K.Bits.. 44 (0) 1323 725817

Email: info@kbits.co.uk

*Suppliers of **Quality** Radio Control Equipment, Batteries and Accessories.*

Foreword

Welcome to the latest K Bits catalogue, during the last couple of years, the advancements in radio control systems has been truly revolutionary. A new frequency band **(2.4GHz)** has become available. Along with synthesized transmitters, modules and receivers which offer up to 34, 40MHz spot frequencies using two simple selector switches and no Tx or Rx xtals. Just think of the cost saving when compared to having a case full of xtals on a conventional R/C system…

Now, celebrating its tenth Year, ***K. Bits*** continues to provide skippers with the very best in radio control equipment, winches, servos and accessories, along with the specialist advice before and *after sales*. Computer radios really do give you the ultimate setup and tuning facilities to get the very best from your chosen Yacht. This catalogue's concept is to assist you in the selection and purchase of Radio control equipment, batteries and accessories from the very basic systems upwards to maximise reliability and performance of your yacht. Remember by finishing ***every race*** gives you the 'winning' formula.

The winch market particularly in the **One Metre** class has firmly established the large DIGITAL servo (a customised K. Bits innovation) using either carbon arm or large wheels as the ultimate for speed and resolution (accuracy) when controlling sails. The void created by the demise of ***whirlwind winches*** has been filled in the main by **Futaba' S5801** drum winch. The mounting and size allows easy replacement with the minimum of hassle.

New* products** include **R/C systems**, servos, ***Li-Po batteries and **RMG winches**, the **280D** and **380D** now offering much improved resolution are stocked by us to provide a more complete support to skippers across the r/c classes. Ken Binks took up Philip Playle's offer to sail in the Radio 'A' class World Championships and having just 1 hours familiarization with the all new design SWORD **(RMG 380D)** from Sailsetc finished 2nd to Graham Bantock in the W.C. at Gosport UK.

A New range of batteries, are now stocked in all popular voltages and sizes for those on a tight budget. These have proved to be very reliable with a performance to match.

This catalogue provides an insight into the possibilities ***you*** can achieve, when using a modern radio system to fine-tune a yacht and get the **very best in performance** from each rig. At the **budget end** the same care and attention is taken. All R/C systems are **customised** for yachting. The sets include both Tx and 6volt boat NiCd's plus one servo where indicated. Transmitter stick assemblies are modified, aerials, lubrication and water 'drip loop' washers are fitted. Also the basic sets now include rechargeable cells and one servo for the rudder function. At the top end the **Futaba 3VC *Super*** is supplied with ***K Bits* software** to get you started quickly.

New Items, Market leaders in **2.4GHz technology**, Horizon Hobbies **Spektrum** brand have just launched the **Spektrum DX6i** to replace the DX6. Priced around **£110** this will take Radio Sailing by storm. (tel for latest delivery info) ***NOW DX5e at just £67.50 Wow!!***

Futaba have also come up with an absolute winner, the all new **Futaba 3GR**. A 3ch system PPM/HRS 10 model memory computer radio which is available on ***FASST* 2.4GHz or 40MHz** needs no xtals whatsoever and can be set to operate on ANY of the 40MHz frequencies from 665 – 995. Add to this Digital trims, EPA, EXPO and ATL

features this system is priced at **£140** (40MHz) **£175** (2.4GHz) Designed as a 'dry' cell car radio this system is customised for yachting and Tx NiCd supplied by ***K Bits..*** 40Mhz system will operate all your existing FM 40MHz receivers.
The Futaba 3VC has been upgraded to the **3VC *Super,*** giving high speed data transfer option (HRS) just for DIGITAL servos. Set now supplied with the 3ch micro HRS receiver. System can be set for PPM, PCM and HRS, so will work all Futaba's existing FM and PCM receivers. Futaba's new ***FASST*** (Futaba spread spectrum technology) **2.4GHz** systems are available as a module for the **3VCS** or complete systems such as **3GR 2.4GHz** or **6EX 2.4GHz**

2.4GHz first appeared in 2005 and has proved to be a superb band, particularly on public lakes that have absolutely no frequency control. The transmitter has 79 'spots' in the band to chose from, the first available 'not in use' is grabbed and starts calling for its matching receiver. The receiver looks/listens for a signal with its unique 'tag' or code, locks on and starts operating. This happens in 1-2 seconds and you start sailing.

Internally generated interference from servo's, winches etc in the case of yachts, speed controllers and drive motors in the case of scale and fast electric boats. HAS ABSOLUTELY no affect on the system and is glitch free. Like all new systems and particularly at this very high frequency (2400MHz) the aerial orientation in the boat is more critical. If all else fails read and follow the instructions!!

'New' 'New' 'New' in **2008** for **UK** market is the **Spektrum DX6i**, a complete six channel system operating in the same way with ***even*** more security. Now customized for yachts by ***K Bits..*** Remember with the 2.4GHz band, NOBODY can switch on your frequency and interfere with your sailing. EQUALLY you will not interfere with anybody else!!!!

New Futaba have excelled themselves with the ***new*** R303FHS/40 a 3ch FM/HRS 40MHz receiver. It comes with 34 'xtals' already installed!! At, just £79.95 ****Wow****
OK, it doesn't really have 34 xtals BUT the new synthesized receiver can be set to any of 34 frequencies on 40MHz by setting two rotary switches. Just think, you could use your existing FM Tx and only have to buy transmitter xtals. Or go for the Futaba matching Tx module at £99.95 and say goodbye to xtal misery forever!!!!

Safety issues
Although computer transmitters supplied by ***K Bits*** have programs dedicated to aircraft, gliders and helicopters, here in the UK these models should never ever be operated on **40MHz as it is exclusively for surface use**. Also just putting 35MHz xtals (exclusive aircraft band) in the transmitter would ***not render set safe to use*** as bandwidth and range would be severely compromised. Equally 35MHz sets require much more than 40MHz xtals to make them operate properly in yachts. Lack of care in this area could have very serious consequences including death if an aircraft/helicopter was operated on 40MHz.

New **Laser** 'One design' yacht
Getting new skippers involved with our chosen sport should be at the forefront of ALL our minds. Without new 'blood' especially the young, who's going to 'put the buoys out' in years to come? Seriously, **cost** has been a very big issue when talking to a prospective skipper about taking up Radio Sailing. The **low cost** both financially and build time makes the r/c LASER an ideal class to promote. Yes, compared to a One Metre they are different to sail, an UNA rig always will be. At last though, the class has finally 'come of age' with more and more clubs adopting the LASER as a second or third class to sail. It's very competitive has an excellent Class Association and website. The Marine Modeling sponsored 'Travelers Trophy' is pulling in seasoned R/C skippers, beginners and top dingy sailors. Are you up to the challenge? *At just* ***£325*** *on the water* including r/c

equipment we all owe it to our sport to promote new blood at an affordable price. The Laser and spares are stocked by ***K Bits..*** Radio Sailing.

The HS-5745MG (the latest upgrade of original HS-5735) modified by ***K. Bits*** has proved to be the **ultimate** winch for a one metre yacht. This means even the most basic Futaba or Hitec r/c system can use the latest winch technology. You would think this is going to be expensive and you would be wrong. Including the carbon arm PKB pulley and fused lead, programmed by ***K Bits*****,** this powerhouse of a winch is just **£82.50**

Used by Graham Bantock to become European Champion and Vice Champion in IOM at the Australian Worlds. Graham's disc output arrangement allows the system to be used where room for the arm is not available. Just be aware that a ***computer*** transmitter ***is*** required to get the **extra throw** required with this system.

The ideal **rudder servo** to partner this is the Hitec **DIGITAL** HS-5985MG. Normal sized, this servo, is a **powerhouse**. 12.4kg/cm torque, speed 0.13sec/60deg, metal geared, dual ball raced. Fully programmable using separate unit ***K Bits..*** use this feature to set servo for throw and **failsafe**. Down in Price @ **£59.95**

****New**** this year the Hitec DIGITAL servo range has been expanded to encompass those available with parameters that suit our needs. Including a budget priced DIGITAL servo the HS5475HB. This, servo offers the ***RC Laser*** owner a more robust servo with the benefit of more power and throw when using the Laser 2ch radio system. Customized with extra throw and failsafe for the ***RC Laser*** by K Bits it costs just £24.95

Futaba DIGITAL servos are also stocked, although not programmable the quality of the gearboxes and digital electronics are excellent, particularly the **S9451** with 9.5kg/cm and 0.10sec/60deg and updates the previous model S9450.

Boat Batteries, *New* on the battery front we have **Li-Po** (lithium polymer) these are TOTALLY different from any other type of battery. They offer extremely **high power** and capacity in a **very light** battery typically just **43grams** for **800mah** at **7.4volts** (two cells). In the **Marblehead class** where weight and performance really count, Li-poly's offer an outstanding performance. We also use **Li-Po** batteries in the **'A' class** to provide exceptional performance complimenting the superb **RMG 380D** winch.

When using **Li-Po** cells they require dedicated chargers and power supplies. The **SAFETY** precautions required for these batteries MUST BE FOLLOWED. It is recommended Li-Po battery packs are only used in boats fitted with a sealed radio 'pot' and NOT directly in the hull exposed to water ingress.

On **the charger front**, Futaba have introduced a basic two outlet charger with 180 and 250ma outlets for 6.0volt boat packs. A2 Pro's **new 200ma dual outlet charger** for Tx and 6 volt packs is highly suitable for today's high capacity NiMH batteries. Interchangeable plugs suit SPEKTRUM and RCLaser batteries, at £10.95 is excellent value!

For charging away from home K Bits.. stock an all new 12volt charger, Tx plus boat pack NiCd or NiMH selectable. We also stock 230-**12volt power supplies** so this charger can be used at home**.** At the other end of the spectrum, the Delta **D4-2000**, a **fully automatic** charging unit with 4 outlets, bristling with features and charge cycle information has established itself on the world yachting scene as the **ultimate automatic charger**.

The very popular lightweight **Aerial/eye protector** that *doesn't* rattle or slide down exposing aerial point continues to be a firm favourite. Sensibly, aerial guards are

mandatory at MYA events, so this safety accessory is NOW available as a **Club pack** at £16.15 for 20. Also available, **waterproof silicon grease** for servo cases, pot lids and pushrod exit guides in a 100g tube at **£4.95**

We have increased the content by **Sailsetc. Now complete rig kits** along with boom kits are available. Also included this year for those wanting to upgrade rigs we now carry the ball raced versions of gooseneck and jib downhaul for those special rigs.

Stealth Sails, Trevor Bamforth has introduced 4 panel mains and a new tapered battens as his 'standard' sail. We stock all IOM sails in 50micron film phone for latest info.

K. Bits.. Has its own website on the Internet for those with access. **www.kbits.co.uk** email kenbinks@kbits.co.uk Look for the link from the **Model Yachting Association's** Home page. *This is currently being updated* so add to your 'favourites' and check it out.

For skipper's who have recently come into r/c yachting and have little previous contact with **radio control**, **batteries** and **chargers**, the following information should help to give an insight to the terminology and application of the latest equipment.

TRANSMITTERS
In any radio control system the transmitter will be the part of an integral system that you feel and operate, it goes without saying that it should be comfortable to hold. But of course it goes **much** further than that.

Note: Regardless of modulation type (AM, FM, HRS, PCM) ONLY ONE transmitter per frequency can be operated. The exception to this is the new 2.4GHz band actually has 79 spots which the Tx auto selects and is the most secure as once 'your spot' has been selected nobody else can use that spot until you switch off.

Should it be 27Mhz AM, 40Mhz, 2.4GHz, FM, AM, HRS, PCM? Multi model, 2 channels or more, have ATL, ATV, Exponential, Dual Rates, Electronic trims, etc. etc. What do all these initials mean? And what are the pros versus the cons? As with most things, you only get what you pay for, this applies equally to radio control equipment. Reliability, accurate and precise control without adjacent channel interference should be the minimum requirements.

27 MHz AM
This is the original radio control frequency and generally, used by models of all types surface, air, scientific, plus its use for citizens band and hospital equipment. The latter, not normally on our band, but at times with enough power to cause interference. With **AM**, the information about the servo and winch positions required by the receiver are superimposed on the 'carrier' frequency (27 MHz) as a signal amplitude change, hence the term **AM** which stands for Amplitude Modulation. Originally the transmitters and receivers could only operate at a frequency separation of 50KHz. (Solid colours) Brown Red etc. 6 in total. Now modern 27MHz radio's can work at around 20KHZ spacing hence the 'Split' colours. These are arranged in a 20/30KHz division. This gives us **12 'spots'** on the 27 MHz band to sail our boats. The latest equipment will be able to work at 10kc spacing and will make available additional spots on this band to comply with the EU.

Frequency Modulation (**FM**) also known as PPM uses a small variation either side of the transmitter crystal (xtal) frequency to encode the signal with the winch and servo positions. The more sophisticated circuitry to enable this is the reason for the higher cost of FM equipment. With the Band allocated to 40 MHz, means up to 34 yachts (plus 12 on 27mhz) and now 2.4GHz another 79 could be operated simultaneously!! Of course we sensibly restrict this to a much lower figure with the Heat Management System. But the higher technical performance and greater choice of frequency means less xtal changing

between races at larger meetings. Also, the band is exclusively for surface models, which means less chance of outside interference.

40 MHz
When the **27 MHz** band became more and more crowded, User Groups lobbied the Home Office this eventually led to two new bands for model use. 35MHz for **Aircraft only'** and 40 MHz for **surface models** only. One of the conditions imposed at that time was that all transmitters and receivers here in the UK on 35MHz would use **FM** as standard. However this was never a stipulation for 40MHz. Now, due to current technology, 40MHz **AM** can operate at 10 k/c spacing with **FM**. 40MHz FM Xtals cost more because the specification is more stringent. Where as, AM xtals 27 or 40MHz are cheaper to make. The TX crystals cannot be interchanged between FM and AM because the FM Tx xtal is half the transmitted frequency for technical reasons.

2.4GHz (2400MHz)
This new band for model control owes its parentage to 'Bluetooth' mobile phone technology. 80 channels have been allocated to this band for model control. The **Spektrum systems** operate in the following way. When transmitter is turned on, it scans 79 channels for one or two available depending on the system requirements. Note ch80 is reserved for failsafe use. Once the Tx finds its spare channels it starts sending data. When the receiver is switched on it scans the 2.4GHz band 'looking' for a 2.4GHz signal with its own unique GUID code, once found the servos are energized and start working. How long does this take? Just a couple of seconds!! The **FUTABA *'Fasst'* system** sequentially sends data in short bursts (3ms) on each channel in the band and the receiver follows its own GUID coded Tx faithfully, almost giving 'instant' control.

UK comes inline with the rest of the world at 100mw (as from 8/12/06) The new DX6 and DX7 Spektrum systems with the higher power output have been tested in the USA and Canada by K Bits.. with truly amazing results. With the extra power the receiver aerials do not need modifying. The new technology offers a very solid glitch free link with absolutely no possibility of other users affecting you. OR you them!!!! **Buy the Future NOW!**

PCM
PCM stands for **P**ulse **C**ode **M**odulation. This modulation type gives a totally 'glitch free' environment to operate r/c yachts at the very highest competitive level. With the advent of digital technology and IC's (integrated circuits) a very sophisticated communication method was developed here in the UK for missile guidance control. Eventually the technology became available for model use. **Futaba** have been at the leading edge of this type of control with their 1024 bit processors. This system offers the ultimate in model control with many safety and fail-safe features.

COMPUTER Based Tx's
More and more the model transmitter and receiver now use computer technology, which in turn has many benefits to offer us.

For instance, **multi model capability**. This is where one transmitter can be set up for several boats. At first glance with only one Yacht, something for the future, but model 1 can be set for the **'A' rig**, model 2 the **'B' rig** and model 3 for the **'C' rig.** This means the boat can be optimised for **each** rig. The winch throw and end points can be set for each rig. For easier control, the **exponential** function on the **3VCS**, **6EXAP, 3GR** and **Pro-Car** can be used on the rudder function to give a 'soft' response around the center. Very good for controlling the yachts course towards the 'reaching' marks whilst retaining maximum throw for tacking in difficult conditions. This should be seen as a refinement over **Dual Rates** where a switch has to be operated to change rudder throws.

THROW ADJUSTMENT

This is done with **EPA,** stands '**e**nd **p**oint **a**djustment'. This is very useful when setting up total winch throws…because it allows the *close-hauled* position to be set, independent from the *running* position. You can now see it is not imperative that the winch has a throw adjustment with **EPA,** although it does give an added dimension to the trimming science. The same applies to the rudder, although the **EPA** would normally be the same for port and starboard. But if your horn geometry caused unequal rudder movement when checked with a degree gauge or ruler, the EPA function can be used to balance the throws and 'feel' of the yacht.

What is **ATL**? And how is it a benefit for the Yachtsman. Adjustable Throttle Limiter is another very useful feature of the computer style transmitters. This function relates to the sail trim lever next to the stick and when activated means the trim lever **only** works when the stick is **in the 'close hauled' position**. So once the throws have been adjusted, by moving the trim it is impossible to 'stall' or damage the winch at the running position because the trim lever position does NOT move the opposite end point. So now we can **'tune'** the close-hauled sail position for different conditions.

EXPONENTIAL FUNCTION

Computer transmitters feature exponential facilities on ch1 and 2 sometimes 3. This variable feature allows the sensitivity of the rudder control to be 'fine in the centre and increasingly coarse as full stick is applied. Transmitters with this feature are set up when 'customized' by ***K Bits..*** Overall this feature feels nicer and it is believed offers lower drag controlling a boat on the 'beat'.

TRANSMITTER TRIMS

The higher specification **Futaba and Hitec** radio's feature **Digital trims** (actually a 2 way switch) which enable fine adjustment with the added bonus that they **only** work when the **Tx** is switched **on**. Where as, the **lever type** can be inadvertently moved when handling the transmitter between races.

On the **Futaba 3VCS** the ATL function is displayed as a percentage with two buttons (**electronic trims**) rather than a lever, adjusting the sail position by 1%-5% per press depending on the setting. This fine setting capability obviates the need for rows of holes in the boom and gives a more precise control anyway, plus it can be done while sailing! This very precise control when close hauled, enables a fine balance between boat speed and 'pointing' ability to be constantly adjusted to suit racing situations.

AERIALS

With some of the antics on the bank while racing resembling 'Fencing' rather than sailing it's little wonder we see so many works of art! On a serious note we should always use some form of **aerial tip** protection and ***K. Bits..*** can supply an excellent eye protector.

Not always appreciated is that a damaged or shortened transmitter aerial can create the following problems:

a) Reduce the range of the set.
b) Increase the risk of interference from adjacent Transmitters
c) Generally **increases** the current taken from the nicads. (Shortening sailing time).
d) With a dirty aerial (sliding joints) the transmitted frequency can be affected and cause a) and b) above.

To maintain the aerial it should be treated with water dispersing spray (WD40) doing each section in turn and carefully cleaned with meths after. This should be done regularly especially after sailing in the rain, with a Tx cover of course. The added benefit is that the

aerial is unlikely to 'fold up' on you and cut your hand or need early replacement. So, the often ignored but vital **aerial** deserves a thought and some maintenance. If you have a repaired aerial then give serious consideration to replacing it ASAP.

While on aerials, the **receiver** or boat aerial should always be fully extended, never partly coiled in the 'radio pot' and not run near the winch or rudder servo if at all possible. Also, if you *want* to change the length **ALWAYS** double or halve the 'tuned' length. If you sail with carbon hulls**, it is vital** that the aerial exits the hull up some form of deck mounted tube. By having it vertical it is out of 'phase' and not screened by the conductive carbon hull. The end of the tube should also be sealed as water in here will reduce the range. **We do not advocate having the aerial totally below deck on any class of R/C yacht** as the range is impaired.

All these points are important to get and maintain a 'solid' radio link with the boat. This means the radio won't be glitching so your yacht will sail FASTER.

With **PCM**, the aerial comments still apply, but the 'glitching' problems mentioned do not occur because the PCM receiver samples every new piece of information before telling the servos to move. If it finds the information is corrupted (interference) then it 'Holds' the last command until it receives valid data, this all happens very quickly. This means the yacht will sail unimpeded, switching the transmitter off briefly will not cause any problems, whilst not recommended, it's even possible to change the Tx battery while sailing! Whereas with a conventional **AM or FM** radio set **you must always** turn the TX on first and off last to avoid winches de-spooling, stalling and being damaged etc.

RECEIVERS

Futaba manufacture a wide range of receivers AM, FM, HRS, and PCM, 2-9 channels single and dual conversion on all the model control bands worldwide. For our use the 2ch 27mhz AM, 3-6ch 40mhz AM/FM/HRS/PCM are the most suitable. In particular, the small car receivers, they are very light.

The environment found in Boats of all types is **hostile** to the sophisticated electronics we now use to control them. It is all but impossible to keep a yacht dry, but we should make every effort to achieve this, as **everything** will last longer including the boat! So we must take as many precautions as possible to protect the receiver, winch, servos and nicads. **'BLACK WIRE'** corrosion **only** occurs in a damp environment. Always remove your Receiver and batteries to a warm dry area after sailing.

ALWAYS REMOVE AT LEAST TWO PATCHES AFTER SAILING THEREBY ALLOWING THE HULL TO DRY OUT. ALSO IT IS RECOMMENDED THAT HULL, BATTERIES AND R/C GEAR ARE STORED IN THE HOUSE OR HEATED GARAGE.

SAIL WINCHES

These are available in two forms, **arm** and **drum** with different specifications. **Futaba** manufacture 3 winches, the S3802, S3801 and the S5801. The first two, are the 'Arm' type and the latter a drum winch. Now **Whirlwind winches** have ceased production the Futaba S5801 will retro fit any IOM or RM, which currently uses the Atlas**. RMG winches** are now stocked by K Bits.. **280D** is recommended for IOM and RM classes and **380D** on the A class. In addition to the winches, various drums are stocked.

Hitec also make the two types, ***K. Bits*** stocks the **HS 785HB** drum winch and also a **modified version to provide turn adjustment** along with the **HS 765BB** arm type. **The ultimate winch** first used by ***K Bits*** in 2004 has got to be the Hitec-*K Bits* **DIGITAL** arm winch. The **HS 5745MG** POWER, SPEED, RESOLUTION are superb AND is programmable with **FAILSAFE** info.

It is recommended that a 'sheeting post' is used for the mainsheet as this gives very precise and strong control over the mainsail, also make sure the 'Kicking strap' is holding the leech curve **NOT** the winch when close hauled. To help you with the installation, additional information sheets are provided with winches supplied by ***K. Bits..***

Summary
A **powerful** and **precise winch** is the heart of any Yacht, if you intend to sail in ALL conditions competitively in the One Meter class the Hitec-***K Bits..*** 6.0 volt DIGITAL arm servo**,** it is the ***'must have'*** sail control for an IOM It is **World Class.** If you prefer drum type sail control, the **RMG 280D** is also an excellent winch, being 'smart' is fully adjustable even with a basic radio system. If weight is an issue the **Futaba S5801** drum winch is very light and fully adjustable. With the added bonus it will replace whirlwind winches with the minimum of hassle. Both these winches can operate on 6-7.2 volt.

If you are on a tight budget, the **Hitec** HS 785 HB drum is a slow but powerful winch, available in standard or modified to give adjustable turns by ***K Bits..*** The **RMG 280D** and **380D** are particularly suitable for other Classes such as **Marblehead**, **Ten Rater** or **A class** Yachts.

All winches are highly water resistant but every precaution to avoid immersion should be taken. This applies to any servo or winch. **Always apply a thin smear of silicon grease to the case joints, screw heads and cable entry point for extra reliability.**

RUDDER SERVO'S
The rudder control of a yacht deserves far more attention than it is generally given. The **power required** to precisely hold and turn a model yacht even with a 'balanced area' rudder should not be under estimated.

Attention to the pushrod, links and horn assembly connecting the servo to the rudder will reward you every time you sail. Not only will the rudder centre precisely on each tack, but as your yacht is hard pressed, reaching and on the run, the chances of 'broaching' due to a sloppy linkage, or a servo which is not capable of holding the rudder exactly where you command it will be minimised.

Starting at the stern, make sure the rudderpost and stern tube are a good fit and apply silicon waterproof grease. Use the ***new*** heavy duty double tiller arm by ***K Bits***. Keeping the rudder servo near the centre of the boat helps to reduce tacking inertia but it means a longer pushrod will be required. Using carbon tube with heavy-duty **ball links** each end is the best way of achieving the absolute minimum slop with minimum friction.

Now the **SERVO end!** Firstly the output arm, either **metal** available from ***K. Bits..*** or use the large plastic **disc** supplied with **Futaba servos**, which is far stiffer than the plastic arm type, which is more likely to twist under our duty. **IMPORTANT** make sure both rudder and servo horns are PEPENDICULAR to the PUSHROD, i.e. at a 90deg angle. This is very important with 'standard' transmitters to achieve equal throw port and starboard.

When choosing a servo for the rudder function. As we only need one, it pays make the right choice. With the arrival of **DIGITAL** technology the 'holding' power and MAXIMUM power when asked to move even small amounts makes a digital servo the recommended choice. Both **Hitec** and **Futaba** make excellent servos for our application, fully ball raced, metal geared, and in the case of Hitec, programmable with FAILSAFE, Speed and resolution.

WHY DIGITAL? This latest technology gives the highest possible resolution and incredible HOLDING power (feels like gearbox has seized). All Hitec servos offered by

K Bits have been programmed with a failsafe position, so on loss of signal, servo or winch does not glitch and jam at extremes, particularly important, with such power available.

Hitec DIGITAL servos offer excellent performance and very good value for money.

Futaba DIGITAL servos are not programmable but have excellent gearboxes with almost zero back lash. The **S9451** is a superb servo a 'rolls royce' with price to match.

The ever popular, **Futaba P-S9202** servo, with adequate torque and an excellent specification serves many well. Torque 5.0kg/cm, Water and dust resistant, dual Ballraced, 0.22sec/60 deg, **coreless motor** and in a slightly smaller case weighing 50g. The power is adequate for our needs, designed for medium duty and is suitable for all yachts.

Still with a **coreless motor** the standard **Futaba P-S9001** comes with Ballraced output, torque 3.9kg/cm, 0.22sec/60 deg and weighs 48g. If force 8 'C' suit sailing is not quite your scene!… then the 9001 will serve you well.

At the budget end of the range the **Futaba S3001** still features a Ballraced output, torque 3.0kg/cm, 0.22sec/60 deg and weighs 45.1g. ***K. Bits..*** has the very basic servo's which will get you sailing very cheaply such as the S3003. The price listing provides full spec details for an informed choice.

BATTERIES

It soon becomes clear that the hours spent sailing means dry cells will be very expensive long term. So rechargeable cells i.e. **nickel cadmium** batteries or **Metal Hydride** are the best option. They are available on all the normal voltages and capacities. ***K. Bits..*** all welded batteries have built an excellent reputation for quality, duration and performance. Ask any one of our hundreds of satisfied customers.

Latterly **Metal Hydride** (NiMH) cells with their more environmentally friendly construction and hence lower disposal risk have become available. However they differ from NiCd's in several ways. Their full cycle life is approx. 75% of NiCd. Also they self discharge more quickly so must be charged the day prior to use if their *full* capacity is to be realised. Obviously the **'Green'** issue is a plus and for the same physical size have a much greater capacity. This means for the same capacity the battery pack is lighter. The cost of NiMH packs is generally higher than their NiCd counter parts. **Note:** if you intend to use a winch or rudder servo with ***digital*** electronics keep power wiring short with high quality connectors and switches.

NiCd and **NiMH** packs from **K. Bits..** are supplied with spot welded connections using pure nickel strip, heat shrink finish and lead with a **Futaba/JR/Hitec universal plug**. By having the cell connections factory welded there is no chance of internal damage to the cells. If packs are to be home made then only tagged cells should be used. Direct soldering on to the case or positive terminal of nicads is **not** recommended.

When converting transmitters to NiCd operation, rather than installing **individual** cells to the existing battery compartment it is highly recommended that a welded pack to the right voltage (usually 9.6v) is installed. The reason is that when individual cells are charged through 'spring type' contacts, oxidation takes place over a period of time and the connections can fail or create a high resistance. This is partly due to the lack of a 'cleansing action', which would normally occur when regularly changing dry cells. Also re-chargeable cells can vent electrolyte gas under fast or over charge conditions, which corrodes the terminals.

CHARGERS
For NiCd and metal hydride NiMH batteries, chargers should ALWAYS be of the 'constant current' type. Chargers for 'lead acid' type batteries **should not be used** on NiCd or NiMH batteries.

For maximum duty cycles *(Life)* from a NiCd it is generally recognised that the charger current should be the **'10hr rate' or C/10** i.e. 900mah/10 = 90mah charging current. The battery would then be put on charge for 14-15 hrs to charge the NiCd from 'flat' (being around 1.1v per cell) i.e. 8.8v for a Tx. At this rate it is very unusual for the NiCd to be damaged if inadvertently left on for 24-30 hrs. *With the move towards the higher capacity cells particularly for boat packs people commonly forget that their charger is not going to be up to the job.* Although extending the charge time goes some way towards solving the problem it is unlikely that a *FULL* charge will be achieved. For instance a 1000mah pack using a 50ma charge current could take 32 hours to charge, not very practical. However Fast **charging**, provided an auto cutoff type (delta peak) charger is employed can be used to speed the process up. This can be a very useful charging method, not only for the late decision to go sailing but also at the lakeside when attending longer race meetings.

Several chargers, which can simultaneously charge Tx and boat packs are detailed in the lists. **The ultimate charger** for home use is the **Delta 4-2000**. Fully automatic this charger will take 4 mixed battery packs at any state of charge (above 1v/cell) and fully charge them all and switch off! *Its just like 4 cars pulling up to a petrol station, not knowing how empty the tanks are connecting up to trigger release hoses and filling all the tanks and cutting out when full.* The **Delta 4-2000** is not quite!! as quick but generally 3-6 hours will have you ready for a days sailing! By opting for the dual input voltage version you can also charge from the car or a 12-volt battery.

ACCESSORIES
These include aerials, aerial/eye protectors, xtals, plugs and sockets, heat shrink, heavy duty ball links, metal output arms, extension leads and several books on related topics.

Only ***Sailsetc*** Fittings**,** rig kits and masts are stocked now, along with selected ***K Bits..*** items, which complements the **high standard** of batteries and radio systems available from ***K. Bits..*** This range will be expanding all the time, so telephone if you can't see what you want.

Sails, Stealth Sails by Trevor Bamforth are in stock most of the time and offer excellent performance in line with other sail makers.

****Look for the *Quick Bits* logo which identifies those products that offer significant advantages in terms of speed or performance when used in the right application. Look for the 'Quick Bits' logo in the pricing section. *QBit****

Your Guarantee
Every new product is tested, for its suitability, durability and application before offering it for sale by **K Bits**. This ensures you get the product and information best suited to our chosen sport of Yacht Racing with radio. Our price list follows with more specific information. If you don't see what you want please ring for the latest information.

Happy and Competitive Sailing, Ken & Susie Binks