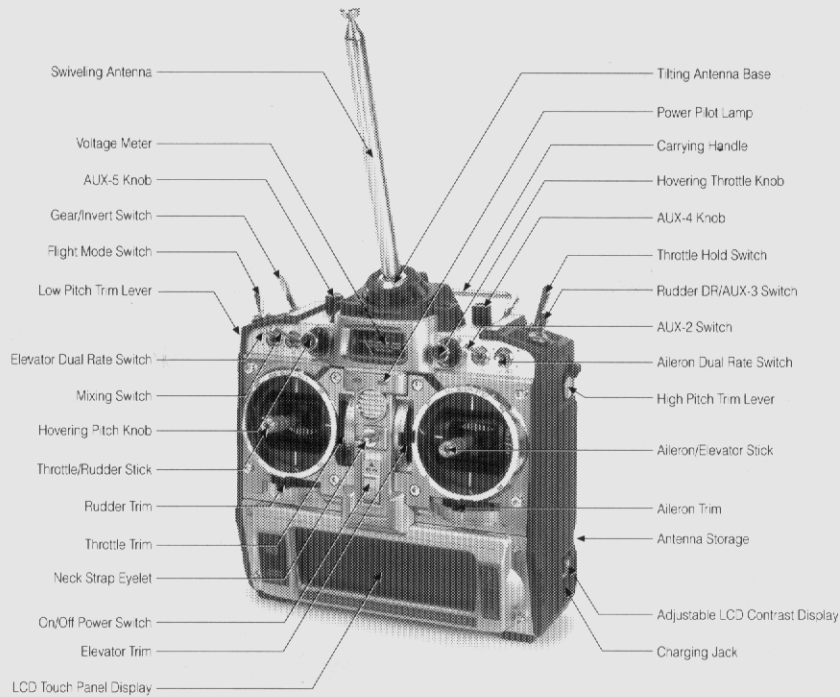
Model Number	NEC-222
Input Voltage	AC100-120v
Output Current	50mAh Tx/120mAh Rx
Charging Time	15 hours

2.6 Airborne Battery Packs

Model Number	4N-1000
Voltage	4.8v
Size	1.70" x 2.60" x .63"
Weight (oz)	4.94

3

Transmitter Controls



3.1

Control Identification

Antenna

- The adjustable base can be locked into position by tightening the two screws just to the rear of the antenna ball mount. Do not over-tighten. This feature allows you to determine the antenna angle that suits you best and to lock it in place.
- The antenna can be removed and stored in the special compartment in the right side panel of the transmitter. The next time you fly, simply thread the antenna into the ball mount. It will automatically assume the previously set angle.

Note: Do not point your antenna directly at your model helicopter. The tip of the antenna is the weakest radio frequency radiator in any radio controlled transmitter. Instead, have the antenna at about a 20°–45° angle away from the model.

Note: The level meter on the new PCM-10SX is a voltage meter. In previous JR radios this meter has been used for radio frequency (RF) output.

For a proper range test of the PCM-10SX system please refer to Section 13, Daily Flight Checks.

Base Loaded Active Antenna

An optional base loaded active antenna is available for use with the PCM-10SX transmitter. It is considerably shorter than the standard antenna. However, the base loaded antenna cannot be collapsed for storage in the side of the transmitter. The base loaded antenna, part number JRPA155, is made of a flexible coil and is covered with a soft plastic material. Your range will not be affected when using the base loaded antenna.

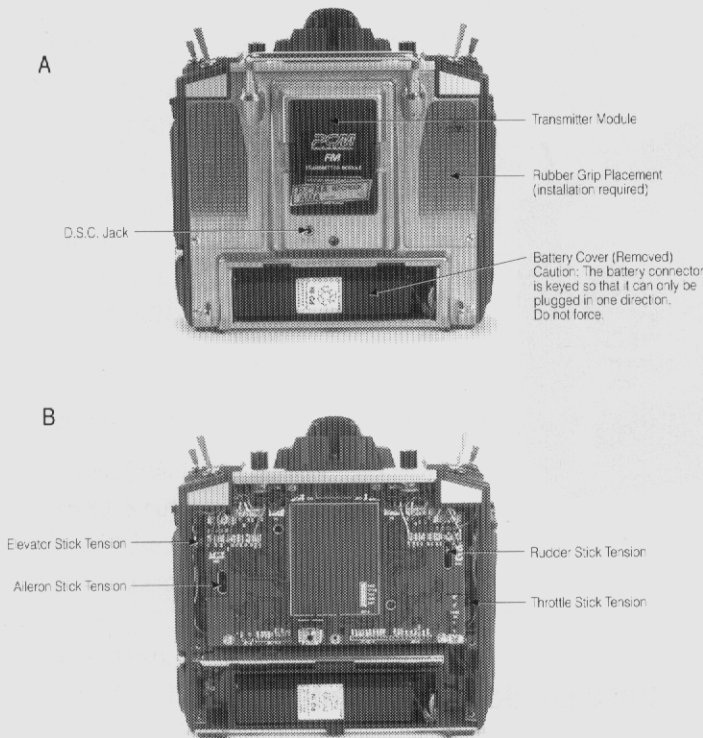
Channel Assignment

1. THRO	Throttle Channel
2. AILE	Aileron Channel
3. ELEV	Elevator Channel
4. RUDD	Rudder Channel
5. GEAR	Gear Channel or Inverted Channel (if active)
6. AUX1	Auxiliary 1 (used for pitch w/collective pitch helis)
7. AUX2	Auxiliary 2 Channel
8. AUX3	Auxiliary 3 Channel
9. AUX4	Auxiliary 4 Channel
10. AUX5	Auxiliary 5 Channel
11. BATT	Receiver Battery Pack Port

Throttle ALT

This function makes the throttle stick trim active only when the throttle stick is less than half throttle. This gives easy, accurate idle adjustments without affecting the high throttle position. In hovering flight, this feature will function as a simple high idle system.

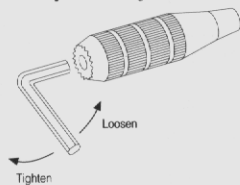
3.2 Transmitter Rear



3.3 Stick Length Adjustment

Control Stick Length Adjustment

The PCM-10SX allows you to adjust the control sticks' length.



To adjust the stick length, use the 2mm Allen wrench (supplied with your PCM-10SX transmitter) to unlock the set screw.

Note: Turn the wrench counter clockwise to loosen the screw and clockwise to tighten it.

Turn the knurled part of the stick counterclockwise to lengthen and clockwise to shorten.

After the control stick length has been adjusted to suit your flying style, simply tighten the 2mm set screw.

If you desire longer sticks, JR has developed a new, thicker stick (JRPA047) which is approximately one inch longer than the standard sticks. This stick, crafted from bar stock aluminum, is available at your local JR dealer.

3.4 Neck Strap Attachment

An eyelet is provided on the face of the PCM-10SX transmitter which enables you to connect a neck strap (JRPA023). This hook has been positioned so that your transmitter will have the best possible balance when you use a neck strap.

Cautionary Note: Please double check to ensure that the neck strap is securely fastened to the transmitter.

3.5 Adjustment of Stick Tension

The PCM-10SX allows you to individually tailor the tension of each of your stick control inputs to suit your flying style. The procedure is as follows:

1. Remove the transmitter RF module from the rear of the transmitter. Squeeze the tabs on either side of the module and pull it straight out.
2. Take the battery door cover off of the transmitter by pressing in on the silver battery door cover grips and slide the door towards the bottom of the transmitter.
3. Unplug the removable NiCad battery pack from its connection in the transmitter.

Note: When reinstalling the battery, do not force the plug into its receptacle. The plug is keyed so that it may only be connected in one way. With the radio sitting (on its "feet") on the table, the orange wire will plug into the top of the receptacle.

4. Remove the five (5) transmitter back screws from the transmitter. Please observe that the center screw (directly beneath the transmitter module) is longer than the other four. It is imperative that you return this screw to its original position when reinstalling the back of the transmitter.

5. Remove the back of the transmitter by grasping the bottom of the transmitter back (near the feet) and pulling it slightly away from the transmitter. Next, pull the back of the transmitter down and away from its groove.

6. Rotate each screw clockwise to tighten its respective stick tension.

7. After achieving the desired stick tension, reverse this process to re-assemble your transmitter.

- Alternatively, if you are unable to achieve the tension that you desire by tightening the stick tension screws, you can purchase stronger springs and have the Horizon Service Center install them for you.

3.6 Installation of Rear Rubber Grips

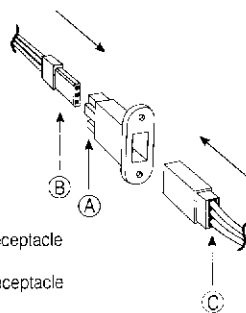
Determine the positions of the rubber grips that best suit your flying style, and attach the grips to the transmitter back with the supplied double stick tape.

3.7 Using the DSC Cord

Direct Servo Control (DSC)

For proper DSC hook-up and operation:

1. Leave the transmitter power switch in the "off" position. The transmitter will not transmit any radio frequency (RF) in this position.
2. Plug the DSC cord (supplied) into the DSC port in the rear of the transmitter.
3. The encoder section of the transmitter will now be operational and the LCD display will be lit.
4. Plug the other end of the DSC cord into the receiver charge receptacle. Turn the switch harness to the "on" position.



A - Charge Cord/DSC Receptacle
B - Switch Harness Lead
C - Charge Cord/DSC Receptacle

Note: When installing the switch harness charging jack, be sure to hook the charging jack receptacle, **JRPA024**, securely into the switch harness charge cord.

Why you should use the DSC function:

1. The DSC enables you to check the control surfaces of your helicopter without drawing the fully operational 200ma from

your transmitter battery pack. Instead, you will only draw 70ma when using the DSC function.

2. The DSC function allows you to make final adjustments to your helicopter without transmitting any radio signals. Therefore, if another pilot is flying on your frequency, you can still adjust your helicopter and not interfere with the other pilot's aircraft.

Note: Under no circumstances should you attempt to fly your helicopter with the DSC cord plugged in! This feature is for bench checking your helicopter only.

3.8 Frequency Notes/Aircraft Only Frequencies

Frequency Notes

The PCM-10SX employs a plug-in module system for transmitter frequency changes. If you wish to change a frequency, you can simply change the radio frequency (RF) module, commonly referred to as either an RF module or transmitter module. The JR modules are universal for all of the modular frequency controlled systems. In other words, if you currently own a modular JR system, you can use the RF module from your current system with the new PCM-10SX.

The PCM-10SX can transmit in either pulse code modulation (PCM) or in pulse position modulation (PPM). Be certain to observe the following guidelines:

1. Do not operate your transmitter when another transmitter is using the same frequency, regardless of whether the second transmitter is PCM, PPM, AM or FM. You can never operate two transmitters on the same frequency simultaneously without causing interference to both receivers and crashing both aircraft.
2. For operation of your PCM-10SX with additional receivers, you should refer to the receiver compatibility chart. The chart is located in Section 8.25 of this manual.

Aircraft Only Frequencies

JR RF modules and receivers are available in 50, 53 and 72 MHz frequencies in the United States for use with model aircraft. Employing 72 MHz frequencies does not require a special operator's license from the Federal Communications Commission (FCC). However, the 50 and 53 MHz frequencies require that you carry a Technician II license.

- A chart for all available frequencies is located in Section 14 of this manual.

4

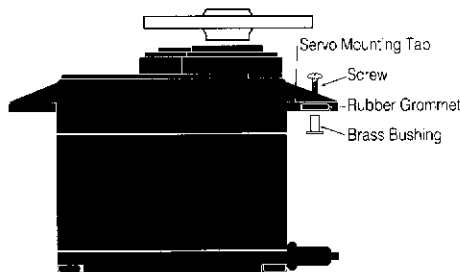
Connections

4.1

Installation Requirements

It is extremely important that your radio system be correctly installed in your model. Here are a few suggestions on the installation of your JR equipment:

1. Wrap the receiver in protective foam rubber that is no less than 3/8 inch thick. Secure the foam to the receiver with #64 rubber bands. This will protect the receiver in a crash or a very hard landing.
2. The servos should be mounted using rubber grommets and brass bushings to isolate them from vibrations. Do not over-tighten the mounting screws — this will negate the vibration absorption effect of the rubber grommets. The following diagram will assist you in properly mounting your servo:



The brass bushings are pushed from the bottom up in the rubber grommets. When the servo screw is tightened securely, this will provide the proper security as well as the proper vibration isolation for your servo.

3. The servos must be able to move freely over their entire range of travel. Make sure that the control linkages do not bind or impede the movement of any of the servos.
4. Mount all switches away from the engine exhaust and away from any high vibration areas. Make sure the switch operates freely and is able to operate over its full travel.
5. Mount the receiver antenna firmly to the helicopter to ensure that it will not become entangled in the main and/or tail rotor blades of your helicopter.

4.2

Connections

