1 Introduction

This application note provides information on how to use the L-Switch with LNS-based network management tools. While Section 2 describes the use of the LOYTEC Shapes available for LonMaker™ for Windows Section 3 takes a more general approach which can be applied to any LNS-based integration tool.

Important: This document refers to L-Switch firmware version 4.0 and above! Please upgrade your L-Switch to this firmware version!

2 Using the L-Switch Shapes in LonMaker™ for Windows

Special L-Switch shapes are provided by LOYTEC to be use with LonMaker™ for Windows for your convenience. They are part of the LOYTEC LonMaker Shapes package, which can be downloaded from the LOYTEC website http://www.loytec.com. This documents assumes the use of version 5.0.0 of the LOYTEC Shapes Sheet and LonMaker™ 3.13.

2.1 Installing the L-Switch Shapes for LonMaker™

1. Copy the "`LoytecShapes.vss`" file into your LonMaker shapes directory (e.g. "`c:\Lonworks\LonMaker\Visio\`").

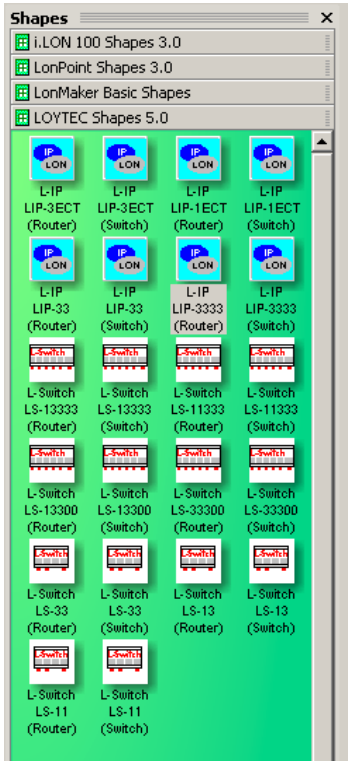

Figure 1: LOYTEC shapes sheet version 5.0.0

2. Open the L-Switch shape sheet in the LonMaker (File->Stencils->OpenStencil and select "`LoytecShapes.vss`").

3. Now the LOYTEC shapes should be accessible in your LonMaker environment (see Figure 1).

2.2 Inserting an Multi-Port L-Switch shape in your project

1. Insert the L-Switch shape by dragging the L-SWITCH shape onto the drawing area. Depending on whether you operate your L-SWITCH in "Configured Router Mode" or in "Smart Switch Mode" choose a shape with "(Router)" or "(Switch)" in its name respectively.

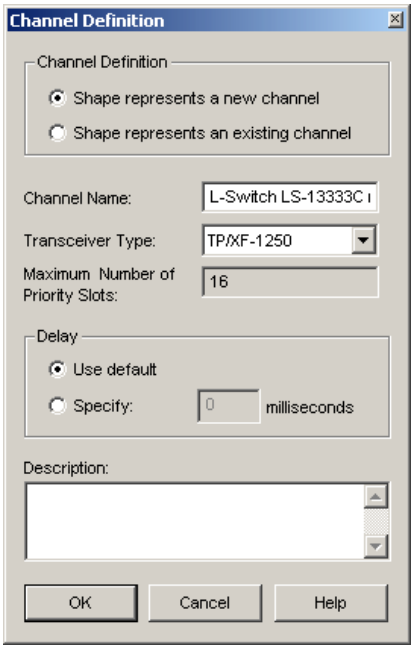

Figure 2: Channel Definition dialog

2. When using LonMaker 3.13 a dialog appears, which asks to create a new channel. This channel (e.g. named "L-Switch LS-13333C (Router)") represents the internal backbone of the L-Switch. **Make sure you keep the "Channel Definition" selection on "Shape represents a new channel"!** Select "OK" (see Figure 2). Note, that if you insert a second L-Switch shape to your LonMaker project "Shape represents a new channel" must be explicitly selected and the internal backbone channel of the L-Switch will be named "L-Switch LS-13333C (Switch) 1"! **This dialog does not appear when using LonMaker TE!**

3. Now for each port of the L-Switch a dialog appears which asks for a channel definition. You can either select an already existing channel or create a new channel with the required transceiver type.

4. The L-Switch now appears in the drawing area as shown in Figure 3 and is ready for use.

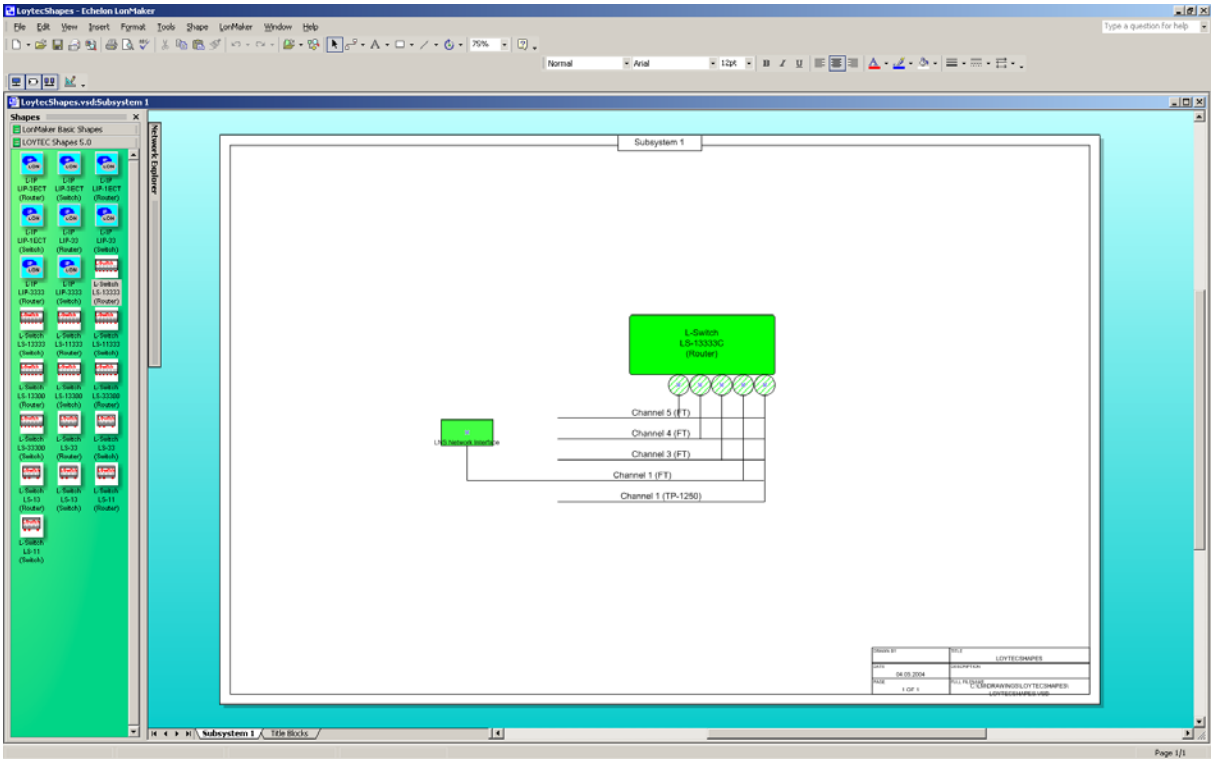

Figure 3: The L-Switch appears on the drawing area

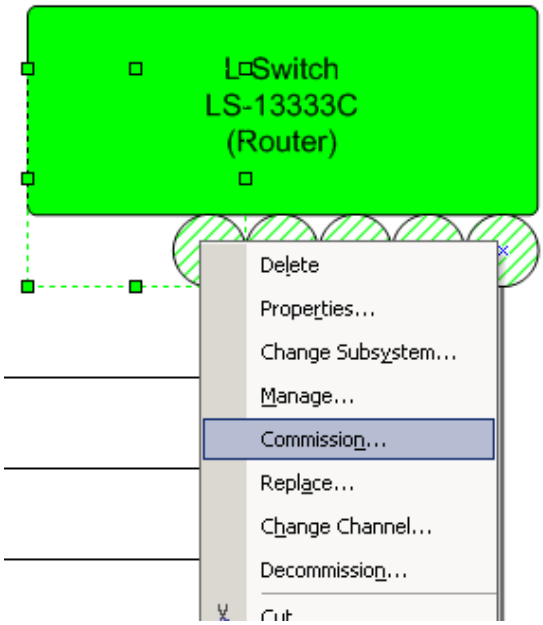

Figure 4: Commissioning an L-Switch port

5. Finally the ports of the L-Switch have to be commissioned (when operating the L-Switch in "Smart Switch Mode" this step is optional). To do this right click on each of the hatched circles at the bottom of the L-Switch shape and select "Commission" from the context menu (see Figure 4). Start with the port closest to your network interface (in our example this is the port connected to Channel 1). Note: You have to be "Onnet" to be able to commission the L-Switch.

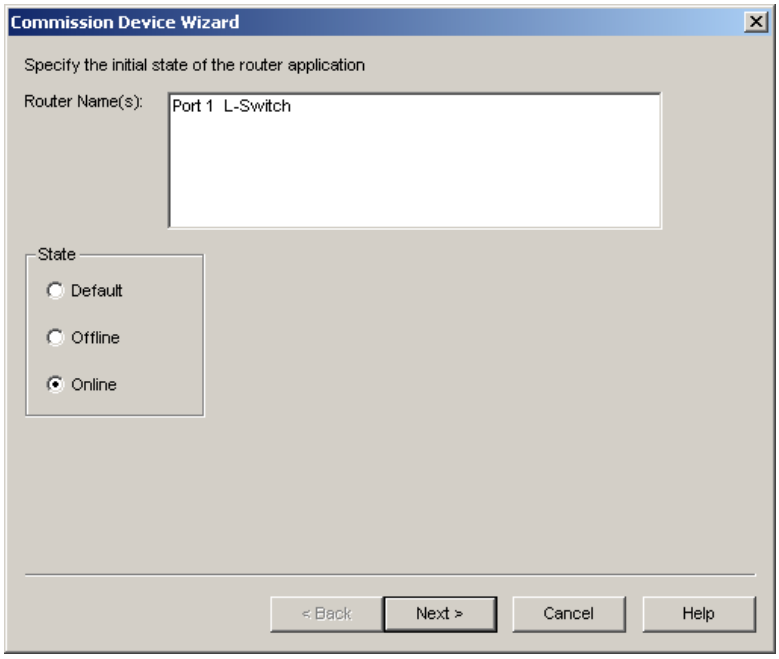

Figure 5: Commission Device dialog

6. In the appearing dialog set the state to “Online” and select “Next>” (see Figure 5).

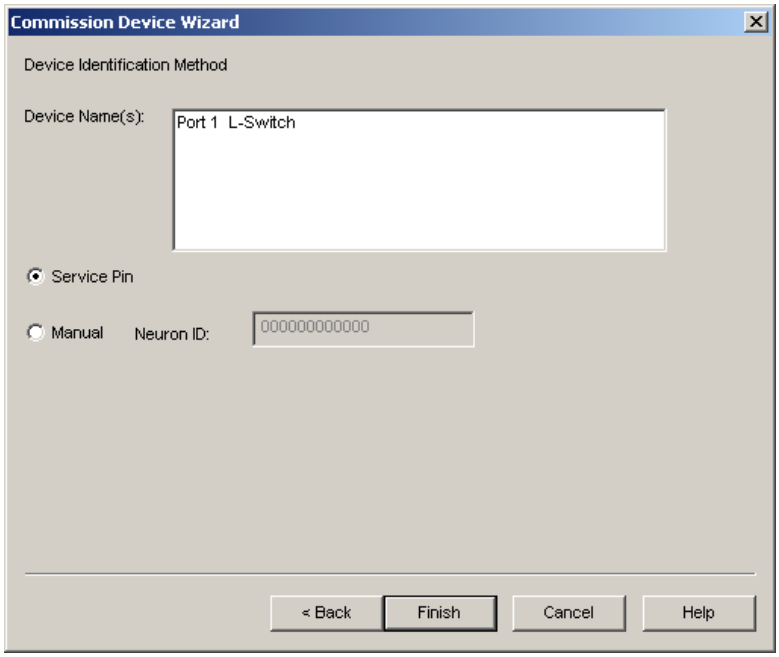

Figure 6: Either enter the Neuron ID manually or select Service Pin

7. In the next dialog either enter the Neuron ID manually or choose “Service Pin”. Select “Next>” (see Figure 6).

8. If “Service Pin” was selected in the last dialog the dialog shown in Figure 7 appears. Pressing the status button longer than 2 seconds will allow you to select the port that sends out the “Service Pin Message”. If you continue to hold the button the first port will be selected and its port LED will light up orange. After 2 seconds the next available port will

be selected. When the status button is released the "Service Pin Message" is sent out on the currently selected port/router.

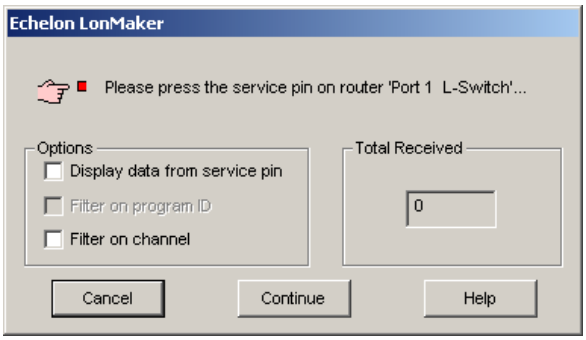

Figure 7: Press the service pin

9. Repeat steps 5 to 7 for the remaining ports of the L-Switch.

10. After commissioning all ports all circles at the bottom of the L-Switch shape appear solid green in the drawing (see Figure 8). The L-Switch is now commissioned and ready to forward packets.

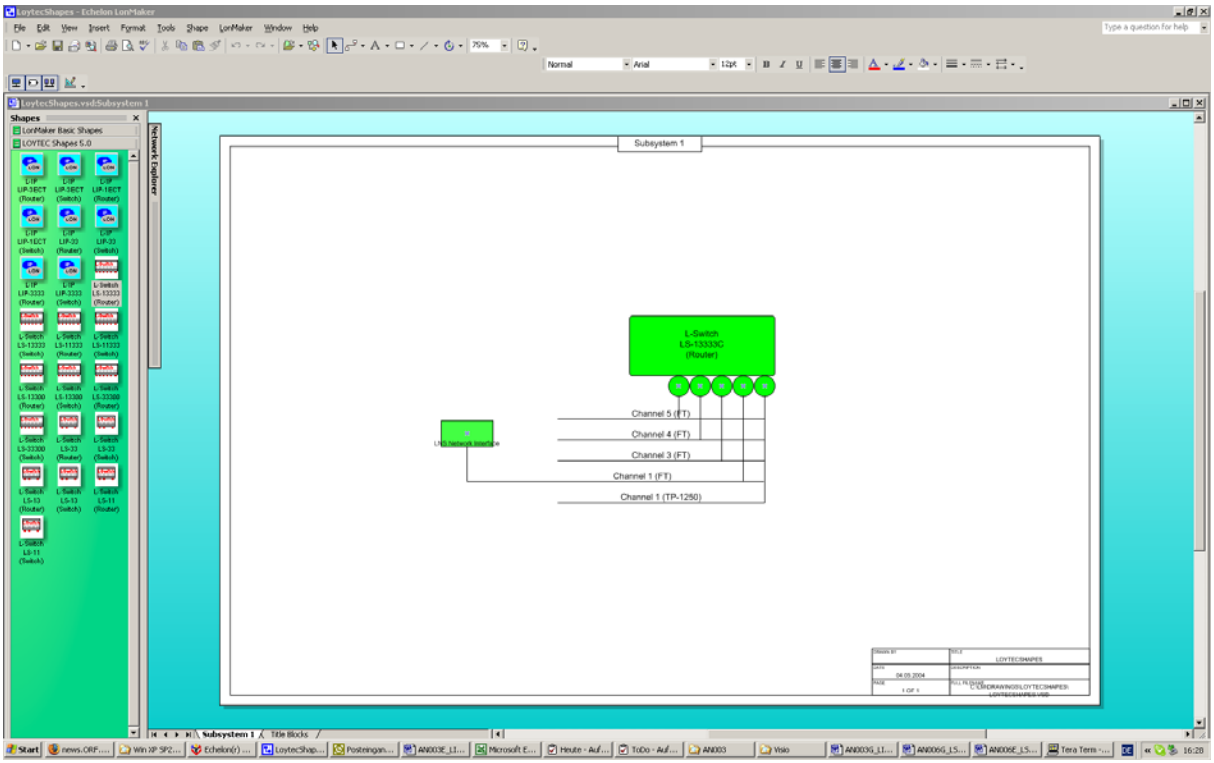

Figure 8: The L-Switch is now commissioned and ready to use

2.3 Inserting a Two-Port L-Switch shape in your project

1. Insert the L-Switch shape by dragging the L-Switch shape onto the drawing area. Depending on whether you operate your L-Switch in "Configured Router Mode" or in

"Smart Switch Mode" choose a shape with "(Router)" or "(Switch)" in its name respectively.

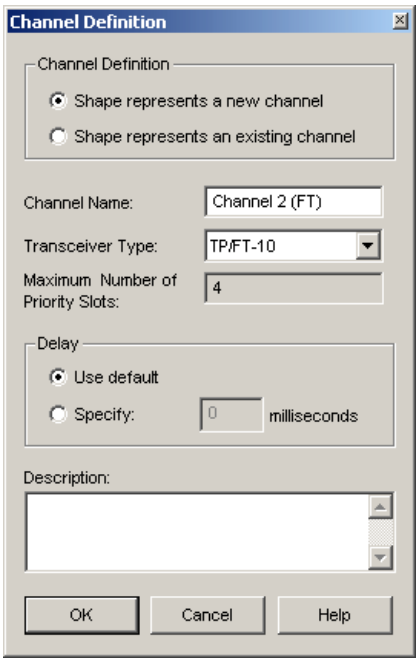

Figure 9: Channel definition dialog

2. Now for each port of the L-Switch a dialog appears which asks for a channel definition (see Figure 9). You can either select an already existing channel or create a new channel with the required transceiver type.

3. The L-Switch now appears in the drawing area as shown in Figure 10.

4. Finally the L-Switch has to be commissioned (when operating the L-Switch in "Smart Switch Mode" this step is optional). To do this right click on the L-Switch and select "Commission". Note: You have to be online to be able to commission the L-Switch.

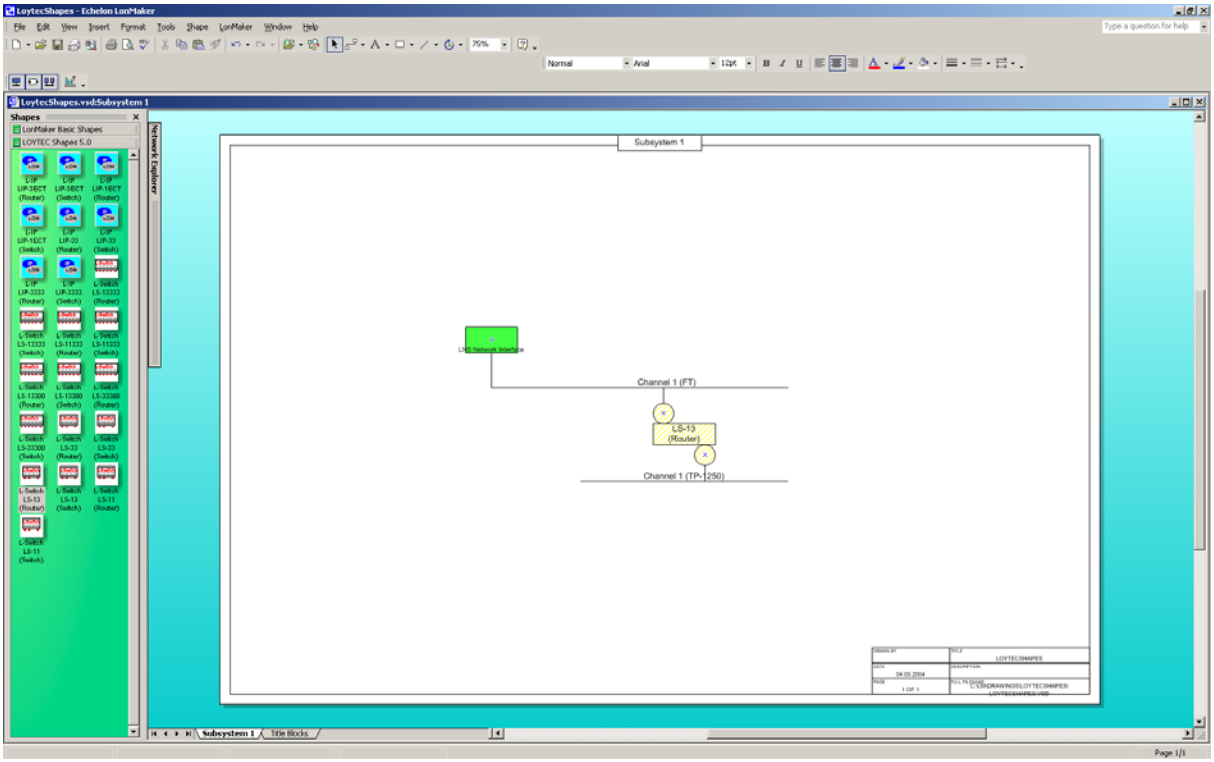

Figure 10: The unconfigured L-Switch appears on the drawing area

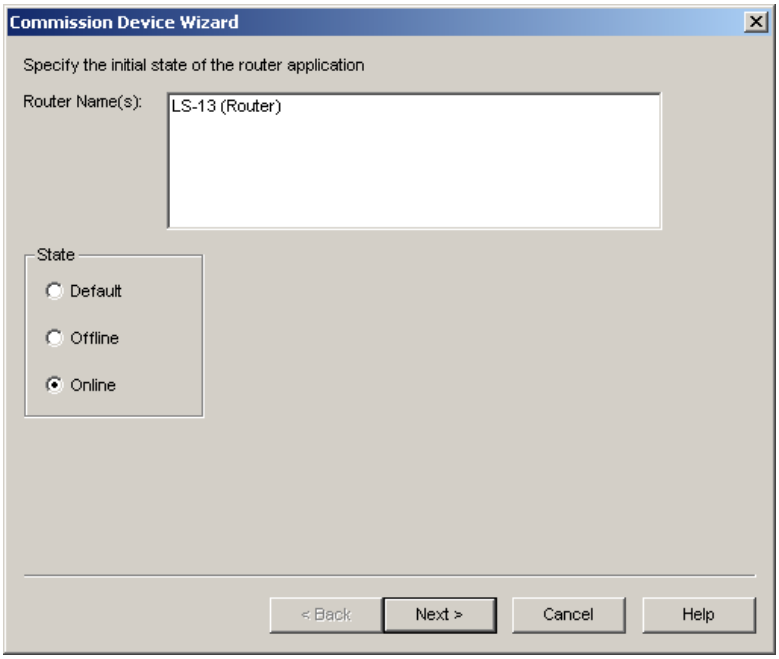

Figure 11: Commissioning the L-Switch

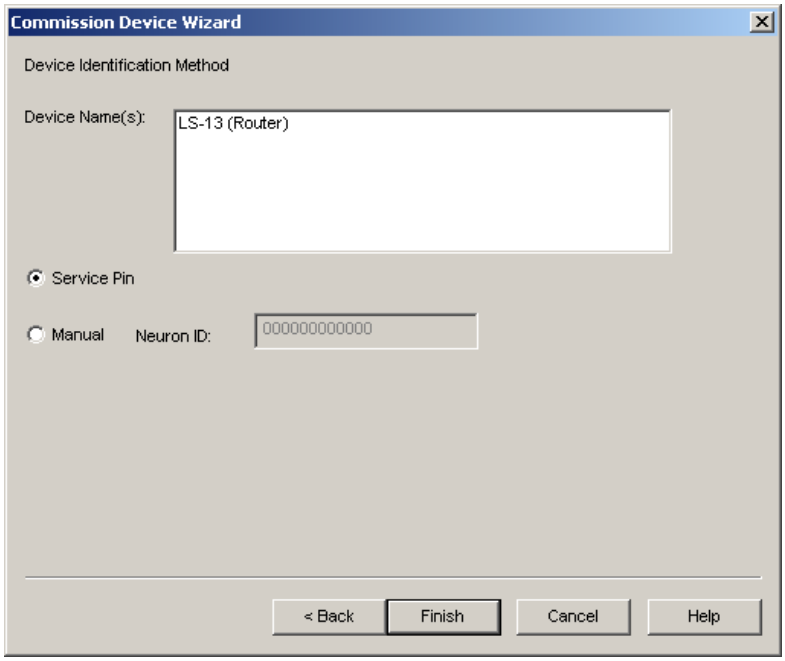

Figure 12: Either enter the Neuron ID manually or select Service Pin

5. In the appearing dialog set the state to “Online” and select “Next>” (see Figure 11).

6. In the next dialog either enter the Neuron ID manually or choose “Service Pin”. Select “Next>” (see Figure 12).

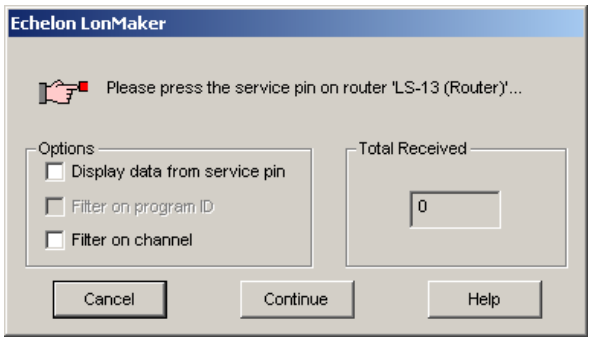

Figure 13: Press the service pin

7. If “Service Pin” was selected in the last dialog the dialog shown in Figure 13 appears. Shortly press the status button on the L-Switch.

8. After the commissioning process the L-Switch appears green in the drawing (see Figure 14). The L-Switch is now commissioned and ready to forward packets.

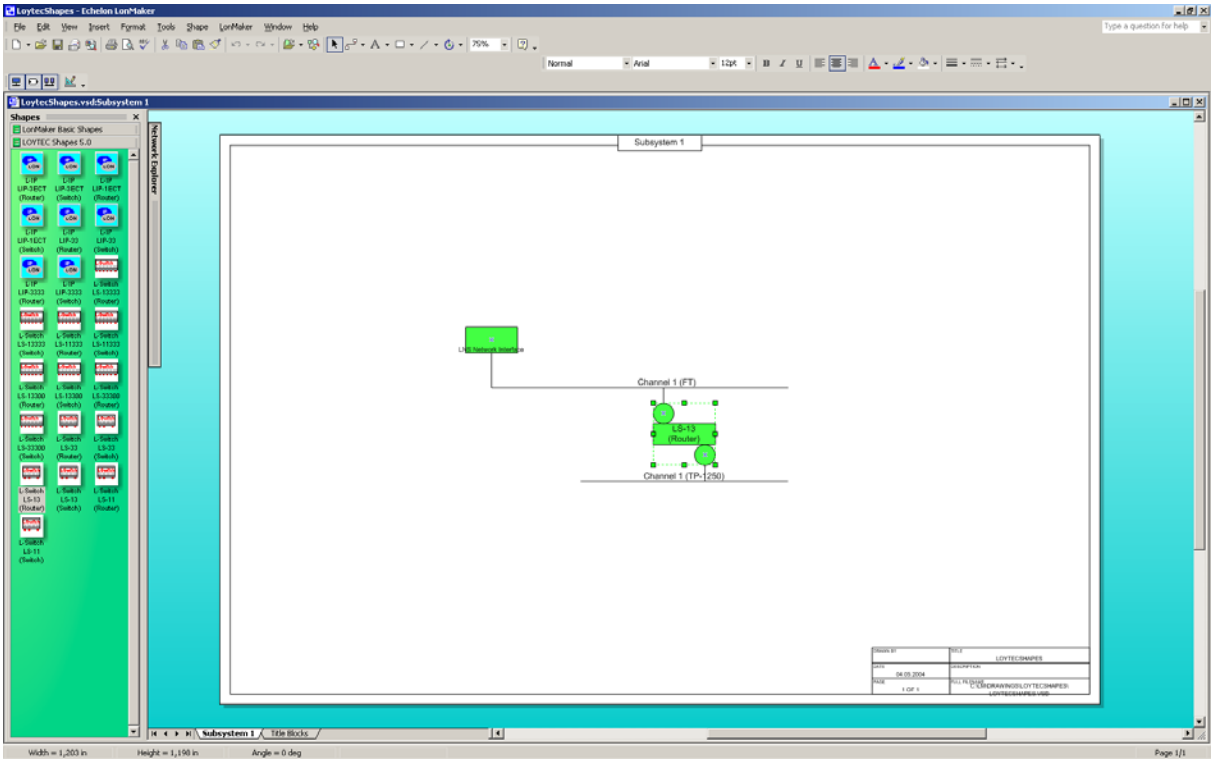

Figure 14: The L-Switch is now commissioned and ready to use

2.4 Hints for using the Multi-Port L-Switch Shapes

2.4.1 Moving an Multi-Port L-Switch Shape

When moving an L-Switch shape, always make sure that you first select all parts of the L-Switch shape by dragging a rectangle around the whole shape. Now the whole shape can be moved.

2.4.2 Deleting an Multi-Port L-Switch Shape

To delete the shape, select all parts of the L-Switch shape by dragging a rectangle around the whole shape and select “Delete” from the context menu (Figure 15). Press “Yes to All” to delete the entire L-Switch from the drawing.

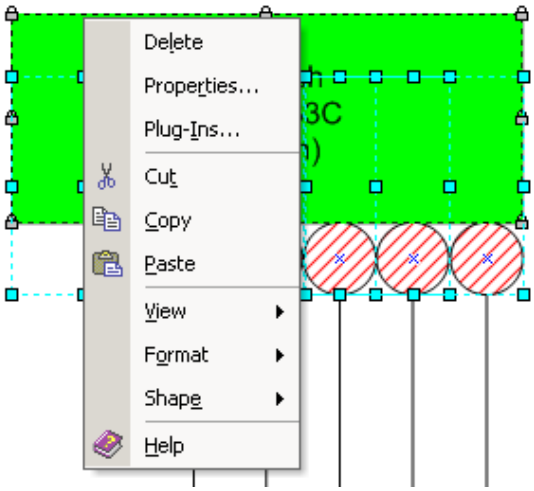

Figure 15: Deleting an L-Switch shape

2.4.3 Background information on the Multi-Port L-Switch Shapes

The L-Switch can be represented by a combination of an internal (virtual) backbone channel and a common EIA-709 two port router for each port of the L-Switch. Each of these routers connects a single external port to the internal backbone channel. The L-Switch shapes connect these routers together with the internal backbone channel and build a single shape out of the routers and the internal backbone channel. The router shape ports are configured in the associated shape sheet to allow only the selection of the proper channel types. Some parts of the shapes and the internal backbone are hidden to create a proper L-Switch shape.

Unfortunately it is not possible to group multiple LonMaker shapes to a single shape so that the different shapes cannot be moved independently. Therefore it is important to select all parts of the shape before moving or editing the L-Switch shape. Further, it is necessary to step through all dialogs when creating the internal backbone channel and the routers for the different ports of the L-Switch.

3 Using the L-Switch and L-Switch XP with LNS based Installation Tools

Although the example in this section refers to the LonMaker™ for Windows network integration tool, the basics are valid for every LNS based network management tool.

3.1 L-Switch XP in Configured Router Mode

3.1.1 L-Switch XP 2-Port

If the L-Switch XP 2-Port is operated in configured router mode, it behaves just like any standard EIA-709 router. Therefore, a router shape must be added to the LonMaker drawing and the router must be commissioned. The L-Switch can be configured as configured router (recommended), repeater, or bridge. Figure 16 shows an example.

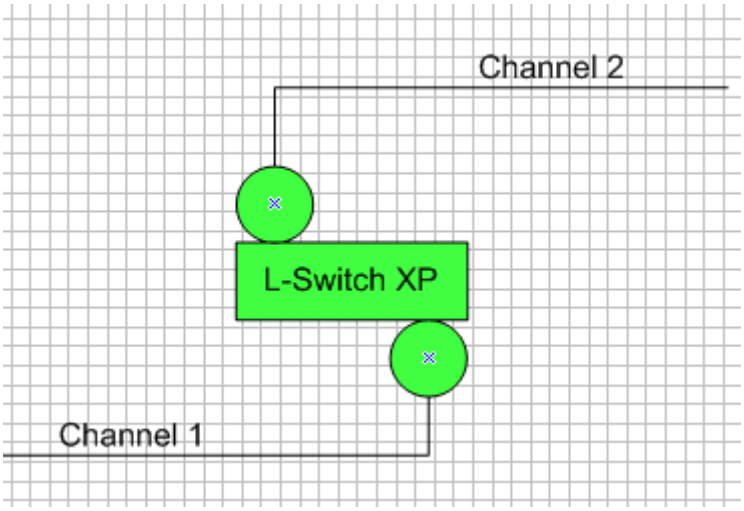

Figure 16: L-Switch XP 2-Port in LonMaker

3.1.2 L-Switch XP Multi-Port

The L-Switch XP multi-port versions (3 to 5 ports) contain multiple standard EIA-709 routers – one for each port – and one internal TP-1250 backbone. The internal TP-1250 is neither visible nor accessible from the outside. Figure 17 shows an example for a 5-Port L-Switch (LS-13333C).

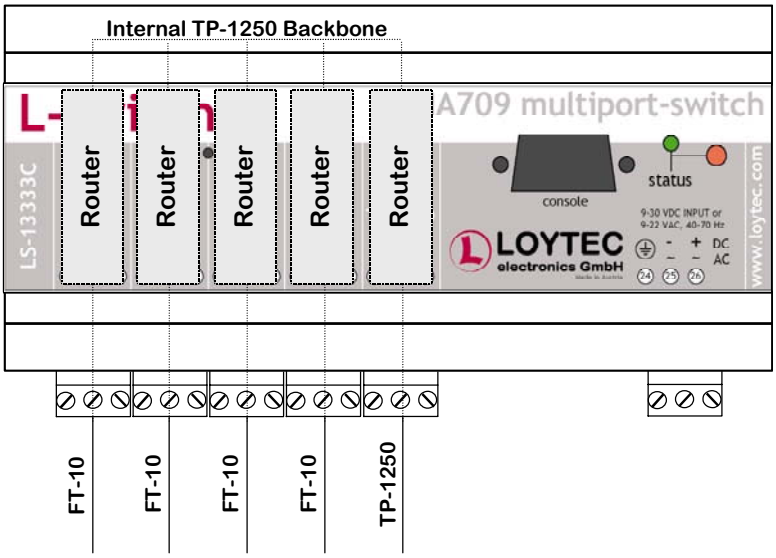

Figure 17: Internal structure of a 5-Port L-Switch in configured router mode

Thus, to add the L-Switch XP Multi-Port to a LonMaker drawing the following steps have to be taken:

1. Add channels which are connected to the L-Switch ports.
2. Add the internal TP-1250 Backbone channel.

3. Add one router shape for each port. Connect one side of the router to the internal TP-1250 Backbone channel added in step 2. Connect the other side to the external channel connected to the L-Switch port.

When commissioning the L-Switch router shapes, start with the one closest to your network interface.

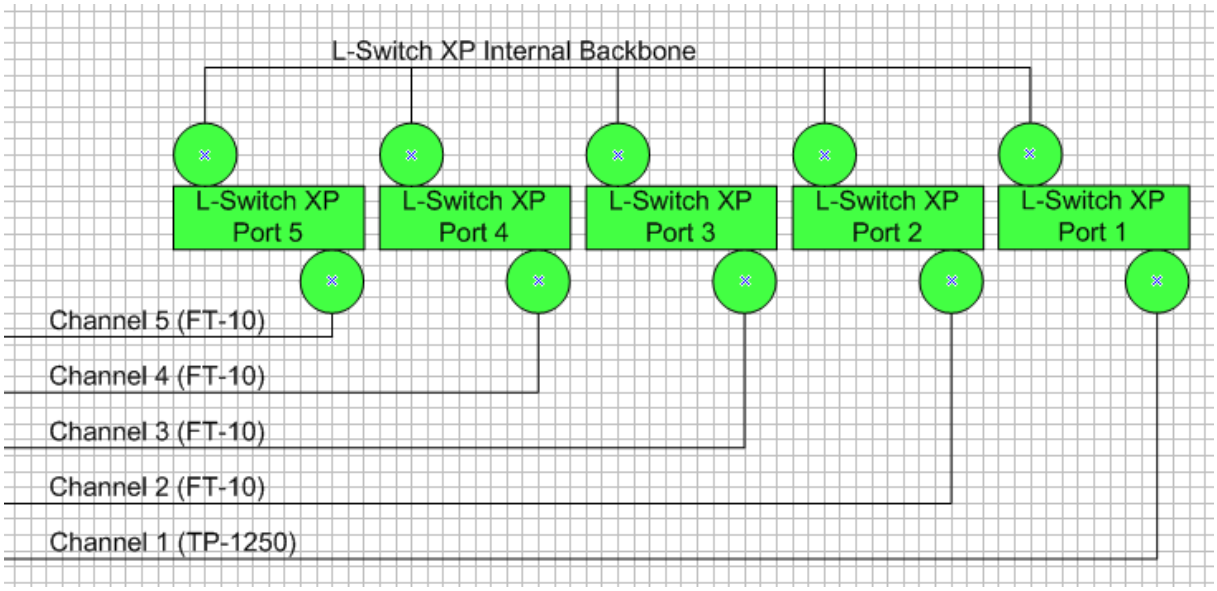

Figure 18: L-Switch XP Multi-Port in LonMaker (LS-13333C)

Pressing the status button longer than 2 seconds will allow you to select the port that sends out the "Service Pin Message". If you continue to hold the button the first port will be selected and its port LED will light up orange. After 2 seconds the next available port will be selected. When the status button is released the "Service Pin Message" is sent out on the currently selected port/router.

Figure 18 shows an example for a 5-Port L-Switch XP (LS-13333C).

Important: Please make sure to create a new internal backbone channel for every L-Switch device in your project!

3.2 L-Switch and L-Switch XP in Smart Switch Mode and Repeater Mode

This section provides information on how to use the L-Switch and L-Switch XP in smart switch mode and in repeater mode with LNS based network management tools.

The L-Switch and L-Switch XP in smart switch mode and in repeater mode is a Plug&Play device and is completely transparent to network management tools as long as the nodes use the same transceiver type (in most cases FT-10). For a LonMaker™ project, generate a single channel and place all nodes on this channel. Since single subnets can spread over multiple ports on an L-Switch, the user does not have to create different channels like when using a common EIA-709 router.

However, the network integration tool will not allow installing nodes with different transceiver types (e.g. FT-10 and TP-1250) on the same network channel. To use the L-Switch transparently on a network with different transceiver types, "Phantom Routers" has to be added to the project.

To add "Phantom Routers" proceed as described in Section 3.1. **However, when prompted to select the router mode choose "Repeater"**!

In case of the L-Switch XP the routers can optionally be commissioned (recommended). **In case of normal (older non-XP) L-Switches do not commission the routers!**

Because the L-Switch in smart switch mode and in repeater mode is no common EIA-709 router device, it does not need to be commissioned to be operational. Nevertheless, the installation of a "Phantom router" as described above tells the LNS database that a physical connection between the different network channels is present. By that, nodes of different transceiver types can be installed and the self learning features and Plug&Play capabilities of the L-Switch can still be used.

Note: There is no need to use this method if a TP-1250 backbone is used only to connect L-Switch devices, but has no "regular" nodes connected to it. In this case, the TP-1250 channel is invisible to LNS.