

PowerBox Mercury SRII

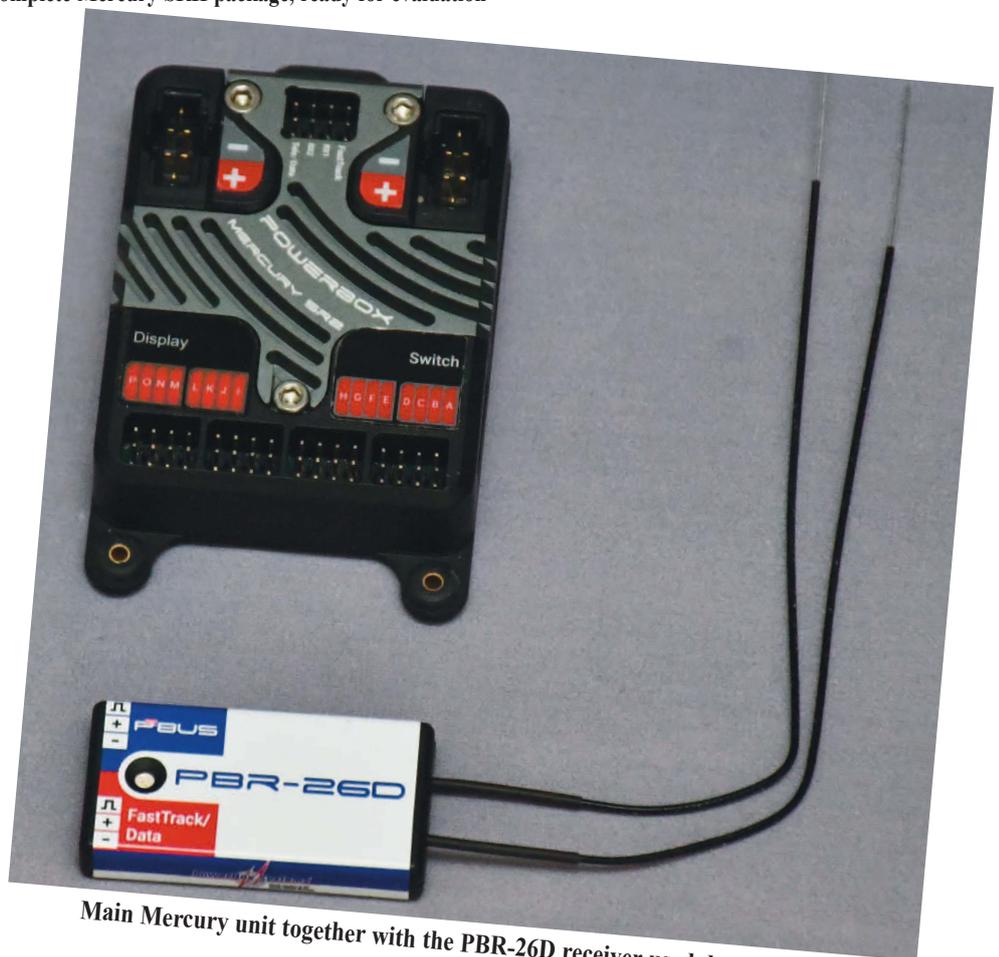
Advanced power supply system



Complete Mercury SRII package, ready for evaluation

I have had several jets outfitted with the original PowerBox Mercury battery/receiver system, and have been very pleased with the performance and reliability of these units, so I was delighted when I saw the new Mercury SRII at the Jets & Props show in September 2022. When it became available in late 2022 we wasted no time in getting an example for review.

Supplied in PowerBox's distinctive, high quality and tough cardboard packaging, the Mercury SRII package includes the main unit, OLED display, SensorSwitch, two double ended leads, mounting grommets and brass ferrules, mounting screws and instruction manuals, both in English and German. The main unit is very compact indeed, being a mere 69 x 54 x 17mm (plus mounting lugs), and weighing just 78 grams. As with other PowerBox products the Mercury SRII exudes quality, with the casing combining both metal and plastic sections to minimise weight whilst giving the unit the required rigidity and heat dissipating properties through the stylish alloy heat-sink part of the case. Connections include two Multiplex style input sockets, six-



Main Mercury unit together with the PBR-26D receiver used during testing

teen servo outputs, interestingly being listed A to P, but reading from right to left, two serial receiver sockets plus FastTrack and Tele/Data connections. The switch and display sockets are on the sides of the unit.

Although small, the Mercury SR11 can handle an impressive maximum load current of 20A for up to 30 seconds on both of the two independent circuits, whilst being able to operate on voltages of 4.0 to 9.0 volts, thus it can be used with 2 cell Li-Po, Li-Fe or Li-Ion packs as well as 5 cell Ni-Cad/Ni-MH batteries, although these latter batteries will only be able to provide high enough voltages to support the 6.0v output option of the unit. Of course, as the most recent product of its type from PowerBox, the unit is packed with features, these including:

- Twin battery operation
- Twin receiver operation
- 16 operating channels
- All power electronics are duplicated
- Failsafe electronic switch
- Servo matching for all 16 servo outputs
- Auto matching function
- Door sequencer with Setup Assistant
- Integrated iGyro technology for optional iGyroSAT sensor
- 9 independent gyro outputs, 3 for each of aileron, elevator and rudder
- Selectable output voltage, 6.0 or 7.8v
- Selectable servo frame rates: 12ms, 14ms, 16ms and 18ms
- Gyro control algorithm developed for fixed wing models
- Telemetry data for PowerBox P²BUS, Futaba S.Bus2, Jeti Ex-Bus, Spektrum SRXL2, Multiplex M-Link, JR X-BUS and Graupner HoTT

The Mercury SR11 can work together with a wide variety of radio systems,



OLED display supplied in the Mercury package

including of course PowerBox CORE or ATOM using P²BUS, Futaba S.Bus2, Jeti Ex-Bus, Spektrum SRXL2, Multiplex M-Link, JR DMSS and Graupner HoTT. Usefully, the actual radio system being used is automatically detected by the unit – this may take a few seconds the first time the unit is ever switched on, but after this it will be instantaneous.



The supplied SensorSwitch is a very high quality item

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Apart from the Multiplex and HoTT systems, all the others required only a single lead between the receiver and the Mercury unit, this carrying both the signal from receiver to unit and the telemetry data back to the receiver. Multiplex and HoTT systems require a second lead for the telemetry signal.

Display

The nice and clear OLED screen provides a lot of information, including both analogue and digital battery voltage display, digital current display, output voltage display, consumed capacity for both batteries and the status of the receivers, gyro and GPS (if fitted) and weighs just 11 grams. The unit is switched on/off and programmed using the compact SensorSwitch which weighs a further 15 grams, and again incorporates a machined aluminium case. Note that there is an option to fit a larger display screen offered by PowerBox, the OLED Display M, which is fractionally over 150% of the size of the included display, giving even greater clarity. When programming the Mercury the main screen display offers the following options:

iGyro – this allows all gyro settings to be adjusted, although of course this applies only if an iGyroSAT is connected.

ServoMatching – enables multiple servos connected to a single control surface to be matched using a five point curve. This is also where Auto Matching is found.

Sequencer – controls and sequences retract operation and offers three different gear door functions.

Output Mapping – all 16 outputs can be assigned directly to any transmitter channel, gyro output or the door sequencer.

Input Mapping – transmitter channels can be assigned here to the sequencer or iGyro.

Basics – as it suggests, this is where the basic operating options are selected, including the language (English or German), regulator output voltage, frame rate (12, 14, 16 or 18ms), battery type and capacity. Note that the radio system being used is also displayed here, but cannot be changed, as the Mercury automatically detects the system in use.

Setup Assistant – it is highly recom-



Main start screen



This is the initial gyro screen



Second gyro screen



Servo matching main screen



Preparing for servo matching



Auto matching screen



Sequencer main screen



Sequencer manual setup screen



Sequencer Setup Assistant first screen



Sequencer Setup Assistant gear screen one



Sequencer Setup Assistant front door screen one

mended that the Assistant is used when setting up a new model, as by its use the primary functions such as transmitter input channel selection, model type and servos assigned to the outputs can be set up very quickly and easily, also linking the appropriate gyro function to the relevant outputs. It should also be noted that the use of the Assistant makes setting up the gyro functions much easier later on.

Usefully, when PowerBox or Jeti radio systems are being used it is possible to control and adjust many of the SR11's settings, (apart from the Setup Assistant and door sequencer) directly from the transmitter.

Setup

As I detailed in my recent review of the Competition SR11, PowerBox has long offered units that include servo matching, which is very useful when multiple servos are being used on a single function, for example on elevators, flaps, slats etc, as well as where more than one servo is operating a single control surface, this often being the case in large IMAC type models, as well as some jets. Of course in this situation it is vital that these servos are perfectly matched over their entire range of movement, which can take a significant amount of time – if this is not done then the servos could end up working against each other, which would reduce the power available to the control surface, whilst increasing the current consumption of the servos, and potentially making the possibility of servo failure more likely, due to the extra stress being imposed. With the SR11 units Powerbox have added a new

auto matching function, which does all the fine tuning for you, being able to match up to 3 servos over a range of five points in just seconds. This is done by the system moving each servo through these 5 points, one at a time, and measuring the current consumption of the servo at all of these points. The sequence of doing this across the servos is carried out three times, with the adjustments becoming steadily finer, until the point is reached where all servos are consuming the minimum level of current, thus being accurately matched. Almost all servos can be auto matched this way, the only exceptions being the handful of digital servos that hold position without any receiver signal – this type of servo can however still be matched manually (note that manual matching also offers matching over 5 points now, not the 3 of earlier PowerBox systems).

I tested this function on the large B-36 model I have been working on intermittently over the last few years as this has two servos on each aileron. It took just a few seconds to setup the two servos as master and auxiliary, so that the

auto matching could commence. The process took less than 30 seconds, and it was impressive to watch the current display on the screen steadily showing reducing figures, as the servo's travels became more and more accurately matched. By the end the current whilst the aileron was centred had more than halved, whilst full deflection saw a drop of around 66% from the initial figures – very impressive and a huge time saving when compared to matching the servo travels manually.

The included gear door sequencer offers the options of manual setup or use of Setup Assistant, this latter being highly recommended for the main programming, although the manual option would come in useful for fine-tuning once the main programming has been done using the Setup Assistant. I spent some time using the Setup Assistant to program various retract and door sequences, and have to say that I was very impressed with the ease with which complicated sequencing could be accurately programmed. There are three modes available, mode 1 being the simplest, for models that have



Input Mapping initial screen



Output Mapping initial screen



Basics screen, where language, battery type and capacity, output voltage and servo frame rate are set



Setup Assistant initial screen, where wing type, tail type and any vector operation is set



Setup Assistant screen two

doors that remain open whenever the landing gear is extended, whilst mode 2 caters for models where some doors remain open but the main rear doors close again once the gear is fully extended (for example the F-100). Mode 3 is for models where all the doors close once the landing gear is extended – examples being the F-86 and similar models. Programming starts with the number of door controls/valves etc being set, then the timings for retraction and extension are decided, after which the individual end positions of the servos/valves are precisely set, all of this taking just a couple of minutes for the model used when testing.

The manual setup is also fairly straightforward to program, and has a graphical display with the various travel points clearly shown as well as the timings. It is easy to select each point and then make an adjustment, or to change the timings, but I would definitely use the Setup Assistant first and then use the manual setup purely for any fine adjustments needed.

iGyro

As already mentioned the SR11 offers full iGyro functionality, requiring only the addition of an iGyro SAT, which connects via the Fastrack connection on the SR11 – note that if a GPS111 is installed then this also connects to the same Fastrack connection via a “Y” lead. Having used iGyro’s in a number of models now, I know just how well they work, and as the iGyro SAT is small, light and inexpensive, it is an option I would always fit to any model, as the benefits of gyro stabilisation, particularly in gusty conditions, are substantial, perhaps most of all when

taking-off or landing. Connected with this is the ability of the system to utilise speed information from a GPS111 or PBS-TAV (True Airspeed Vario) to automatically adjust the gyro sensitivity as the speed of the model (over the ground in the case of the GPS111 or airspeed with the PBS-TAV) changes, which normally is set to give increased gyro effect as speed is reduced, for example on the approach to landing.

As detailed in the instructions it is important that the SR11 Setup Assistant is used to program all the basic settings into the unit before any adjustments are made to the iGyro settings, as by doing this the correct channels are set for the gyro, and the various parameters set to good starting points, so that minimal changes should be required. In fact one option is to test fly the model without the iGyro SAT being connected, then plug this in once the model has been perfectly trimmed.

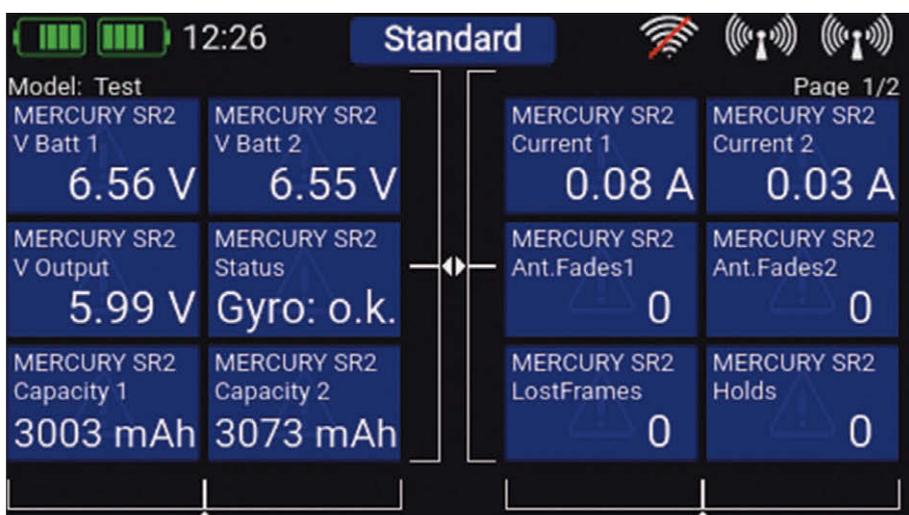
Telemetry setup, using my Atom transmitter, is seamless and very easy, with widgets being brought up on the tran-

smitter screen showing the telemetry data selected, and provides all the information displayed on the main screen of the SR11, so input battery voltages, output voltage, capacity remaining in each battery, current being consumed antenna fades, lost frames, holds and receiver/gyro status, as well as data from the GPS111 or if this option is being used. Of course, warnings etc, can also be set up in the transmitter, to activate if any of the parameters falls outside the safe level.

The Mercury SR11 is another very impressive new product from PowerBox – it is compact and light, yet packs a huge amount of functionality, whilst being extremely easy to program. Highly recommended and I will certainly be installing the review system in the next suitable model I assemble!

Colin Straus

WEBSITE
www.powerbox-systems.com



Atom transmitter screen filled with widgets displaying all of the data supplied by the Mercury SR11