Hi All,
I have just retrieved my Container Terminal from three years in storage and thought it was about time to get the crane working with TrainController and this document is another record how I configured TrainController for easy control of my Heljan Container Terminal 89001 and the important points required to successfully run it using macros embedded as function buttons in a Train Window.

Note: - As there is no feedback from the Heljan Container Terminal all actions are time based and will be subject to time variations caused by temperature change, power supply variations, wear and tear etc.

Systems Tested: - ESU ECoS

Container Terminal Control Demonstration
Time Duration: - 7:01min.

Video on YouTube

Tip: - Control of the Heljan Container Terminal using TrainController Gold  
Date: 18-08-2012 Created

Read Container Terminal Manuals

For completeness I have supplied links to the Heljan Manuals below

   a. Main manual how to set up the container terminal and control it using the supplied controller.
   b. It is essential you understand how the container terminal works before trying to use DCC control and the TrainController software.

2. Container Terminal Trouble Shooting Guide
   a. At some point with your experimentation to control the container terminal you may find the hoist cables get jammed and this explains a point by point procedure to fix the problem. (This is not for the faint hearted).

Testing the Container Terminal for the First Time

Having read the Container Terminal Manual, try out controlling the Container Terminal with the supplied controller to get a feel for how it operates.

Testing the Container Terminal for the First Time using DCC

Before connecting your Container Terminal to a DCC system make a note of the address being used on the Heljan controller, C1: C2: C3: are the possible choices.

Refer to the Configuration Variables (CV’s) table page 4 to match the “Local Crane Address” to that shown on the Heljan controller.

Next enter two locomotive addresses on your DCC equipment (ECos) with the locomotive address matching the CV1 value for the “Local Crane Address”. (see example)

C1: would have a locomotive address 4 for the Trolley/Hoist  
C1: would have a locomotive address 5 for the Gantry

Tip: - Control of the Heljan Container Terminal using TrainController Gold
Date: 18-08-2012 Created

Setup locomotive functions as shown on the (CV’s) table next page to match the functions required.

Now connect your Container Terminal to the DCC system and try controlling the crane with your DCC controller. Once you have got this far you can start thinking about using TrainController to control the Container Terminal.

Configuration Variables (CV’s) and Function Keys for DCC Operation

### Trolley / Hoist Decoder

<table>
<thead>
<tr>
<th>CV#s</th>
<th>Function Description</th>
<th>Range</th>
<th>Default Setting</th>
<th>Value</th>
<th>Function Key</th>
</tr>
</thead>
<tbody>
<tr>
<td>CV1</td>
<td>Local address, Crane 1 (C1:)</td>
<td>1-99</td>
<td>4</td>
<td>4</td>
<td></td>
</tr>
<tr>
<td>CV1</td>
<td>Local address, Crane 2 (C2:)</td>
<td>1-99</td>
<td>6</td>
<td>6</td>
<td></td>
</tr>
<tr>
<td>CV1</td>
<td>Local address, Crane 3 (C3:)</td>
<td>1-99</td>
<td>8</td>
<td>8</td>
<td></td>
</tr>
<tr>
<td>CV2</td>
<td>Trolley Motor, start voltage</td>
<td>1-255</td>
<td>48</td>
<td>48</td>
<td></td>
</tr>
<tr>
<td>CV3</td>
<td>Trolley Motor, acceleration time</td>
<td>1-255</td>
<td>0</td>
<td>0</td>
<td></td>
</tr>
<tr>
<td>CV4</td>
<td>Trolley Motor, deceleration time</td>
<td>1-255</td>
<td>0</td>
<td>0</td>
<td></td>
</tr>
<tr>
<td>CV5</td>
<td>Trolley Motor, maximum speed</td>
<td>1-255</td>
<td>255</td>
<td>255</td>
<td></td>
</tr>
<tr>
<td>CV55</td>
<td>Hoist Motor, Down Speed</td>
<td>1-255</td>
<td>100</td>
<td>8.0V</td>
<td>F8</td>
</tr>
<tr>
<td>CV56</td>
<td>Hoist Motor, Up Speed</td>
<td>1-255</td>
<td>100/120</td>
<td>8.0V</td>
<td>F7</td>
</tr>
<tr>
<td>CV57</td>
<td>Hoist Rotation, Turn right speed (CW)</td>
<td>1-255</td>
<td>80</td>
<td>6.5V</td>
<td>F5</td>
</tr>
<tr>
<td>CV58</td>
<td>Hoist Rotation, Turn left speed (CCW)</td>
<td>1-255</td>
<td>80</td>
<td>6.5V</td>
<td>F6</td>
</tr>
<tr>
<td>CV59</td>
<td>Spot Light function mapping</td>
<td>1-255</td>
<td>2</td>
<td>2</td>
<td>F2</td>
</tr>
<tr>
<td>CV60</td>
<td>Magnet function mapping</td>
<td>1-255</td>
<td>1</td>
<td>1</td>
<td>F1</td>
</tr>
<tr>
<td>CV61</td>
<td>Magnet On</td>
<td>1-255</td>
<td>255</td>
<td>16.0V</td>
<td></td>
</tr>
<tr>
<td>CV120</td>
<td>Address Change CV (write only)</td>
<td>1-3</td>
<td>-</td>
<td>-</td>
<td></td>
</tr>
</tbody>
</table>

Hoist Down = F8
Hoist Up = F7
Hoist Rotation CW = F5
Hoist Rotation CCW = F6

CV56 = 120 was increased from the default value 100 to allow the hoist to lift a container at a better speed.

### Gantry Decoder

<table>
<thead>
<tr>
<th>CV#s</th>
<th>Function Description</th>
<th>Range</th>
<th>Default Setting</th>
<th>Value</th>
<th>Function Key</th>
</tr>
</thead>
<tbody>
<tr>
<td>CV1</td>
<td>Local address, Crane 1 (C1:)</td>
<td>1-99</td>
<td>5</td>
<td>5</td>
<td></td>
</tr>
<tr>
<td>CV1</td>
<td>Local address, Crane 2 (C2:)</td>
<td>1-99</td>
<td>7</td>
<td>7</td>
<td></td>
</tr>
<tr>
<td>CV1</td>
<td>Local address, Crane 3 (C3:)</td>
<td>1-99</td>
<td>9</td>
<td>9</td>
<td></td>
</tr>
<tr>
<td>CV2</td>
<td>Gantry Motor, start voltage</td>
<td>1-255</td>
<td>48</td>
<td>48</td>
<td></td>
</tr>
<tr>
<td>CV3</td>
<td>Gantry Motor, acceleration time</td>
<td>1-255</td>
<td>0</td>
<td>0</td>
<td></td>
</tr>
<tr>
<td>CV4</td>
<td>Gantry Motor, deceleration time</td>
<td>1-255</td>
<td>0</td>
<td>0</td>
<td></td>
</tr>
<tr>
<td>CV5</td>
<td>Gantry Motor, maximum speed</td>
<td>1-255</td>
<td>255</td>
<td>255</td>
<td></td>
</tr>
<tr>
<td>CV58</td>
<td>Gantry Light, function mapping</td>
<td>1-255</td>
<td>4</td>
<td>4</td>
<td>F3</td>
</tr>
<tr>
<td>CV60</td>
<td>Flash Light config</td>
<td>0-44</td>
<td>33</td>
<td>33</td>
<td></td>
</tr>
<tr>
<td>CV120</td>
<td>Address Change CV (write only)</td>
<td>1-3</td>
<td>-</td>
<td>-</td>
<td></td>
</tr>
</tbody>
</table>

The **Function Key** assignments are not stated in the original Heljan Container Terminal Manual.

CV56 = 120 was increased from the default value 100 to allow the hoist to lift a container at a better speed.
Changing the Default CV1 Values

The reason changing the default CV1 values on one of the cranes possible 3 channels (C1:C2:C3:) is I have a very full roster of Märklin locomotives which can only use addresses 1-80. The Container Terminal has a range of 1-99 so I chose the following values.

Changing the Default CV1 Value for the Gantry (CV1=85)
1. Since I have an ECoS I wired the Gantry to the programming track and removed the Trolley / Hoist from the Gantry.
2. I decided to use C3: then read CV120 to obtain its value. I changed the value=3 and wrote the value.
3. Next I read CV1 and obtained the value=9. I changed the value=85 and wrote the value.

Changing the Default CV1 Value for the Trolley / Hoist (CV1=84)
1. The Trolley / Hoist is more difficult to program. Using an ohmmeter I traced which side of the Trolley / Hoist when mounted on the Gantry was connected to the red (R)/brown (B) wires. I made a temporary sticker and identified the Trolley pickups.
2. You can’t program the Trolley/Hoist when mounted on the Gantry so I made a rail setup to mount the Trolley/Hoist on and wired the rails according to my temporary identification to my programming track.
3. I used channel C3: then read CV120 to obtain its value. I changed the value=3 and wrote the value.
4. Next I read CV1 and obtained the value=8. I changed the value=84 and wrote the value.
5. After some testing I increase the Hoist Up speed to help improve the Hoist lift with a container.
6. I read CV56 and obtained the value=100. I changed the value=120 and wrote the value. This was the only operational value that I changed.

Fix the addresses on DCC equipment (ECoS)

1. Having changed the default CV1 addresses on the Trolley/Hoist and Gantry I edited the locomotive addresses on my ECoS to reflect **CV1=84** for the Trolley/Hoist and **CV1=85** for the Gantry.

2. Test all the operations once more on the DCC equipment (ECoS) before attempting to use the TrainController software.

Container Terminal Orientation
Container Terminal Control Using TrainController

The diagram above shows the four TrainController Windows required for the Container Terminal.

Gantry
In the Gantry Window the Gantry can be operated **Left** and **Right**. The only function is the Gantry lights **Off** and Gantry lights **On**.

Gantry Slew A
In the Gantry Slew A Window the Gantry can be operated **Left** and Trolley **Backward**. In the Gantry Slew A Window the Gantry can be operated **Right** and Trolley **Forward**.

Gantry Slew B
In the Gantry Slew B Window the Gantry can be operated **Left** and Trolley **Forward**. In the Gantry Slew B Window the Gantry can be operated **Right** and Trolley **Backward**.

Trolley and Hoist
In the Trolley and Hoist Window the Trolley can be operated **Backward** and **Forward**.

Trolley and Hoist Functions

- **F1** = Magnet **Off** and Magnet **On**
- **F2** = Spotlight **Off** and Spotlight **On**
- **F5** = Hoist Rotate CW Pushbutton **Off** and Pushbutton **On**

Hoist Rotate CW 90 Deg macro and Hoist Rotate CW 180 Deg macro

**Tip:** - Control of the Heljan Container Terminal using TrainController Gold

Date: 18-08-2012  Created

**Trolley and Hoist Functions** continued

F6 = Hoist Rotate **CCW** Pushbutton **Off** and Pushbutton **On**

Hoist Rotate **CCW 90 Deg** macro  

For the macro operations the rotation time was setup without a container load and with the Container Load the hoist doesn’t rotate to the correct position but can be adjusted with the pushbutton controls as required, this works well.

F7 = Hoist **Up** Switch **Off** and Switch **On**

F8 = Hoist **Down** Switch **Off** and Switch **On**

Slew **macro** = Gantry **Left** and Trolley/hoist **Backward** for a timed duration.

Slew **macro** = Gantry **Left** and Trolley/hoist **Forward** for a timed duration.

Slew **macro** = Gantry **Right** and Trolley/hoist **Backward** for a timed duration.

Slew **macro** = Gantry **Right** and Trolley/hoist **Forward** for a timed duration.

The time duration for the Slew operation can be changed by the **7 sec** and **14 sec** macro functions.

14 seconds is required for the full traverse of the Gantry and 7 seconds is as you have guessed it, for the Gantry to traverse half the distance.

The Container Terminal **Pwr Off/On** toggle switch and Flagman indicators are controlled by the **ContTerm Pwr Off/On** icons in the Trolley/Hoist Train Window.

The toggle switch controls a k84 relay which turns Off/On the power supply to the Container terminal.

This icon is used to toggle **Off** the Gantry lights from the Trolley/Hoist window via a pushbutton and flagman.

This icon is used to toggle **On** the Gantry lights from the Trolley/Hoist window via a pushbutton and flagman.

Blocks and Flagman

The Container Terminal has four motors. Two motors are controlled by function buttons, F5-F6 control the hoist rotation with a preset speed and F7-F8 control the hoist Up and Down movements which is also controlled by a preset speed. The Gantry and the Trolley are controlled by variable speed controls.

The “ContTerm Slew Trolley Fwd” and “ContTerm Slew Trolley Rev” blocks are required to control the direction of the Container Terminal when both motors (Gantry and Trolley) are used together in a slewing motion, this provides four different movements.

The “ContTerm Trolley & Hoist” block is used for all functions and movements for the Trolley and Hoist. All diorama macros are also controlled or channelled through this block.

The “ContTerm Gantry” block is used for all functions and movements for the Gantry. Some macros are also controlled or channelled through this block.

All Flags are assigned to their respective blocks except for PWR Off/On and Macro Link.
Blocks, Flagman, Engines and Train Sets

“CT Gantry A Slew” train set is made up of two engines “(85) CT Gantry A Slew” and “(84) CT Trolley A” each is defined with the connection as shown in ( )

The “CT Gantry A Slew” train set is associated in the block “ContTerm Slew Trolley Fwd”

“CT Gantry B Slew” train set is made up of two engines “(85) CT Gantry B Slew” and “(84) CT Trolley B” each is defined with the connection as shown in ( )

Note that “(84) CT Trolley B” has had the Toggle Direction button used on it.

The “CT Gantry B Slew” train set is associated in the block “ContTerm Slew Trolley Rev”

This setup provides four different slewing movements for the Gantry and Trolley of the Container Terminal.

Tip: - Control of the Heljan Container Terminal using TrainController Gold
Date: 18-08-2012 Created

The Engine “(84) CT Trolley & Hoist” is associated in the block “ContTerm Trolley & Hoist”
The Engine “(85) CT Gantry” is associated in the block “ContTerm Gantry”

All Train Sets and Engines are associated to the right hand side of the respective blocks.

Engine Functions

All functions for the Container Terminal can be controlled from the “CT Trolley & Hoist” engine.

You will notice some functions are decoder function On/Off Switches, decoder function Push Buttons and List commands. As the database “rms_container_terminal_160812.yrr” is supplied, have a discovery tour to see how things are setup.
Macros

I have provided a few macros to help provide a base structure to control the Container Terminal.

When I use my container Terminal on my layout I intend to have a larger Gantry track which will have contact sensors. This will alter how the slew functions will work and I will have more timer functions. I will update this article sometime in the future to reflect the Container Terminal installation on my layout.

The supplied file “container_terminal_files.zip” contains the following files

- rms_container_terminal_160812.yrr
- rms_container_terminal_160812.yrs
- rms_container_terminal_160812.yrw
- container_terminal_engines.yrl
- ContainerTerminal.yra
- CT_Trolley.yra
- fx_1.yra

Portalkran_87dfe3b713.bmp (Loco icon for the ECoS Command Station)
Portalkran_902aace727.bmp (Loco icon for the ECoS Command Station)

Warning: - All files have been created using Gold TC software version 7.0F7c

Testing your Heljan Container Terminal is done at your own risk.

Installing Container Terminal Files

To have a look at the Heljan Container Terminal operating, unzip “container_terminal_files.zip” and do the following.

1) Place rms_container_terminal_160812.yrr, rms_container_terminal_160812.yrs and rms_container_terminal_160812.yrw under the TrainController directory.
2) Make a directory called “function_items” under the TrainAnimator directory and place ContainerTerminal.yra, CT_Trolley.yra and fx_1.yra under the function_items directory.
3) Place container_terminal_engines.yrl under TrainController\Locomotive Data directory.

Tip: - Control of the Heljan Container Terminal using TrainController Gold
Date: 18-08-2012 Created

Container Terminal Control Testing
  a. Start TrainController and select your digital system. The rms_container_terminal_160812.yrr file was created using an ECoS.
  b. Go into Edit Mode, Under the General Tab add the correct graphic from Function Items directory then under Connection Tab The Container Terminal address (default is 4 and 5) to suit the decoder address that your Container Terminal has on channel C1: and you are now nearly ready to start testing.
  c. Control you Container Terminal manually from your digital controller and confirm that the forward directions for the Gantry (5) is to the right and the Trolley (4) is forward, see Container Terminal Orientation page 6.

4) Ensure all engines and Trains are assigned to the correct Blocks.

Heljan Container Terminal

Diorama

5) Click the function button in the Trolley Train Window, the spot light will turn on.

6) Click the function button in the Gantry Train Window to test the gantry lights.

7) Click the function button and hold down the left mouse key in the Train Window for a CW rotation of the hoist, release the mouse button and the rotation will stop.

8) Click the function button and hold down the left mouse key in the Train Window for a CCW rotation of the hoist, release the mouse button and the rotation will stop.

9) Click the function button in the Trolley Train Window, ensure the Container Terminal will lower the Hoist, click the button to stop the action.

10) Click the function button in the Trolley Train Window, ensure the Container Terminal will raise the Hoist, click the button to stop the action.

11) Test the Container Terminal Slew Operations in the Train Window(s) to make sure all directions are correct, keep the speed low to avoid running too far.

12) The blue macro icons shown contain macros where the action required is first selected then the crane is controlled for a period of time. Make sure you are successful with points 7-8 before you start using the blue rotate hoist icons and wait until the action is complete before selecting the next action.
   a) If you notice the Container Terminal overruns any action, edit the appropriate macro (listed below) and shorten the time duration.

Tip: - Control of the Heljan Container Terminal using TrainController Gold

Date: 18-08-2012 Created

b) If the Container Terminal underruns any action, edit the appropriate macro (listed below) and lengthen the time duration.

- ContTerm CW_180
- ContTerm CW_90
- ContTerm CWW_180
- ContTerm CWW_90

13) The Slew icons are very complex and should only be tested once you have adjusted all the times in the macros shown and point 11 is correct.

- ContTerm Slew G-Left T-Backward 14 Sec
- ContTerm Slew G-Left T-Backward 7 Sec
- ContTerm Slew G-Left T-Forward 14 Sec
- ContTerm Slew G-Left T-Forward 7 Sec
- ContTerm Slew G-Right T-Backward 14 Sec
- ContTerm Slew G-Right T-Backward 7 Sec
- ContTerm Slew G-Right T-Forward 14 Sec
- ContTerm Slew G-Right T-Forward 7 Sec

a) First click the sec function, position the Trolley to its most forward position using the Train Window.
b) Position the Gantry to the far right using the Train Window.
c) Click the function, the Container Terminal should slew the Gantry left and the trolley backward.
d) If you notice the Container Terminal overruns any action, edit the appropriate macro (listed below) and shorten the time duration.
e) If the Container Terminal underruns any action, edit the appropriate macro (listed below) and lengthen the time duration.
f) Repeat this process for all 14 Sec slew macros using the correct function making sure you position the Gantry and Trolley before you execute the slew macros.
g) Possible positions are
   i) Gantry right Trolley forward
   ii) Gantry right Trolley backward
   iii) Gantry left Trolley backward
   iv) Gantry left Trolley forward

14) Edit all 7 Sec slew macros and make sure the time you may have changed in the 14 Sec macros is half the value.

15) The Diorama Macro push buttons should ONLY be tested once points 4-14 work really well.
   a) Ensure you Container Terminal power is on and can be controlled from the Train windows.
b) Position the Gantry to the far right and the Trolley to the most forward position using the Train Windows.
c) Both Heljan containers should be stacked and positioned so the hoist can lower and pick up the first container, see YouTube video demonstration.
16) The Diorama push buttons 1-3 will only work when the Macro Link flagman is on.
   a) Once the diorama (1) button is pushed, pause a few seconds then turn the Macro Link switch off and sit back and enjoy the action.

   ![Diorama Diagram]

   b) Once the first diorama (1) is complete, refer to the message window to know when. Switch the Macro Link switch on, push diorama (2) button, pause a few seconds then turn the Macro Link switch off and sit back and enjoy the second diorama.
   c) Repeat once again for diorama (3)
   d) Leaving the Macro Link on will execute all macros one after the other.
Tip: - Control of the Heljan Container Terminal using TrainController Gold
Date: 18-08-2012 Created

Bonus Time

If you have successfully tested and run the Heljan Container Terminal 89001 as listed above and would like to enter the information into “your_layout.yrr” you will have completed most of the hard work required. I have outlined some procedures below.

Warning: -
Copying “rms_container_terminal_160812.yrr” will take an experienced user 1-2 hours or less to complete.

Because this is an advanced topic the procedures below are an outline only of what you will have to do.

TIP:
Copying data from one *.yrr file to another *.yrr file
To do this process you must start another TrainController (you will have two TrainController’s running) and resize both windows so they are side by side.
“rms_container_terminal_160812.yrr” should be open in the left side TrainController and “your_layout.yrr” is open in the right TrainController.

In the left TrainController window select the items required in a window then hit Ctrl + C to copy items.

In the right TrainController LMC (left mouse click) the location you want to place the items and Hit Ctrl + V to paste items. Do another LMC away from any other item in the right TrainController to finally place the items in your_layout.yrr

Copy Procedure Outline
1. Create a new Switchboard in ‘your_layout.yrr’ named “Container Terminal”.
2. Import the Engine named “container_terminal_engines.yrl” (supplied file) into ‘your_layout.yrr’. This provides all icons required and a speed profile for the Container Terminal engines (total 6) so Dr. Railroad won’t complain too much.

3. Using New Explorer windows copy all macros. Make sure that you copy last and in the order stated.
4. Copy all switchboard switches, Flagmen, text and image.
5. Check all switch properties and make any required changes.
6. Fix Flagman to required switches and check all properties.
7. Using the Block Editor delete all Flagman and reinsert the required Flagman for all blocks.
8. Edit the Engine ‘CT Trolley’ and fix list operations (accessories and macro’s).
9. Enjoy controlling your Heljan Container Terminal with ease.

As always enjoy your model trains.