User Notes

Timpdon Electronics

GigaRad Radio System Transmitter Model *GTX2*

This advanced multi-channel 2.4 GHz GigaRad Radio Transmitter, is designed to be used with any model of GigaRad receiver/ controller.

It is intended primarily for radio control of battery electric model rail vehicles.

It incorporates:

- Control of up to three vehicles at the same time, with switch selection of the active vehicle.
- One fully variable Speed and Direction control channel, with centre off Stop detent and LED Stop indicator.
- Four uncommitted Auxiliary digital switched channels for the control of, for example, lights and sound cards.

  The function of each Auxiliary channel is dependent upon the model of receiver/ controller fitted to your vehicle.

It complies fully with all UK legislation for licence free operation.

Specification

Frequency	2.4 GHz Radio Control Model Band
Radiated Power	+20 dBm [100 mW]
Modulation	Gaussian Frequency Shift Keying
Duty Cycle	6% maximum
Range	Up to 100 metres with any GigaRad receiver, in a normal model railway or garden environment.
Size	111mm x 66mm x 50mm
Weight	150g
Batteries	2 x 1.5 V AA primary cells

Introduction

The GTX2 2.4 GHz multi-channel transmitter is designed for operation of up to three battery electric vehicles at the same time.

The use of the GTX2 with live steam vehicles is possible, but not recommended, as the GTX2 does not incorporate calibration facilities for servo settings, and the combined direction/speed control is not ideal for the control of some types of steam locomotive.

Each vehicle can be independently controlled, but only one vehicle can be under active control at once, with the other two vehicles maintaining their last control settings for direction, speed and auxiliary switch settings.

Active vehicle selection is via a three position Loco Selector switch, and can be changed at any time.

Speed and direction control is via a single rotary control, with a mechanical detent at the centre stop position, and indication of the stop position by a Stop LED indicator.

Each transmitter has with a unique ID number for each of the three Loco Selection channels, to which any GigaRad receiver may be bound by the user via the Bind procedure described below. Any Loco Selection channel can be bound to any receiver, at any time.

For battery electric vehicles, GigaRad receiver/controllers are designed for bidirectional d.c. electric motor speed control using an external Electronic Speed Controller [ESC] and, in addition, can control up to four switched auxiliaries using an optional GigaRad auxiliary controller.

Safety Warning

Because only one vehicle can be actively controlled at any time by the GTX2, with the other two inactive vehicles maintained at their last active settings, there is always a possibility of a condition arising where it is required to stop an inactive vehicle in an emergency.

Simply switching off the transmitter is not a viable option, as the receiver/controller fail safe functions will not activate for a period of ten seconds.

To force an emergency stop on all vehicles the following procedure is recommended as the fastest available method:

1 Set the speed control knob to Stop—the Stop LED will illuminate.

2 Rapidly switch the Loco Selector switch through all three positions, and repeat as necessary until all vehicles have stopped.

Multi-Vehicle Operation

Although up to three vehicles can be controlled independently from a single transmitter, only one vehicle can be actively controlled at once, as the transmitter has only one set of speed/direction controls and auxiliary control switches.

The active vehicle is determined by the setting of the Loco Selector switch, which can be changed at any time.

The other two vehicles, if operational, will be maintained at the last control settings made when they were active, until activated again.

For safety, when the Loco Selector switch setting is changed to select a new active vehicle, the new vehicle selection will not become active until the Speed Selector control has been set to the Stop position, This position is also indicated by the Stop LED illuminating. This safety feature is designed to prevent a new active vehicle immediately assuming the direction and speed of the previous active vehicle, which might lead to unsafe operation.

As radio transmissions to both active and inactive vehicles are maintained at all times, the in-built safety features of all GigaRad receiver/controllers designed to stop vehicles in the event of loss of radio transmissions will normally be over-ridden.

However, if the transmitter is turned off, this feature will activate after 10 seconds and bring all vehicles to a halt.

Operation

Data is transmitted in serial digital packets, which incorporate for each of the three Loco Selection channels details of all analogue and digital channel settings, the unique Loco ID number and CRC checksum data to permit the data integrity to be verified automatically by the receiver.

A new data packet is transmitted every 25 ms, permitting extremely fast response times within the controlled model. Each data packet sequentially addresses all three Loco Selection channels provided by the transmitter.

Each time a new data packet is transmitted, the Tx indicator LED flashes once. Note, however that you may not be able to resolve the flash rate of 40 Hz, so the LED may appear to be permanently On.

A receiver and associated controller will respond only to transmissions from the specific transmitter and Loco Selection channel to whose ID number it has been bound.

Multiple transmitters and bound receiver/controllers may be operated in close proximity at the same time without mutual interference.

Batteries

The GTX2 is designed to operate from 3V battery supplies, using two 1.5V AA primary cells mounted within the case. Operation from re-chargeable cells is not permitted, as these only provide a voltage of 1.2V per cell.

In normal use, battery life is in excess of 100 hours of continuous operation.

The GTX2 is shipped with batteries not fitted, to avoid battery discharge if the power switch is accidentally operated during transit, and with the two halves of the case not fastened. Fixing screws are supplied loose.

To fit or change batteries, proceed as follows:

1 Remove the four case fixing screws on the rear of the case, if already fitted.

2 Carefully separate the two halves of the case.

3 Locate the battery holder at the lower end of the case front.

4 Carefully remove the old batteries, if fitted, and replace with two new 1.5 V size AA primary [non-rechargeable] cells, checking that you have installed them with the correct polarity.

5 Refit the battery holder in the case as shown in the illustration above and re-assemble the front panel to the case rear and finally fit or refit the four fixing screws.

Digital Auxiliary Channels

The Aux 1 to Aux 4 Auxiliary control switches of the GTX2 function only when used with a controller which is equipped with auxiliary outputs. Refer to the manual of the respective controller for details.

All of the Auxiliary control switches are dual function, Press the switch left for momentary operation, and right for latched operation.

Aerial and Range

To achieve the specified maximum range from the GTX2, the aerial supplied must be fitted to the connector on the top of the case.

However, for short range indoor applications, up to about 5 metres, adequate performance can normally be achieved without an aerial.

Note, however, that maximum range may be affected if the receiver/ controller is shielded by being mounted within a metal vehicle body.

Binding

Before any GigaRad transmitter can be used with a Gigarad receiver/ controller, they must be bound together, so that the receiver responds only to one particular transmitter and Loco Selector switch setting.

Any receiver/controller may be bound to any transmitter and Loco Selector switch setting at any time and, once bound, remains bound until binding is performed again with another transmitter or Loco Selector switch setting.

All binding procedures are initiated from the transmitter, require no access to the vehicle and may be performed with other GigaRad transmitters operating nearby.

Binding Procedure

1 First ensure that any transmitter to which the receiver/controller is already bound is switched off, and that there are no other GigaRad receiver/controllers powered up and unbound within range.

2 Then ensure that the transmitter is powered off, the Loco Selector switch is set for the required vehicle, and that the Auxiliary switches are set as follows:

Aux 1 = On
Aux 2 = On
Aux 3 = Off
Aux 4 = Off

3 Power up the receiver/controller. The receiver LED will flash slowly [about five flashes per second].

4 Now power up the transmitter and immediately—within two seconds—set the Aux 4 switch On. This instructs the receiver/ controller to bind to the transmitter. If successful, the receiver/ controller LED will go fully on.

5 You may now set the Aux 4 switch Off. Normal operation will commence immediately, and the Receiver LED will flash once every time a valid data packet is received from the transmitter, every 25 ms [Note: you may not be able to separate the flashes at 40 Hz - The LED may just appear dimmer].

6 If the Receiver LED does not go fully On during binding, and remains flashing slowly, the procedure has failed and must be repeated from the start. Once bound, the operation of any Auxiliary switch during normal operation will have no effect on binding.