

Benchmark

'electronic precision at its best'

The JR R1 Steerwheel radio

Hugh has his hands on the second of JR's latest steerwheel computer gear. This time the top of the range three function, ten memory comprehensive R-1.

The R1 is a well balanced design in more ways than one

Regular readers would have seen the JR xR2 review in the May issue of your favourite mag and will know the details of this budget two function - two memory - 27 meg steerwheel gear.

Refreshing our memories the principles of computer gear are pretty straightforward. They enable the driver to tune each servo to respond to Tx instructions in a more sophisticated way rather than just moving in a linear way. The driver can also program servos to interact with one another under difficult driving and track conditions and also trim them much more accurately. All this info can be stored into the Tx memories for future use. The xR2 is a good introduction to this family of computer gear being simple and uncomplicated and it's very useful to remember this when approaching the comprehensive R-1.

Not a good start which is a pity because the R-1 exceeded all my expectations once the system was fully understood.

Control Layout

The Tx layout follows what is now the norm of a steerwheel design - a pistol grip with the batteries in the base and a trigger throttle. The steerwheel is mounted on a console similar to a full size car with finger tip operated buttons and switches on the top and either side. These are basically trim adjustments and system switches which can be function dedicated as the user wishes. The console is extended downwards to house the display and securely bolted to the battery base. To the right of the wheel is the dual coloured Key Pad. To the left is the ON-OFF master switch, Tx status indications and behind a lift down cover a display only switch, DSC socket and charging socket. Also on the left and part of the console is a neck strap attachment. The rear house's the plug in RF module. Although the review Tx came with a nicad pack it is normally sold with a dry battery box. Access is via the usual sliding cover with the nicad pack securely held in place with moulded in ribs and anti movement packing stuck to the cover underface. This may not seem important but nothing is more disturbing than a large nicad pack moving around inside a Tx when it is being operated. The supplied Rx, frankly, is a puzzle. It's the new 40FM Two Function Mini R200RX with a RRP of £71. It is just 2mm shorter in length and width with the same height than the vastly superior R330S Rx which is Three Function PCM and, wait for it, just £4.95 dearer! So you get Pulse Code Modulation with three functions and fail safe for just another five quid. I know what I would prefer. Incidentally the R330S Rx is 28 mm x 32 mm x 12 mm in height. (But 22 mm overall the crystal)

As is usual with computer gear in this price bracket the set comes without servos leaving the choice to the user. JR recom-

mend the NES-2825, @ £78 RRP each, and I cannot disagree. I requested two of these for review and I wasn't disappointed. The Rx battery supply is not included and although a 700mAh nicad was supplied for the review I would recommend at least a 4.8V

Quick Start

Opening the manual reveals a Quick Start series of six steps on the inside of the front cover prior to the contents index. This is very good as we are always impatient to connect up a new system and try it out. The six steps allow you to access the System Mode and select Servo Reverse (REV.SW) then select the Function Mode and adjust each servo travel. (TRVL ADJ) Following this allows you to set up the basic requirements of any installation from which all further setting and programs start. I then bench tested this basic form to establish the performance of that crucial unseen RF link between transmitter and servo via the receiver. Now I have in my workshop a 'beast' which is the most dirty thing known to a set of gear. I've seen a Rx and servos move off the bench in fear when this appears! It's dirty magnetically and when switched on creates the biggest amount of RF interference anyone is unlikely to experience. I test gear with the Tx aerial retracted and the Rx aerial fully unwound. The Tx is positioned two metres away from the Rx with the 'beast' located equidistant between the two. Both Rx's supplied were subjected to this interference test the R330S a PCM Rx and the R200 a FM Rx. Both passed the chequered flag as winners and the 330, which I had previously programmed to fail safe did so when the Tx was switched off. This fail safe is a serious bonus with a PCM Rx activating the fail safe after a brief time delay following loss of signal which if running a large IC car changes a potentially lethal projectile into a purring pussy cat.

Servos

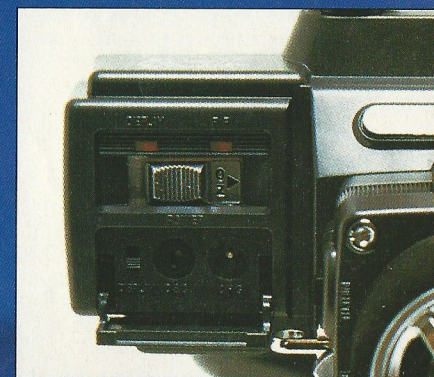
The two NES2825 servos gave superb performances which was expected when considering their specs. I tested them at 4.8V. Their torque at 6V is a respectable 8.0Kgm/cm with a speed through 60° of 0.15secs. To get this into context a standard servo has a torque of 3.1Kgm/cm with a speed of 0.27secs. at 4.8V. So the NES2825 is almost twice as fast with again almost double the torque but remember at 6V. It is also metal geared and double ball raced. The precision of centering and therefore back to any previous position fully justifies its price and the digital trim positions of the R-1 system. These trims are available for instant use from the console. However sub-trims can adjust steering and throttle servo centres either way up to 30% of the travel and each button press programs in just over 8.5

seconds of a degree which equals a whisker under seven presses per degree!! Altogether there are five digital trims and each can be programmed into one of the following functions: steering trim, steering dual rate, throttle trim, panic brake, Aux. 3, ABS Swing and ABS Point. These are programmable and memorised for up to ten models. This is electronic precision at its best and fully underlines the need not only for high quality servos but also very high quality mechanical linkage on steering and throttle. No bits of bent wire here. Quality ball and socket connections and uncompromising joints and linkage should be the minimum.

Program selection

Before getting into the programming detail a word regarding the display. Its a dot matrix LCD with variable contrast which I found held its own in bright sunlight. The Normal condition when first switched will display Tx voltage numerically with a battery Full-Empty bar graph. This graph has a visual nib showing the battery 9V failure point. If this occurs an audible tone will sound five times and the word BATT will flash on the screen. Many of the programmable functions in use at that time will be disabled but all the memory storage will be protected by a five year life plus lithium battery built in. Eventually this will fail and "1 BACK UP ERROR" will appear. Its replacement is a service centre job. Normal Display will also show the model number, integral time and the JR logo. The integral time shows the elapsed time the Tx has been ON for the model number shown. This is a very useful aid to Tx battery consumption during a day's racing. The integral time is part of a comprehensive Timer system which is displayed when required in place of the JR logo.

Programming is simple and straightforward once you have mastered the logic of the modes. At first sight there appears to be only two modes - System and Function. However there are another three - Direct Mode, Tx Mode and Beginner/Expert Mode. This last is a very thoughtful addition and JR are to be congratulated for its inclusion. I found it by practising what I preach! I read the manual right through and found it buried on pages 12 and 25. It's part of setting up the Tx Mode which allows the user to customise the Tx for personal preference. The Beginner setting deletes the more advanced program features allowing an easier intro into the system. Expert setting provides the full Monty once the basic programming has been mastered. All programming is done using the Key Pad which is dual coloured - one key is

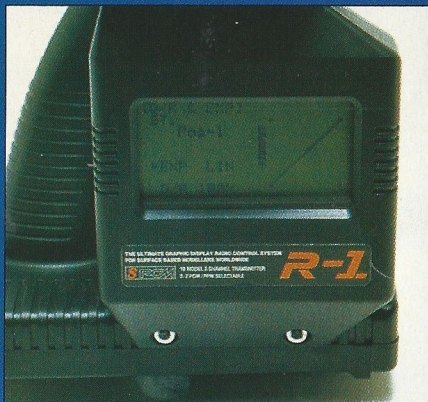


DSC and charge sockets sit neatly behind a flap



Manual Labour

I was very impressed with the XR2 manual especially the safety notes and I had hoped that the R-1 manual would be as impressive. Unfortunately this was not to be. The manual supplied by the manufacturer is once again written for the American market which in itself doesn't matter for 99% of the instructions. However it can confuse the UK purchaser when on the last page only a 3 month warranty is stated and on page 7 a 27MHz two function Rx is shown when the system is 40MHz and three function. This manual does not include any safety notes and for these one must refer to the supplied MacGregor's own Installation booklet. OK I hear the critics say what's the problem? Its the usual one. The booklet is written for the aero boys and issued with equipment labelled 'The Ultimate Graphic Display radio Control System for Surface Based Modellers Worldwide'! The car user needs to be advised on his car requirements which includes 40meg band info including the right pennant colour etc etc., Reluctantly, it must be said, this is just not good enough when a purchaser has paid a RRP of £269 for a set of gear comprising of only a Tx and Rx - no servos - which incidentally if the best is to be had from R-1 means a further outlay of £78 each for two servos.



The excellent liquid crystal display

orange and seven are orange and blue. An orange key selects a function and a blue key programs. For example: Holding the orange key MODE-LIST down and switching on the Tx will enter the System Mode menu. This can be scrolled using either the dual keys blue UP or DOWN. Once at the selected function pressing the MODE-LIST key will bring it up and programming can commence using the blue + and - keys. Once completed pressing the UP and DOWN keys simultaneously will return to Normal Display. To access Direct switch on and press the MODE-LIST once. Pressing any dual coloured key will bring the orange function. For example: Trim Pos will show graphically the three servo trim positions TH- ST - AUX plus BRAKE and Dual Rates as bar graphs, pressing the appropriate trim button will move a cursor along the bar graph showing the servo arm position relative to its centre. BRAKE and D/R are shown as percentages. Pressing the blue PAGE key will alternate the display to show the three servo positions again on a bar graph. Once set pressing MODE-LIST will revert to Direct Mode and pressing blue CLR will revert to Normal Display.

Feature Rich

The programming options are very comprehensive and outside detail description in a review. However I have included a list showing the principle options but the reader should realise that this list is far from complete mainly due to the fact that one needs to use the system over a period to find and maximise its potential. Nevertheless there are features that deserve a mention.

Because of the dot matrix nature of the display the various graphs are truly representative of the program the user requires. An example is the Throttle Curve where the throttle can be adjusted accurately to a response curve created from eight points. Users of electronic speed controllers will better understand this facility when I say you can program in your own 'soft start' requirements. This also applies to the brake function. These curves can be further smoothed out by using the Exponential Function option. A Steering Speed program can be created to suit car and track conditions. This option programs the steering servo speed to be adjusted away from centre as well as back to centre. Also all points can be selected in both turning and return and the speed between each point independently selected. Values can be set and selected by using the Drive Mode Switch.

The Advanced Braking System is, as far as I am aware, a first - cadence braking. Cadence is a musical term meaning rhythm: the measure or beat of sound or movement and it's the measure

of movement that applies to this system. It's well known in full size driving that sudden application and then continuous hard braking is not good practice and can lead to situations not of the driver's choosing. Far better to pulse the brakes with various times on and off and couple this with the strength of the braking action all the time integrating this with steering. This is what the R-1 ABS System is. The frequency of the pulses is called a Pattern and there are nine to select from. Each pattern occurs within half a second. The Swing is the height of each pulse which is the strength of the braking action. A delay can be built into the regular braking before ABS kicks in plus the system can be mixed with steering so that harder braking can be achieved in turns. It can also allow for ABS to be decreased during a turn. Finally the ABS System can be selected On or Off using the Drive Mode switch. When selected ABS will flash on the screen. We all know of the throttle 'dead spot' or band when gently squeezing, nothing happens. The R-1 has a Quick Throttle option where this can be eliminated to give a more accurate feel to the throttle. Its done in percentages for both forward and brake. Well that's it as far as the bench testing goes so what are the conclusions.

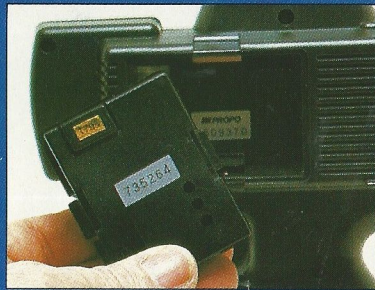
Conclusions

There is no doubt it's the best computer steer-wheel system I've had on my bench. The system logic indicates there has been a lot of driver info input with options that are there for practical use and not included because it seemed a good idea in the design stage. Once the programming logic is understood it's quite simple to use. The RF link between Tx and Rx is very, very tight and extremely accurate when used with the PCM Rx and the JR recommended NES-2825 servos. Once again the user must ensure the mechanical connections are of the same if not higher quality. If not the purchase price has been wasted. Warts? - a number I regret to report. JR Quality Control slipped in two areas. I could not insert the servo plug into FUN1 of the 330 Rx. A magnifying glass revealed that 'flashing' around the entrance was the cause. Gently removing the flashing cured the problem. I do not expect this from gear of this quality and price. The FM Rx came with its crystal inserted. When I removed this to test the 330 the grey

sealing cover came out leaving the crystal behind with no room to extract using fingers. The only way it came out was using the thin jaws of a pair of snipe nose pliers. This is not a clever thing to do because if the crystal case is damaged it will possibly also damage the crystal inside creating a future failure waiting to happen and you've guessed it just as you leave the last bend and head for the finish in the lead! A spot of cyano between crystal and cover cured the problem but I should not have had to do it. MacGregor have also got Quality Control problems. The DSC lead supplied was the wrong one. It could not be plugged into the Rx. The Rx end of the lead was fitted with a female socket. The two flyers' supplied detailing the R-1 features contradicted each other with regard to the Rx supplied. One said a 'Three channel ABC&W receiver' and the other 'R200 2ch PPM Micro'. The manual shows the R200 and I've already said which I prefer.

The radio control surface user is a large and expanding market both in cars and boats and it has taken a long time for it to be recognised that it has its own idiosyncrasies and shake off the aero influence. It just needs that much more care and I'm sure not only would the modellers benefit but also the trade. Sorry but it had to be said.

Well that's it once again so as usual May Your RC (Computer!!) Force Never Leave You. **RMCI**



The removable RF unit

JR R-1 Steerwheel Computer Radio Features

- Three function transmitter with anti glare aerial and adjustable steering tension
- LCD screen programming with variable contrast and two speed scrolling
- Beginner or Expert Mode
- For receiver details see text
- Ten car memories with naming facility
- Sub trim of all three functions
- Two Rate and Exponential Steering curves with graphical display
- Programmable cadence Advanced Braking System
- Two five point throttle curves with exponential option and graphical display
- Programmable separate steering response for turn and return
- Digital Trimmers with audible neutral and servo positions display
- Servo Reverse on all three functions with graphic displays of servo and trim positions
- Two programmable mixes on any two functions
- Warning alarms with PCM or PPFM - Fail safe with PCM
- Idle up
- Lap timer and counter storing up to 100 lap times
- Copying of data between memories

Further details and list of stockists from: MacGregor Industries Ltd., Canal Estate, Langley, SLOUGH. SL3 6EQ. tele: 01753 549111 or FAX: 01753 546983.