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## Model Trains Gauge 0/1/G , DCC via Radio

With this solution for your large scale trains you benefit in many ways:

- Very generic and price competitive solution. You save the large DCC-controllers and boosters and can operate by the smallest DCC-terminal.
- Applicable both in-door and out-door
- DCC commands are not destroyed by dirt on tracks, secure transmission on long distances
- Use tracks for DC-Power only, you benefit from stay-alive and battery support without DCC reduction complications.
- Full range of DCC-commands and CV-settings, exclusive the CV1.
- Applicable to all accessories like turnouts and signals saving wires
- No set-up, no coding is necessary, plug and play.
- Upgradeable to PC-based automations, In-out door GPS-positioning, Loconet operations etc.

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### **1: How it works?**

In the initial and simple set-up, the solution consists of three components:

- 1) The GT-Xconnect radio master
- 2) The GT-Xcontrol Loco (Item 1302721) in the Train
- 3) The GT-Xcontrol Device (tem 1302722) in turnouts, signals etc

In its first simple set-up you connect the DCC Track terminal on your DCC-Controller to the DCC-input on the GT-Xconnect. Then you insert the GT-Xcontrol Loco in your train between the track-power and your DCC-decoder.



You select a train on your DCC-controller. When you push a command the GT-Xconnect lifts the DCC-signal to the radio and broadcast the signal to any GT-Xcontrol. The GT-Xcontrol captures the signal and push it directly as normal DCC-track power into the decoder. GT-Xcontrol takes power from the tracks. Power can be pure 16-24 V DC or any DCC as well.

You can transmit any DCC-command this way, including CV-values but exclusive CV1.

### **Short Specifications**

GT-Xconnect, Radio device 868 Mhz DCC by Radio, Transmits up to 400 DCC commands/second, 50 m radio range. Very usable in automatic control with more trains. Upgradeable to PC and Position control. Uses less than 500 mA, supply from either DCC-terminal, USB, or 16 V AC trafo. GT-Xconnect operates as standard on one main channel. Using a PC it can be configured differently.

GT-Xcontrol, Radio device 868 Mhz and DCC device, 3A with 5A peak. Usable in trains as well as turnout and signal control. Expandable with “Stay Alive capacitors” and Position Transmitters.

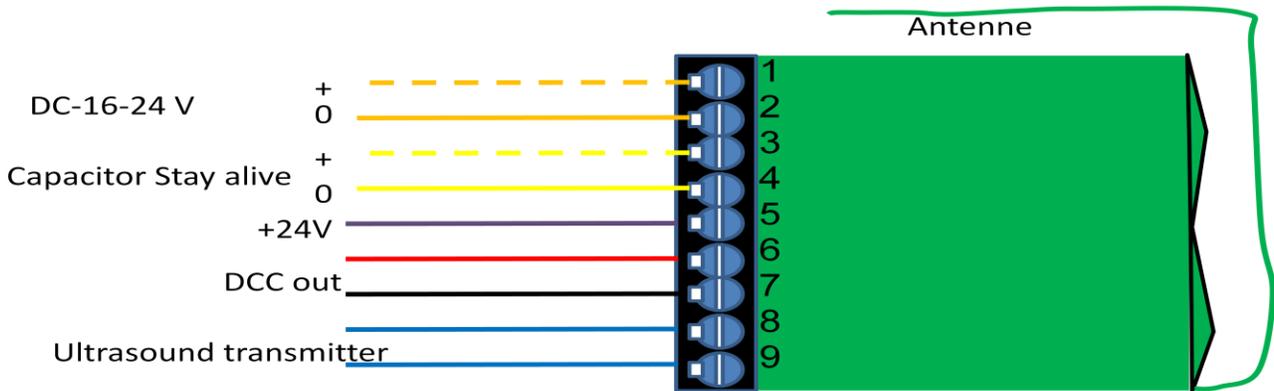
## ***2: How to apply with DCC-terminal/controller only.***

Connect your GT-Xcontrol Loco to your decoder in the train. Insert it between the track-power and the DCC-input to your decoder – if you need to switch between then insert a double shifter. Power can be both DC and DCC. Connect our GT-Xcontrol Device to your turnout, assuming power from tracks.

Connect your GT-Xconnect to your DCC-controller using the DCC-input connectors. Your GT-Xconnect will turn on the green DCC diode and assume power from the DCC-input. The GT-Xconnect will start looking for radio-devices and start flashing on the yellow TX diode when it sees a train or device with GT-Xcontrol - or any GT-Xcontrol with power.

Select a train (DCC-address) on your DCC-terminal, turn the button and your train is moving. Make any operation you like. The GT-Xcontrol acts in front of the DCC-decoder as tracks, thus the DCC-decoder will only consume commands related to his specific DCC-address. If your train loses Radio connection with the master the GT-Xcontrol will take the power from the train. This happens in 0,5-1,0 second and works as emergency stop. The train can lose the radio if the master is shot down.

Select a turnout on your DCC-terminal. The address is the last 3 digits in the ID – the number on the device. Press the turn or straight button to change the turnout or signal.



- Mode A: In Vehicle: Use 1+2 as power (DC or DCC), use 3+4 as Stay alive, use 6+7 as DCC output to decoder, Eventually use 8+9 for positioning transmitter.
- Mode B: Use 1+2 as power (DC or DCC), use 6+7 if Polar switch, or use 5 as high and 6+7 as left/right draw on switch
- Mode C: As mini booster: use 1+2 as power (DC or DCC), use 6+7 as DCC for rails.

### 3: How to apply GT-Xcontrol with PC and GT-Command only.

Connect your GT-Xcontrol Loco to your decoder in the train. Insert it between the track-power and the DCC-input to your decoder – if you need to switch between then insert a double shifter. Power can be both DC and DCC. Connect our GT-Xcontrol Device to your turnout, assuming power from tracks.

Connect your GT-Xconnect to your PC using the USB. Your GT-Xconnect will turn on the power diode. The GT-Xconnect will start looking for radio-devices and start flashing on the yellow TX diode when it sees a train or device with GT-Xcontrol - or any GT-Xcontrol with power – and flash on the RX diode if it finds satellites.

Start GOTMasterUtils. The Master shows up with ID and firmware status. Power on the GT-Xcontrol connecting Power to terminal 1 and 2. Use Tab 2 and see the GT-Xcontrol shows up. Change the type from 4 to 3, now it works with a specific train, and it has DCC address 3 in its internal setting. Shut down GOTMasterUtils.

Start GT-Command on the PC, follow the GT-Command manual, license code, and connections. When the GT-Xconnect is connected it shows green down left on the screen. The GT-Xcontrol will show up as a sender (vehicle). Use GT-Command to configure it, say as Track G-Scale train “Thusis”. Use the CV-Change line in vehicle configuration to set the DCC-address to the one of your vehicle, say 9. Confirm “Write” and “Save”. Move the speed-bar of the vehicle on the PC, and the train moves left/right, and turn on the functions, light etc.

Now the train is ready to use for any driving, it might need a speed calibration, please see the GT-Command manual.

If you are in doubt whether the GT-Xcontrol is captured, then use in GT-Command the Function **../tools/show debug** to find it in the red to the right. If it shows up with the right ID but in a narrow black box it is a Type 5 GT-Xcontrol Device and is configured for turnouts and switching.

If you use it for switching then create a turnout and insert the GT-Xcontrol ID, now you can use both dual coil and polar turnouts

#### **4: Change the type of your GT-Xcontrol,**

Just use the GOTMasterUtils. You can shift between 2-3-4-5

Type 2: Prepared for original LGB-decoder. GT-Xcontrol operate in Broadcast mode between Decoder and GT-Xcontrol, meaning that GT-Xcontrol does not care about the DCC-address of the decoder. You only need to tell the GT-Xcontrol its own DCC-address. To be used with PC-operation.

Type 3: Prepared for all other decoders, GT-Xcontrol and the Decoder has corresponding DCC-addresses. Also to be used with PC-operation and can also work with operation using DCC-controller only.

Type 4: GT-Xcontrol has no specific DCC-address but reads all DCC-commands in the air and pass them on to the Decoder, which then filters them base on its own DCC-address. To be used only with DCC-Controller operation.

Type 5: GT-Xcontrol acts as a radio decoder for a turnout or any Magnetic Article. The last 3 digits in the ID works as DCC-address.

#### **5: Advanced Settings**

Both GT-Xcontrol has a green diode flashing differently depending on the Status:

- 1) Slow Flash, (500ms On, 1500ms Off): It tells the Power is on but the Radio in GT-Xconnect is off. This mode is used when the GT-Xcontrol searches the Radio channel.
- 2) A short double flash for every measurement, in this mode the GT-Xcontrol and the Radio in the Master is connected, however the GT-Xcontrol has not yet received his configuration data from the Master.
- 3) One short flash every 3rd second. This is operation mode meaning that the GT-Xcontrol receives DCC-data from the GT-Xconnect, however GT-Xcontrol is NOT in Position measurement mode.
- 4) Short flash every time a measurement is made.. GT-Xcontrol is in both measurement mode and control mode. The flash frequence follows each measurement, as an example 10 measurements per second in only one train.

If you power your GT-Xconnect from a DCC-central, then the power to the GT-Xconnect will disappear if you press emergency stop – the red button. It means the radio will turn down and you can not operate your train. If you want to stop the power on the rails with this button, then please operate a relay for your power supply to the rails which can shift your current (may be 5 A?) and which is driven by the DCC-terminal power. Then both rails and Radio will terminate.

Normally when you loose the radio the train will stop in less than 10 seconds if the radio does not turn up again.

## **6: GT-Xcontrol Loco supports CV- settings:**

As standard your Loco is running on all the initial settings you have made. You can always take you Loco off track and put it on Programming track and make adjustments. This method is the standard method to change CV-values. Please set the Address of your Loco to a specific one **before** you connect the GT-Xcontrol. The GT-Xcontrol will support any setting you do via programming track, **however you must dismount the GT-Xcontrol in order to put the train on programming track.**

Should you want to change CV's after you have connected your GT-Xcontrol then the changes will be made via radio. Not all decoders will allow the Loco Address (CV1) to be changed this way. It depends on how the decoders apply the broadcast mode. We have tested ESU-decoders and Uhlenbrock decoders which all allow the CV1 change as described below.

## **7: Change CV-values on Loco using a DCC-Controller or PC:**

- 1) Change the Loco DCC Address. This can only be made if there is one and only one GT-Xcontrol connected to the GT-Xconnect. Please shut down all other powered GT-Xcontrol – or simply take the trains off track. Please think of the following process as if your train with the GT-Xcontrol connected stands on Main track as the only one.
  - a. Please select the decoder programming mode. If
  - b. your controller allows that please select Programming on main track. Please select your current loco address (i.e. 3), please select CV to be 1, please select the CV-value to be say 9. And then press Program. Now the radio will transmit the new CV1 to the decoder. Please select the new loconet address (9) and press an Fx button to see that it operates on the new address.
  - c. You might also apply a broadcast process. GT-Xconnect supports loco address 9997 as equivalent to Loco address 0, meaning 9997 is used for broadcast. Please select 9997 as your Loco address on the controller, and use any available method to set the CV1 for the 9997. **It means that you should not have any Loco running on address 9997.** Please select a new DCC-address and send it from the your DCC-terminal. The GT-Xconnect will broadcast this message to all radio-devices, however as you have only one connected the decoder behind this GT-Xcontrol will receive the new value for the Address and then adjust it. Afterwards you can operate your train with this new address.
- 2) You can change any CV-value from you DCC- terminal. It woks the same way as if you were sending a new CV on main track. Please select the CV-setting mode on your terminal. Select the Loco address and select the CV you want to adjust. Key in the new CV-value and submit it in the same way as if you would normally do on a main track.
- 3) You can change any CV using the Vehicle Configuration on your PC. Please be aware that nothing happens in Type 3 if the CV1 of the GT-Xcontrol is different from the CV1 of the decoder. Please ensure they are in sync. from beginning.

## **8: GT-Xcontrol Device supports the following settings**

GT-Xcontrol Device equals Type 5. As standard the GT-Xcontrol Device operates as an accessory decoder and shifter. The standard is 300 ms pulse time to perform any position shift of the article, this is useable for most turnouts. You might change the settings of the GT-Xcontrol Device, it requires however that you use the GT-Command tool on a PC to do so, there might be a free download which can only perform settings, please see the [www.GamesOnTrack.co.uk](http://www.GamesOnTrack.co.uk) web-site, download section.

- 1) As standard the GT-Xcontrol device has a DCC-address which corresponds to the last 3 digits of the ID number. If you should have a GT-Xcontrol Device with the address xx000, then you can use 001 on your DCC-terminal to shift the turnout for this ID, – since 0 is not a legal DCC-address for devices.
- 2) Change Pulse time. Please go into the Edit-mode and select turns. Please select GT-Xcontrol. Please insert your GT-Xcontrol ID as the Digital address (the full number of digits, minimum 5). Please select the pulse time to be between 100 ms and 6000 ms. Please press Save. Then you operate your device from the screen, and thereby control that it shifts as intended. Pulls longer or shorter. In this operation your GT-Xconnect is connected to the PC using the USB-cable. When the device has changed a couple of times the GT-Xcontrol has learned the new pulse time, and you can disconnect the PC and operate it from your DCC-terminal.
- 3) A pulse time about 2-3000 ms will normally be enough to pull a servo-engine driven accessory. Please be aware of the Voltage:  
**GT-Xcontrol has 16 V on the DCC-out, meaning you might need a resistor for driving your Servo engine.**
- 4) If you want to use it with a permanent draw or pull, please select 6300 ms this value corresponds to permanent left/right.
- 5) If you want to use the GT-Xcontrol Device for pure signal handling, please connect red/green to the two DCC-terminals and the middle wire to the “high” terminal. **Please be careful since there is 16 V on these terminals, at least insert 300 Ohm Resistor between the middle wire and the high terminal.**

## **9: GT-Xconnect can be configured using GOTMasterUtils - or GT-Command if you operate from a PC.**

GT-Xconnect operates as standard on one set of radio parameters. Using a PC it can be reconfigured:

- 1) As standard it uses one broad channel for maximum capacity. This channel can be split in two half channels each having enough capacity for a 10 trains in normal use. Upper channel and lower channel. Any GT-Xcontrol will automatically search for the available channel and in case of more channels operating it will try to configure itself on the channel coming from the closest master or from the one it used last time. If a GT-Xcontrol is powered off it will re-open again on the last working channel.
- 2) As standard it uses maximum radio power allowed under the short range device regulation. It can be configured to use less in case of indoor use or use of two systems running next door.
- 3) As standard it uses power from the PC or from the DCC-central. It can use power from any other source as an example a 16 V AC power supply.
- 4) As standard it operates with a ¼ wave antenna. Other antennas like Dipols or the like can be mounted for longer distance.

GamesOnTrack A/S cannot guaranty any functionality or compliance in such cases.