

UK RADIO CONTROL TECHNICAL INFORMATION

The BMFA is an active member of the UK Radio Control Council (UKRCC) which used to be named the Joint Radio Control Users Committee (JRCUC). This is the body recognised by the Government's Radiocommunications Agency (RA) as representing all modelling use of radio frequencies in the UK.

For more information check out the UKRCC (JRCUC) website at www.ukrcc.org

OFFICIAL FREQUENCY ALLOCATIONS

These and other information concerning modelling use of radio frequencies can be found in the Radiocommunications Agency document RA-60. You can view the latest copy of RA-60 on http://www.ofcom.org.uk/static/archive/ra/publication/ra_info/ra60.htm

All our legal use of modelling frequencies stems from this document and if you have an interest in radio control then you should look at it if you can.

1. THE 27 MHz BAND.

(a) Identification is by coloured ribbon attached to transmitter aerial in the colours as listed and/or a white flag with channel number in black.

(b) The channel spacing on this band is now 10 kHz and all modern sets, with the CE mark, should meet this specification. However, many older specification sets are still in use and these have a minimum channel spacing of 20 kHz. This situation will remain for a number of years so if you are operating narrow band 27 MHz then be aware of the danger.

(c) It is recommended that, with new equipment capable of operating on a 10kHz channel spacing, a white flag with black channel numeral be used to identify the channel you are using. If this coincides with one of the old colour frequencies then you should show that colour ribbon too.

(d) It is likely that crystals to meet the new intermediate frequencies may not be freely available but synthesised frequency sets may become available in the medium term.

(e) You must not use an old 20 kHz split crystal in a new set. Even if you wish to transmit on the same frequency, a new narrow band crystal will be required in a narrow band set.

(f) As a shared band, many of the 27 MHz frequencies are used by others but 26.995, 27.045, 27.095, 27.145 and 27.195 MHz are not shared and would seem to offer the best chance of interference free model flying operations but only on sites remote from other modelling applications (cars, boats etc.). These equate to the old 'solid' colours of brown, red, orange yellow and green.

| <u>CHANNEL</u> | <u>FREQUENCY</u> | <u>OLD COLOUR</u> |
|----------------|------------------|-------------------|
| 1 | 26.965 | |
| 2 | 26.975 | Black |
| 3 | 26.985 | |
| 4 | 26.995 | Brown |
| 5 | 27.005 | |
| 6 | 27.015 | |
| 7 | 27.025 | Brown/Red |
| 8 | 27.035 | |

| | | |
|----|--------|-----------------|
| 9 | 27.045 | Red |
| 10 | 27.055 | |
| 11 | 27.065 | |
| 12 | 27.075 | Red/Orange |
| 13 | 27.085 | |
| 14 | 27.095 | Orange |
| 15 | 27.105 | |
| 16 | 27.115 | |
| 17 | 27.125 | Orange/Yellow |
| 18 | 27.135 | |
| 19 | 27.145 | Yellow |
| 20 | 27.155 | |
| 21 | 27.165 | |
| 22 | 27.175 | Yellow/Green |
| 23 | 27.185 | |
| 24 | 27.195 | Green |
| 25 | 27.205 | |
| 26 | 27.215 | |
| 27 | 27.225 | Green/Blue |
| 28 | 27.235 | |
| 29 | 27.245 | Blue |
| 30 | 27.255 | Blue |
| 31 | 27.265 | |
| 32 | 27.275 | White or Purple |

2. THE 35 MHz BAND.

(a) Identification is by orange flag with black or white channel numerals.

| <u>CHANNEL</u> | <u>FREQUENCY</u> | <u>CHANNEL</u> | <u>FREQUENCY</u> |
|----------------|------------------|----------------|------------------|
| channel 55 | 34.950 | channel 73 | 35.130 |
| channel 56 | 34.960 | channel 74 | 35.140 |
| channel 57 | 34.970 | channel 75 | 35.150 |
| channel 58 | 34.980 | channel 76 | 35.160 |
| channel 59 | 34.990 | channel 77 | 35.170 |
| channel 60 | 35.000 | channel 78 | 35.180 |
| channel 61 | 35.010 | channel 79 | 35.190 |
| channel 62 | 35.020 | channel 80 | 35.200 |
| channel 63 | 35.030 | channel 81 | 35.210 |
| channel 64 | 35.040 | channel 82 | 35.220 |
| channel 65 | 35.050 | channel 83 | 35.230 |
| channel 66 | 35.060 | channel 84 | 35.240 |
| channel 67 | 35.070 | channel 85 | 35.250 |
| channel 68 | 35.080 | channel 86 | 35.260 |
| channel 69 | 35.090 | channel 87 | 35.270 |
| channel 70 | 35.100 | channel 88 | 35.280 |
| channel 71 | 35.110 | channel 89 | 35.290 |
| channel 72 | 35.120 | channel 90 | 35.300 |

(b) To identify the channel number of an untagged crystal:

(1) If the crystal is marked 34.xxx you subtract 40 from the first two numbers after the decimal point of the frequency marking, (i.e. 34.960, subtract 40 from 96 giving channel 56).

(2) If the crystal is marked 35.xxx you add 60 to the first two numbers after the decimal point of the frequency marking, (i.e. 35.260, add 60 to 26 giving channel 86).

3. THE 40 MHz BAND.

This is for surface vehicles only and band identification is usually by green flag with white channel numeral. The band will use the last three numerals of the actual transmitted frequency as the channel identification, for instance:

40.665 MHz will be channel 665, 40.825 MHz will be channel 825

4. THE 459 MHz UHF BAND.

Identification will be by channel numeral.

| <u>CHANNEL</u> | <u>FREQUENCY</u> | <u>CHANNEL</u> | <u>FREQUENCY</u> |
|----------------|------------------|----------------|------------------|
| channel 1 | 458.525 | channel 21 | 459.025 |
| channel 2 | 458.550 | channel 22 | 459.050 |
| channel 3 | 458.575 | channel 23 | 459.075 |
| channel 4 | 458.600 | channel 24 | 459.100 |
| channel 5 | 458.625 | channel 25 | 459.125 |
| channel 6 | 458.650 | channel 26 | 459.150 |
| channel 7 | 458.675 | channel 27 | 459.175 |
| channel 8 | 458.700 | channel 28 | 459.200 |
| channel 9 | 458.725 | channel 29 | 459.225 |
| channel 10 | 458.750 | channel 30 | 459.250 |
| channel 11 | 458.775 | channel 31 | 459.275 |
| channel 12 | 458.800 | channel 32 | 459.300 |
| channel 13 | 458.825 | channel 33 | 459.325 |
| channel 14 | 458.850 | channel 34 | 459.350 |
| channel 15 | 458.875 | channel 35 | 459.375 |
| channel 16 | 458.900 | channel 36 | 459.400 |
| channel 17 | 458.925 | channel 37 | 459.425 |
| channel 18 | 458.950 | channel 38 | 459.450 |
| channel 19 | 458.975 | channel 39 | 459.475 |
| channel 20 | 459.000 | | |

Note - Many of these channels are shared with various telemetry users.

FREQUENCY BAND OVERVIEW

The 27 MHz band is legally shared by other users, in particular, model cars, model boats, citizens band operators and an increasing number of radio controlled toys. It may still be used for model aircraft but great care should be taken by model flyers, especially near urban areas.

Many clubs in this situation have found the need to ban this frequency band from their flying fields on the grounds of safety.

When you fly a model aircraft you are personally responsible for the safety of the flight and you should think carefully before using 27 MHz equipment because of the many sources of potential interference in the UK.

The 35 MHz band is SOLELY for model aircraft and under no circumstances must it be used for any other purpose, such as the control of surface vehicles.

The 40 MHz band is SOLELY for surface vehicle use and under no circumstances must it be used for the control of model aircraft.

The 459 MHz is shared with various telemetry operations which are used for specialised telemetry and users of these channels should be aware of the possibility of interference being present. The use of frequencies above 459.100 MHz (channel 24) is recommended.

You may see some equipment in the 49 MHz band but this is quite legal and is widely used for toys and low power devices with a transmitter output of 10 mw maximum, one tenth of our 35 MHz transmitters.

72 MHz EQUIPMENT

Contrary to some people's belief, 72 MHz IS NOT A LEGAL FREQUENCY FOR MODEL CONTROL IN THE UK. A manufacturers development license is available (under very strict conditions) to bona-fide designers/manufacturers from the DTI. Anyone using 72 MHz without such a current special licence is operating illegally and may face a fine and confiscation of the equipment. This licence is for genuine development work only and does NOT give the operator the right to use the frequency for normal R/C flying.

R/C EQUIPMENT TYPE APPROVAL

In October 1998, harmonised standards for low power radio control equipment were introduced into European Union Countries. From that date all new equipment either manufactured or imported into the UK has to comply with the requirements for the issue of a CE marking. As the legislation is not retrospective, all 35 MHz equipment which has previously been tested against the old SMAE/MHTF Type Approval standards remains legal to use.

The European standards which apply to all newly introduced R/C equipment are ETS 300 - 200 (Type Approved testing for short range devices) and ETS 300 - 683 (EMC testing).

It is therefore essential that any 35 MHz equipment you use carries either an SMAE/MHTF Type Approval sticker or an official CE marking. Equipment bearing either of these markings indicates that the manufacturer or importer of the equipment has submitted a sample for independent testing and that the equipment conforms to the test specification applicable at the time the tests were conducted.

The SMAE/MHTF sticker or CE marking is your only assurance that the equipment you own, or are intending to purchase, complies with the standards laid down by the Government. If your 35 MHz equipment carries neither marking, contact either the shop where it was purchased, the manufacturer or the importer for details on your particular equipment. When purchasing your next R/G equipment, make a special point of looking for the SMAE/MHTF sticker or CE marking; this is the only way you can be sure the equipment you are using is legal.

Notes:

(a) From October 1998 all newly introduced 27 MHz equipment must also carry a CE marking and be capable of operating at 10 kHz spacing. 27 MHz equipment imported into or manufactured in the UK prior to the introduction of the new standards is exempt from this legislation.

(b) Current legislation allows the CE marking to appear on the equipment itself, the instruction leaflet or on the box.

SYNTHESISED FREQUENCY EQUIPMENT

(a) Synthesised frequency equipment is legal in the UK as long as it has been tested and carries the CE mark. There is, however, a limitation to its use in the UK that has been agreed with the RA and also at international level by the FAI.

(b) This is that any synthesised transmitter must have a two stage switch-on process. The first switch-on stage must NOT transmit but must give a clear indication of the frequency that will eventually be transmitted. This is to enable you to select frequencies safely and, more importantly,

to obtain clearance from the site frequency control system.

(c) Only after you have done this should you activate the second switch-on stage which enables transmission.

(d) Synthesised frequency equipment will give you much greater flexibility in your frequency selection but it also has many pitfalls and you should take great care if you use such equipment. Remember that most people you are flying with will not have the same facilities and your operations must fit in with what is accepted as normal operating procedures.

(e) For instance, you should be showing a frequency flag and be prepared to change it if you change frequencies. You must take extra care when using the frequency control system as your opportunities to reserve the wrong frequency will be much greater. You may find that the ability of your transmitter to select any frequency will be viewed with suspicion by some and, in the event of interference being suspected, you could find that you are the first person checked. The only way to avoid problems is to be scrupulously careful in your operations.

(f) Finally, although synthesised sets have the potential to be more reliable and cheaper to produce than plug-in crystal sets, remember that they still use a fixed crystal in the transmitter module and the receiver and that any crystal can drift over time. You will still need to have your radio equipment checked occasionally as a master crystal drifting will affect all the other frequencies synthesised from it. Curing the problem will be a job for the importer/manufacture and will not be as simple as just plugging in a new crystal.

RADIO CONTROL LICENCE

From 1.8.1981, model control equipment is exempt from the requirement of a Licence under Section 1 (1) of the Wireless Telegraphy Act 1949 subject to the terms, provisions and limitations set out in parts 1 and 2 respectively of the Statutory Instrument 1980 No. 1848.

AIRBORNE TELEMETRY

A frequency band that may be used to download telemetry from model aircraft has been allocated by the Radiocommunications Agency (RA).

The band is 433.05 to 434.79 MHz with a channel spacing of 25 kHz and a maximum Effective Radiated Power (ERP) of 10 mW. All equipment used must be type approved to EN 300 220-1. A list of available equipment can be obtained from the Low Power Radio Association (LPRA),
Tel: +44 (0)1208 850187, Fax: +44 (0)1208 850871, Email: info@LPRA.org.

This is an unprotected band and some of the frequencies are already used by radio amateurs so it would be wise to limit airborne use to 434.025 to 434.79 MHz.