

Product Review

**Multiplex
dual conversion
7 channel
synthesised
receiver**

by
Brian Green &
Mark Kyle

The Multiplex seven channel IPD receiver is now available without a crystal to determine its operating frequency. Synthesizer is the new word and one we will learn to love in coming months and then forever. While this technology has been around for several decades in communications equipment it has been a relatively recent entry into our radio control systems.

There are three major advantages, the first is that you can assign the receiver's operating frequency to any compatible transmitter with the press of a button. The second is that radio manufacturers, importers and retailers no longer have to carry an extensive range of crystals. And the third is that this technology is more crash resistant when compared to receivers using plug in crystals. While the synthesized receiver does have a crystal, it is a permanent mount device and therefore with it's much lower mass, the forces during an impact are substantially reduced.

This crystal determines the operating frequency band of the receiver, for example 36 or 40 mhz. The individual frequencies within this band are determined by dividing down the master crystal frequency.

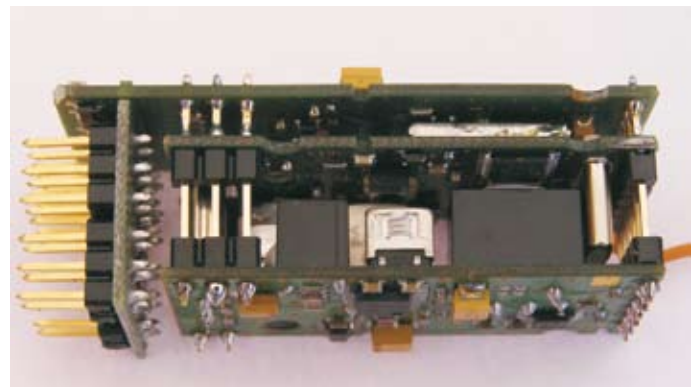
To assign a frequency to this Multiplex RX the TX must be transmitting in FM PPM mode. You don't even need a Multiplex transmitter although Multiplex would hope you would have one.

Turn on the TX with some aerial extended. Place the TX close to the receiver and turn it on. Press the button on the side of the receiver in while turning on the receiver power then release the button and the receiver searches for the strongest transmitter signal and locks onto that. That's why, if there are several other transmitters in action your transmitter has to be close to the receiver. Otherwise it could get very confused. When locked on to a frequency the receiver's LED stops flashing and stays on. Then you move any transmitter stick steadily to the end and back four times and the LED should switch on/off



Small, light and packed with features, 7 channels, dual conversion and no crystal to change.

All surface mount components make up a small package coupled with great reliability. Four substantial circuit boards hold all the works.



in time with the transmitter stick. When this happens you know it's your frequency that's locked in.

While it is theoretically possible for a stronger transmitter signal to override yours and for that transmitter's stick to be moved four times in the correct sequence, the chances of this happening are so remote as to not even be considered. If in doubt repeat the procedure with a different stick movement. I have been using synthesised receivers for some time and they have never failed to lock onto my transmitter.

In the past, if one wanted to use the radio system's failsafe operation one had to use a PCM system. However with FM PPM modulation failsafe operation is available with the Multiplex receiver. Simply set the transmitter controls to the desired failsafe position and press the receiver button for half a second. That is on and off, so don't hold the button in any longer. To check the settings have been stored in the receiver, move the transmitter controls to another position and then turn off the TX and the servos should run to the failsafe position. The receiver stores the failsafe settings and when interference occurs the receiver holds the servos in the last good signal position.

Then after a predetermined time moves them to the failsafe position.

Another feature of Multiplex receivers is the use of IPD technology. Intelligent Pulse Decoding is the full title and it works by checking the incoming signal for errors. When any are detected the receiver tries to restore them to a valid signal and if it can't the failsafe system is started. IPD can be turned on/off, and why you might ask. OK, when an installation in a model is completed or changed, radio interference, even slight, may be generated. If IPD is turned on this function may mask out the interference and could lead to a substantial loss of operating range. Multiplex recommend turning off the IPD function and carry out a range check. If the range is satisfactory, turn the IPD back for flying.

There is a trick when using the IPD function. When the receiver is initially locked on to it's transmitter, it stores the channel count, for example 5, 6 or 7 channels. If you change the channel count by for example using another transmitter on the same frequency but with a different number of channels the receiver will simply not work.

And if you manage to get totally

confused with frequency, channel numbers and IPD and failsafe setting, power up the TX and RX and hold the button in for ten seconds. This restores the receiver memory to the initial factory setting and you can start again.

**BANDWIDTH TEST REPORT
FOR RX-7-SYNTHDS IPD
By MARK KYLE**

This new receiver from Multiplex is a beauty. It is dual conversion, FM (not PCM) synthesised and has a lot of very nice features built in with some nice software available from the Multiplex website (if you buy the serial pc cable). The actual construction of the receiver is typical German design. It is well thought out and uses very good RF design properties when you consider there is actually four pcb's in the case. One pcb contains all the servo/battery connections which is mounted at right angles to the three other pcb's which are layered on top of each other. The base board contains the microprocessor that runs all the control for synthesiser, failsafe and IPD functions. The centre pcb has the synthesiser, front end and first mixer. The last pcb contains the rest of the IF circuitry and the demodulator chip.

The bandwidth test results for this receiver are extremely good. Using the MAAA standard for testing this receiver at 40dB of blocking returned a bandwidth of 4.9 khz on both the high and low sides of the centre frequency. When the signal generator is increased by a further 10dB to make the blocking signal now 50dB the bandwidth measurement was 5.5khz. This quite exceptional amongst normal "higher quality" receivers. Most receivers currently in use today are +7 and -7 khz at the 40dB level and up to 8 khz and even 9khz at the 50dB level.

The sensitivity is also very good although the IPD function in this receiver does enhance this. When range checking your aircraft be it a bug smasher (prop aircraft) or turbine powered you should turn off the IPD as this can actually mask slight interference problems. Then of course you will turn the IPD back on for actual flying. There are also many other functions as in a "glitch detector" which will log low voltage, reception blind spots and signal interference. This is all done by the LED on the receiver which has many functions to let you know when you have programmed the channel and failsafe and the glitch detector function.

In conclusion this is one impressive receiver. I bandwidth test a lot of radios and receivers and I would say this is the best one that I have tested to date. I would not hesitate to have these in any of my aircraft which include turbine aircraft. Mark Kyle.

SPECIFICATIONS

- 36 mhz band, 10khz operation.
- Seven channels
- Dual conversion
- Two battery sockets
- Universal servo sockets (takes Hitec, JR and Futaba servo plugs)
- Size is 44 x 22.5 x 24.5 mm
- Weight is approximately 30 grams
- Operating voltage 4-7 nicad or NiMH cells.
- Channel count range 2-7
- Operates with any FM PPM modulated transmitter.
- Servo hold and failsafe function

Multiplex radio control equipment is distributed to hobby shops by:
 Model Engines (Aust).
 PO Box 828 Noble Park. Vic. 3174.
 Pphone: 03 8793 555. Fax: 03 8793 5566.
www.modelengines.com.au