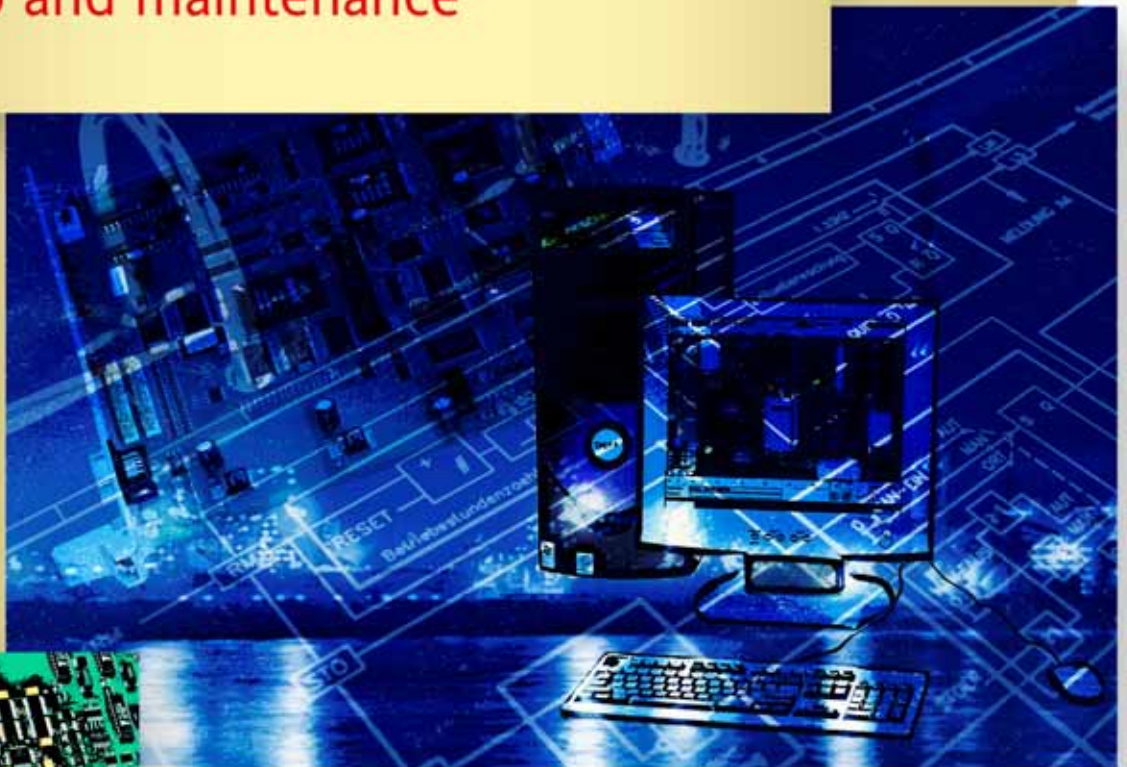




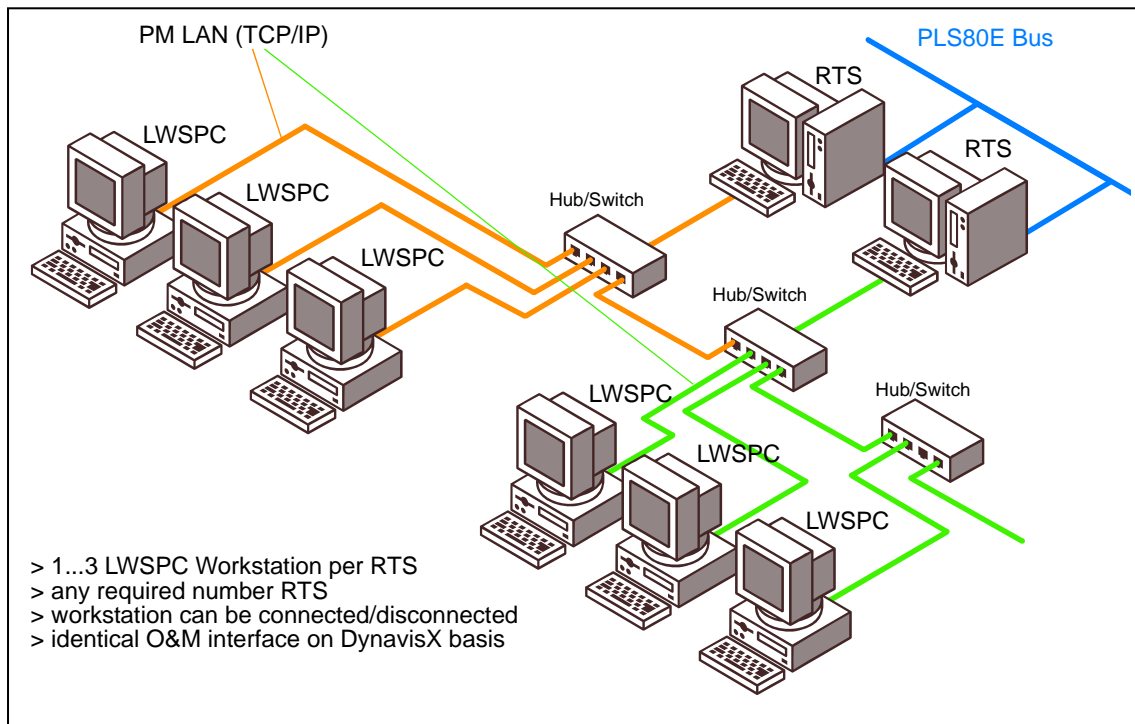
## PLS80E, Process Management Level with RTS & LWSPC

Startup and maintenance



invensys®

## PLS80E, process management level with RTS & LWSPC: startup, maintenance



The process management level LAN connects the various PLS80E stations of the process management level and enables them to communicate with each other.

It is used in conjunction with at least one of the following components and / or functions:

### Components

Real Time Server RTS with LWSPC

Network - colour printer together with LWSPC

PLS80E Office computer with/without interface to factory-wide network

### Functions

Transfer of project data between stations

Concurrent configuration on several stations

Distribution of parameters that were changed online to other stations

# 1 Table of Contents

<b>1</b>	<b>TABLE OF CONTENTS.....</b>	<b>3</b>
<b>2</b>	<b>GENERAL INFORMATION.....</b>	<b>7</b>
<b>3</b>	<b>SHUTTING DOWN THE STATIONS.....</b>	<b>8</b>
3.1	Disconnecting an LWSPC from the RTS .....	8
3.2	Exiting the RTS operating mode automation.....	10
3.3	Switching off an LWSPC .....	11
3.4	Switching off a real time server .....	11
<b>4</b>	<b>STARTING THE STATIONS.....</b>	<b>12</b>
4.1	Starting an RTS .....	12
4.2	Starting an LWSPC.....	12
4.3	Switching the operating mode of an RTS .....	12
<b>5</b>	<b>SETTING UP THE PROCESS MANAGEMENT LEVEL LAN .....</b>	<b>14</b>
5.1	Station name and IP address .....	14
5.2	Adding an RTS to the PM LAN .....	15
5.2.1	Configuring the name .....	15
5.2.2	Configuring the IP address .....	16
5.2.3	Process management level administrator.....	16
5.2.4	Station directory .....	16
5.2.4.1	Adding an entry .....	16
5.2.4.2	Deleting an entry .....	17
5.3	Editing the RTS on the PM LAN .....	17
5.3.1	Editing the name .....	17
5.3.2	Editing the IP address .....	17
5.3.3	Editing the name and IP address at the same time.....	17
5.4	Removing an RTS from the PM LAN.....	17
5.4.1	Deleting the station directory of this RTS .....	17
5.4.2	Removing the administrator from the PM LAN .....	18
5.5	Adding an LWSPC to the PM LAN.....	18
5.5.1	Adapting the file /etc/hosts .....	18
5.6	Removing an LWSPC from the PM LAN .....	19

<b>6</b>	<b>COMMISSIONING THE STATIONS .....</b>	<b>20</b>
<b>6.1</b>	<b>RTS .....</b>	<b>20</b>
6.1.1	Variant installation .....	20
<b>6.2</b>	<b>LWSPC.....</b>	<b>21</b>
6.2.1	Editing the start file .....	22
6.2.2	Setting up the network printer .....	23
<b>6.3</b>	<b>Network printer .....</b>	<b>23</b>
<b>6.4</b>	<b>PLS80E Office computer .....</b>	<b>23</b>
<b>7</b>	<b>BACKUP AND DISTRIBUTION OF PROJECT DATA .....</b>	<b>24</b>
<b>7.1</b>	<b>Backup and distribution of user data .....</b>	<b>24</b>
7.1.1	User data backup on tape streamer .....	24
7.1.2	Distributing the user data with the tape streamer.....	24
7.1.3	Distributing the user data via the PM LAN (export / import).....	25
7.1.4	Distributing the user data via the PM LAN (client-server variant) 8.3.....	26
7.1.4.1	The Configuration Master is also the Automation Master.....	26
7.1.4.2	Configuration Master and Automation Master are not the same RTS .....	26
7.1.4.3	Updating the Automation Slaves .....	26
<b>7.2</b>	<b>Backup and distribution of object base .....</b>	<b>26</b>
7.2.1	Directory structure for the object base on the LWSPC.....	27
7.2.2	Transferring the object base between LWSPC and RTS .....	27
7.2.2.1	OBB transfer when RMX version < RMX3, Revision 2.3 .....	27
7.2.2.2	OBB transfer when RMX version >= RMX3, Revision 2.3 (see 14.5) .....	28
7.2.3	Backup of object base on RTS on tape streamer .....	29
7.2.4	Distributing the object base to all LWSPCs .....	30
7.2.4.1	OBB transfer (send) to LWSPC when RMX version < RMX3, Revision 2.3 .....	30
7.2.4.2	OBB transfer (retrieval) from RTS when RMX version >= RMX3, Revision 2.3 .....	31
7.2.4.3	Copying from (source) LWSPC to (target) LWSPC .....	32
7.2.5	Restoring the object base from tape streamer on RTS.....	33
<b>7.3</b>	<b>Backup and restoration of trend data.....</b>	<b>33</b>
<b>8</b>	<b>HELP, TIPS AND TRICKS.....</b>	<b>34</b>
<b>8.1</b>	<b>Assigning an LWSPC to another RTS as workstation.....</b>	<b>34</b>
8.1.1	Starting an LWSPC with a modified start file .....	34
8.1.2	Adding an additional workstation login to the LWSPC .....	34
8.1.3	Adding another object base to the LWSPC .....	34
<b>8.2</b>	<b>Interrupting the RTS starting procedure.....</b>	<b>34</b>
8.2.1	Without a selection menu .....	35
8.2.2	With a selection menu .....	35
<b>8.3</b>	<b>Operator workstation no longer reacts.....</b>	<b>35</b>
<b>8.4</b>	<b>Test to determine whether or not a station on the PM LAN can be accessed .....</b>	<b>37</b>
<b>8.5</b>	<b>Manual backup of user data .....</b>	<b>38</b>

<b>9</b>	<b>RTS WITH DATABASE VERSION CLIENT-SERVER .....</b>	<b>39</b>
<b>9.1</b>	<b>Configuration Master and Configuration Slaves.....</b>	<b>39</b>
9.1.1	Defining the CM and CS .....	39
9.1.2	Defining configuration rights .....	39
9.1.3	Executing Distributed Engineering.....	40
9.1.4	Disabling Distributed Engineering .....	40
<b>9.2</b>	<b>Automation Master and Automation Slave.....</b>	<b>40</b>
9.2.1	Defining the AM and AS.....	40
9.2.2	Defining Update .....	40
9.2.3	Message Routing during normal operation.....	41
9.2.4	Message Routing during booting procedure.....	41
9.2.5	Troubleshooting during Message Routing.....	42
<b>9.3</b>	<b>Distributed Engineering and Message Routing .....</b>	<b>42</b>
9.3.1	RTS is CM and AM.....	42
9.3.2	CM and AM are different RTSs .....	43
<b>10</b>	<b>ADDITIONAL RTS JOBS; STRATEGIES &amp; CONSEQUENCES .....</b>	<b>44</b>
<b>10.1</b>	<b>Process management level administrator.....</b>	<b>44</b>
<b>10.2</b>	<b>Time master .....</b>	<b>44</b>
<b>10.3</b>	<b>Recipe mode for batch applications .....</b>	<b>44</b>
10.3.1	Recipe master (RM).....	45
10.3.2	Substitute recipe master (SRM).....	45
10.3.3	Recipe slave.....	46
<b>10.4</b>	<b>CM and CS, AM and AS.....</b>	<b>46</b>
<b>10.5</b>	<b>Recommended distribution of additional tasks.....</b>	<b>46</b>
10.5.1	Logical unit with database <i>embedded</i> , without recipe mode .....	46
10.5.2	Logical unit with database <i>embedded</i> , with recipe mode .....	46
10.5.2.1	Logical unit is formed with just one RTS (not recommended!): .....	46
10.5.2.2	Logical unit is formed with two RTSs:.....	46
10.5.2.3	Logical unit is formed with three or more RTSs: .....	47
10.5.3	Logical unit with client-server database, without recipe mode.....	47
10.5.3.1	Logical unit is formed with one RTS (which does not actually make sense!):.....	47
10.5.3.2	Logical unit is formed with two RTSs:.....	47
10.5.3.3	Logical unit is formed with three or more RTSs: .....	47
10.5.4	Logical unit has a <i>client-server</i> database, with recipe mode .....	47
10.5.4.1	Logical unit is formed with one RTS (which does not actually make sense!):.....	47
10.5.4.2	Logical unit is formed with two RTSs:.....	48
10.5.4.3	Logical unit is formed with three or more RTSs: .....	48
<b>11</b>	<b>MIXED OPERATION WITH OS AND RTS/LWSPC.....</b>	<b>49</b>
<b>11.1</b>	<b>Converting and transferring the entire object base.....</b>	<b>50</b>
11.1.1	Converting the object base on the OS.....	50
11.1.2	Transferring the object base to the LWSPC .....	50
11.1.2.1	OBB transfer from RTS when RMX version < RMX3, Revision 2.3 .....	50
11.1.2.2	OBB transfer from RTS when RMX version >= RMX3, Revision 2.3 .....	51
11.1.3	Converting the object base on this LWSPC.....	52

<b>11.2</b>	<b>Converting and transferring a single container .....</b>	<b>52</b>
11.2.1	Converting the container on the OS.....	52
11.2.2	Transferring the container to an LWSPC .....	53
11.2.2.1	Transfer (send) to LWSPC when RMX version < RMX3, Revision 2.3 .....	53
11.2.2.2	Transfer (retrieval) of RTS when RMX version >= RMX3, Revision 2.3 .....	54
11.2.3	Converting a container on the LWSPC.....	54
<b>11.3</b>	<b>Backup of object base on operator station .....</b>	<b>55</b>
11.3.1	Backup via the Dialogmenu in the Automation mode .....	55
11.3.2	Backup at operating system level. ....	55
<b>11.4</b>	<b>Restoring the object base on the operator station.....</b>	<b>56</b>
11.4.1	Restoring via the Dialogmenu in the Automation mode.....	56
11.4.2	Restoration at operating system level. ....	56
<b>11.5</b>	<b>Distributing the object base to other operator stations.....</b>	<b>56</b>
11.5.1	Restoring with a backup tape streamer.....	56
11.5.2	Restoring by import / export via the process management level LAN. ....	56
<b>12</b>	<b>EXTERNAL HORN MODULE FOR RTS/OS. ....</b>	<b>57</b>
<b>12.1</b>	<b>8-channel horn module.....</b>	<b>57</b>
12.1.1	Configuring event assignment. ....	58
12.1.2	Connections, settings and signals of the horn module. ....	59
<b>12.2</b>	<b>1-channel horn module.....</b>	<b>61</b>
12.2.1	Configuring event assignment. ....	61
12.2.2	Connections, settings and signals of the horn module. ....	61
<b>13</b>	<b>REVISION DIRECTORY .....</b>	<b>63</b>
<b>14</b>	<b>APPENDIX A .....</b>	<b>64</b>
<b>14.1</b>	<b>Different Solaris versions.....</b>	<b>64</b>
14.1.1	Differences when logging in.....	65
14.1.1.1	Solaris 2.5.1 .....	65
14.1.1.2	Solaris 8.....	65
14.1.1.3	The relevant windows in the graphic interface of Solaris.....	66
<b>14.2</b>	<b>Opening and editing files under Solaris.....</b>	<b>66</b>
<b>14.3</b>	<b>Return to login .....</b>	<b>67</b>
<b>14.4</b>	<b>Logging in and out of RTS.....</b>	<b>67</b>
<b>14.5</b>	<b>Different hardware and different versions of the RMX operating system .....</b>	<b>67</b>
<b>14.6</b>	<b>PLS80E process management level hardware .....</b>	<b>69</b>
<b>14.7</b>	<b>General and PLS80E-specific abbreviations.....</b>	<b>73</b>
<b>14.8</b>	<b>List of selected RMX commands.....</b>	<b>74</b>

## 2 General information

The information in this brochure requires that the reader has a general knowledge of the process control system PLS80E, as can be obtained in the following control system training modules:

- Basic Training and
- Service Training

We assume that the reader is familiar with the procedures for calling the Dialogmenue (full graphic) or Operating mode menu (semi-graphic), as described in the operating manual Display and Operation, and defining project-related passwords. It is also assumed that readers are aware that all commands are completed by pressing the **<Return>** (Figure 1) key. Abbreviations that are typical for PLS80E are used in this brochure. Should you come across an abbreviation that you are not familiar with, please refer to the explanation under [14.7 General and PLS80E-specific abbreviations](#).



Figure 1

All stations that are connected to the process management level LAN are preinstalled at INVENSYS SYSTEMS prior to delivery and configured with the settings for the process management level LAN.

Details relating to the hardware structure of the process management level LAN, the definition of the station names and the assignment of IP addresses can be found in the project documentation.

This brochure aims to assist the PLS80E user in:

- connecting further stations to the process management level LAN;
- removing stations from the process management level LAN;
- assigning an LWSPC to another RTS, as required;
- exchanging stations in the presence of a fault;
- performing a data backup after modifying or making additions to the configuration data or process displays;
- distributing this data to various stations;
- using the database variant client-server.

### 3 Shutting down the stations

During normal operation, all RTSs are in the operating mode Automation and the LWSPCs are assigned to any required RTS for process monitoring and operation as workstation no. 1, 2 or 3.

**The functions of the stations should not be terminated using the shortcuts**

<CTRL> - <ALT> - <DEL> or <CTRL> - <C>

. Stations should also not be simply disconnected at the mains. They should first be shut down in the proper manner as described below.

#### 3.1 Disconnecting an LWSPC from the RTS

Reasons for disconnecting an LWSPC from the RTS include:

- this LWSPC should be switched off or assigned to another RTS;
- the object base is to be copied on this LWSPC;
- the operating mode Automation of the assigned RTS is to be exited.

Here, the procedure is explained using screen shots from the full-graphic mode. Later in the brochure, only the function keys e.g. **-F1-** for the semi graphic mode are indicated starting from the Operating mode menu (Figure 2). In the case of the full-graphic mode, the menu items are indicated starting from the **[Dialog menu]** (Figure 4 and Figure 5).

**If DCS data is edited in the full-graphic mode, it will be necessary to restart the RTS for these changes to become effective.**



- From this point onwards, the Operating mode menu to the left shall serve as the starting point for all explanations relating to the function keys that are to be used.

Figure 2

## PLS80E, process management level with RTS &amp; LWSPC: startup, maintenance

## Shutting down the stations

- On this LWSPC, the Dialogmenu is called by selecting [Menus] with the right mouse button (keep this button pressed), then drag the cursor to [Dialog menu] and release the right mouse button. This Dialogmenu is the above mentioned starting point for the displays selected in the remainder of the document.

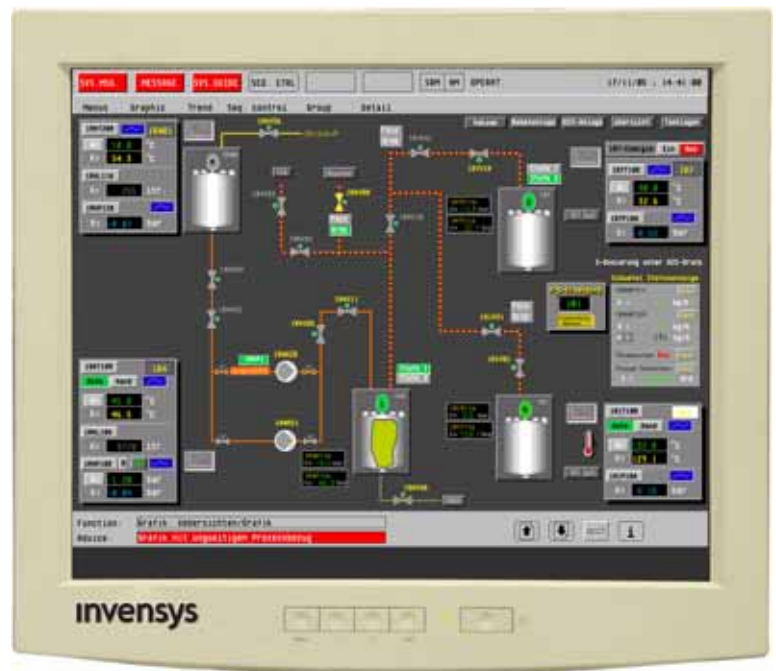


Figure 3

- Click on the dialog function [Enter Password], then enter the password for configuration or system maintenance and confirm.

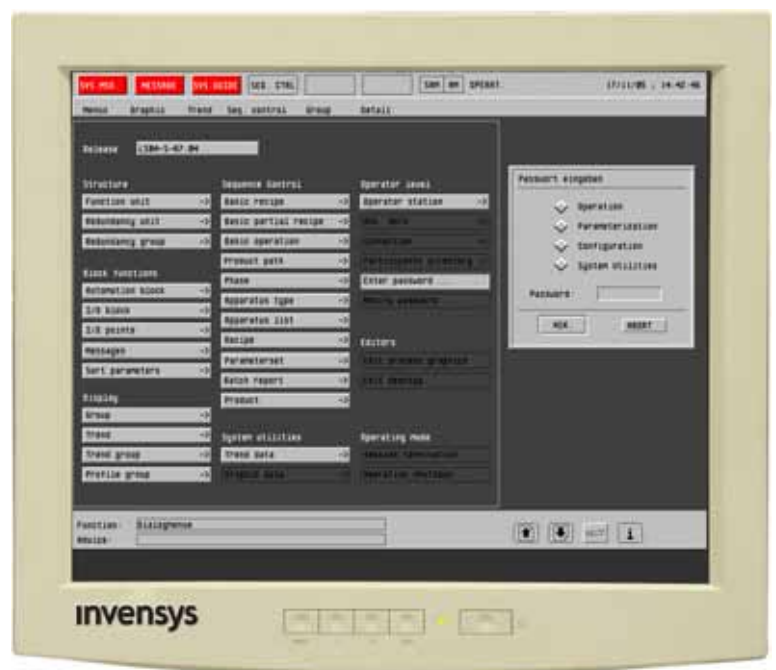


Figure 4

## PLS80E, process management level with RTS & LWSPC: startup, maintenance

### Shutting down the stations

- When the password has been entered, further buttons will be available for selection. After clicking on the dialog function [Session termination], a query dialog box will open. Confirm with YES to shut down the LWSPC.

This LWSPC is no longer a PLS80E workstation. The RTS remains in the operating mode automation and the connection to all the other LWSPCs that are assigned to this RTS is maintained.

If all LWSPCs of the same RTS are disconnected, process monitoring and operation is no longer possible via this RTS. The RTS remains in the operating mode automation and continues to execute all PLS80E jobs:

- collection of trend data;
- monitoring of process sequences, if this RTS is the active recipe master;
- collection of system messages with printer output and horn activation;
- collection of process messages with printer output and horn activation (if configured). The horn can only be acknowledged via another RTS.

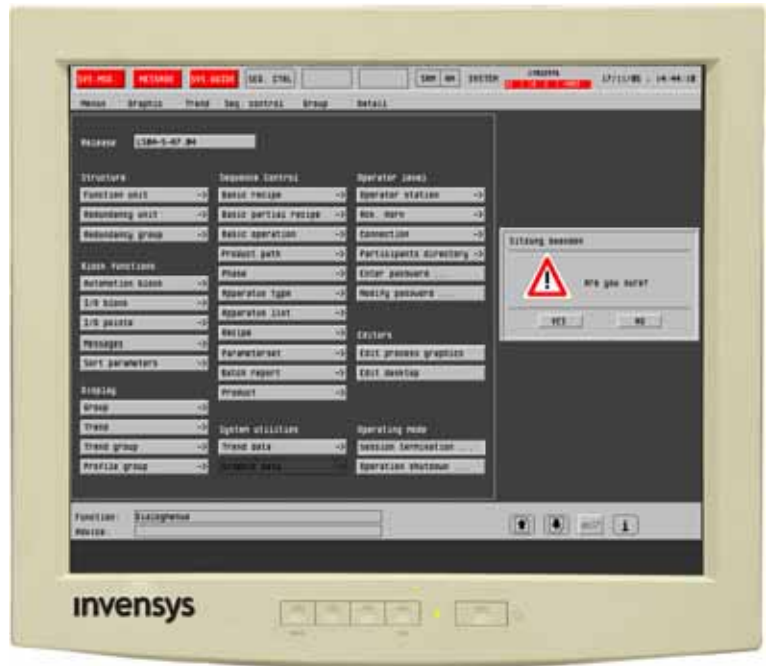


Figure 5

### 3.2 Exiting the RTS operating mode automation

If configuration tasks or system services are to be executed on the real time server, the operating mode automation must first be exited. First, all LWSPCs must be disconnected from the RTS. All but one of the LWSPCs can be disconnected by clicking on Session termination, the last LWSPC is disconnected from the RTS with Operation shutdown. This procedure is described under 3.1 and only differs in Point 3 through the selection of Session termination or Operation shutdown. This disconnects the last LWSPC from the RTS and shuts down the RTS. The order in which the LWSPCs are disconnected from the RTS is of no significance.

Before the RTS is shut down, consideration should be given to the consequences this will have if this RTS is configured for one or more of the following functions:

- administrator on process management level LAN and / or time master;
- recipe master (RM) or backup recipe master (SRM);
- Configuration Master (CM) and / or Automation Master (AM) with client-server database.

## PLS80E, process management level with RTS & LWSPC: startup, maintenance

### Shutting down the stations

### 3.3 Switching off an LWSPC

If an LWSPC is to be disconnected from the power supply, the following procedure must be adhered to:

- disconnect the LWSPC from the RTS with Session termination, as described under 3.1;
- log in as root user (see 14.1.1 Differences when logging in)  
Entry of command: # halt
- As soon as Solaris has shut down - i.e. when the text Type any Key is shown -, the LWSPC can be switched off.

**After logging in as a root user, the user has all access rights and can destroy the software installation on the LWSPC by entering incorrect commands!**

### 3.4 Switching off a real time server

If an RTS is to be disconnected from the power supply, proceed as follows:

- exit the RTS operating mode automation, as described under 3.2

Switch off after the RTS has shut down.

Figure 6 shows an example of what the monitor should look like after an RTS has shut down.



Figure 6

## 4 Starting the stations

### 4.1 Starting an RTS

Once an RTS has been switched on, it automatically enters the operating mode Automation and starts to execute the jobs of a PLS80E server. The access rights are set to Operation.

The starting time will greatly depend on the size of the database (user data). Figure 7 shows the monitor of the RTS on completion of the starting process. The last three lines depend on whether APILWS is activated or not – here it is activated.

### 4.2 Starting an LWSPC

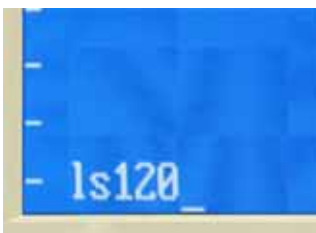
Once an LWSPC has been switched on, it automatically loads the operating system and prompts the user to login. Logging in as a workstation for an RTS is only possible, if this RTS is in the operating mode Automation. The assignment to the RTS using a workstation number is saved in a file that is read during the login procedure (see 6.2.1 for instructions on how to set up this file). Logging in as a workstation is effected by logging in as a PLS80E operator station (see 14.1.1)

The possibility of assignment to another RTS is described in Chapter 7.1.

### 4.3 Switching the operating mode of an RTS



When an RTS has been shut down (3.2) or the starting process has been interrupted (7.3), this RTS shows the input prompt of the RMX operating system. Here, the user can enter commands to switch the operating mode.



The menu for selecting the semi-graphic functions is called with the command `ls120`:



The menu for selecting the semi-graphic functions is exited with the function key F7.

## PLS80E, process management level with RTS &amp; LWSPC: startup, maintenance

## Starting the stations



The operating mode Automation is started with the command `ls130`. In special, isolated cases, for example, when an LS120V is an RTS, the command `ls120V` will also make this computer start in the Automation mode.

When the initialization process for this operating mode is completed, the LWSPCs can be reconnected (see 4.2).

If an error message is shown after the command `ls120` has been entered, it is possible that a background program is/was still running. Enter the command `jobs` to check whether background programs are still active (exit with: `kill *`).

Re-enter the command when all background programs have stopped. When using the "client-server" database variant, the database server will remain active. This has no effect on the switch-over to semi-graphic functions.



Figure 7

## 5 Setting up the process management level LAN

The hardware and software of the process management level LAN is set up while the system is being commissioned. When adding or removing stations, this setup has to be modified. A description of the entries that can be added or deleted for the individual stations is provided in the following. Possible changes or additions to the hardware of the process management level LAN are not discussed here.

### 5.1 Station name and IP address

Each station on the process management level LAN is assigned a unique name and a unique IP address. Any required name can be assigned (RTS name max. 9 characters, excluding " # and ' ", LWSPC name **must** begin with a letter but can be as long as required).

The IP address comprises four groups of numbers (max. entry: 255), which are separated with decimal points; e.g.: **192.118.132.21**

The first three groups of numbers must be identical for all stations; the fourth group of numbers must be different for each station. When entering the address, do not start a group with a 0, i.e. do not enter **192.118.132.021**.

Unpredictable events will occur, if the same name or address is assigned more than once, e.g. as a result of an input error. If the customer does not enter any names and IP addresses, the following names and address will be assigned by Invensys Systems:

Station	SOLARIS name		Fourth group of numbers of the IP address
	2.5.1	8	
first real time server	RTS1		XXX.XXX.XXX.1
first workstation	OWS1.1	OWS1-1	XXX.XXX.XXX.11
second workstation	OWS1.2	OWS1-2	XXX.XXX.XXX.12
third workstation	LWS1.3	OWS1-3	XXX.XXX.XXX.13
second real time server	RTS2		XXX.XXX.XXX.2
first workstation	OWS2.1	OWS2-1	XXX.XXX.XXX.21
second workstation	OWS2.2	OWS2-2	XXX.XXX.XXX.22
third workstation	OWS2.3	OWS2-3	XXX.XXX.XXX.23
third real time server	RTS3		XXX.XXX.XXX.3
first workstation	OWS3.1	OWS3-1	XXX.XXX.XXX.31
second workstation	OWS3.2	OWS3-2	XXX.XXX.XXX.32
third workstation	OWS3.3	OWS3-3	XXX.XXX.XXX.33
network printer	NETDRU		XXX.XXX.XXX.109

## PLS80E, process management level with RTS & LWSPC: startup, maintenance

### Setting up the process management level LAN

## 5.2 Adding an RTS to the PM LAN

When integrating an RTS into the PM LAN, please take the following steps in the order in which they are listed:

- Configure the RTS name and RTS IP address.
- Shut down the RTS to operating system level.
- Boot the RTS. Note that the RTS that operates as **administrator** must be in operation:
  - Either in the semi-graphic operating mode Configuration
  - or in the full-graphic operating mode Automation.
- Manually update the file `/etc/hosts` of each LWSPC on the PM LAN.

### 5.2.1 Configuring the name

The name of the RTS is entered in a configuration mask, either in the semi-graphic operating mode

Operating mode menu: **-F1-** **-F5-** **-F1-** **-F1-** **-F1-** or in the full-graphic mode

Dialogmenu: `[Operator station] [OS-Data] [configure]`

All RTS-specific data is defined in this mask (see also 7.1).



Figure8

## PLS80E, process management level with RTS & LWSPC: startup, maintenance

### Setting up the process management level LAN

#### 5.2.2 Configuring the IP address

The IP address of the real time server and the IP address of the process management level LAN administrator are entered in a configuration mask. These can be entered in the semi-graphic mode:

Operating mode menu: **-F1-** **-F5-** **-F3-** **-F1-** - with the query whether this RTS is the process management level administrator, or in the full-graphic mode

Dialogmenu: **[Connection]** **[configure]**

#### 5.2.3 Process management level administrator

One RTS (and only one!) must be configured as the process management level administrator on the process management level LAN (see 5.2.2). This should be in operation before other RTSs are started (operating mode Configuration or Automation), so that it can execute its administrator jobs.

When an RTS is starting up, it logs in with the administrator. If the name and the IP address of the RTS is not known to the administrator, both will be entered in the administrator's station directory; this directory is then sent to all other RTSs that are in operation and is therefore updated.

If the administrator already knows the name and the IP address, the station directory of the RTS that is being started will be updated.

#### **This administration only extends to connected RTSs.**

Other PM LAN stations such as LWSPCs, network printer or PLS80E Office computers are not integrated. The station directories of the LWSPCs are updated manually (4.5.1).

#### 5.2.4 Station directory

The station directory is available and can be accessed on each RTS. Changes can only be made via the administrator which subsequently updates the other RTSs. The station directory (/etc/hosts) of the LWSPCs must be maintained manually on each LWSPC! (4.5.1).

##### 5.2.4.1 Adding an entry

If an RTS is added to the PM LAN, all RTSs will be updated automatically by the process management level administrator (4.2.3).

If another station, e.g. an LWSPC is added to the PM LAN, the name and IP address of this station must be entered in the station directory. These entries should be made in the semi-graphic mode

Operating mode menu: **-F1-** **-F5-** **-F4-** **-F1-** as no names can be entered in the full-graphic mode

Dialogmenu: **[Participants directory]** **[configure]**.

The station directories of all other RTSs are updated automatically by the administrator. If these new stations are also to be introduced to the LWSPCs, the file /etc/hosts will have to be changed manually on each LWSPC (see 5.5.1).

## PLS80E, process management level with RTS & LWSPC: startup, maintenance

### Setting up the process management level LAN

#### 5.2.4.2 *Deleting an entry*

If an PM LAN station is to be removed permanently, you have to delete its name in the directory and overwrite its IP address with `0.0.0.0`. Proceed in the same manner as when adding an entry.

## 5.3 Editing the RTS on the PM LAN

### 5.3.1 Editing the name

The new name is entered as described under 5.2.1. The process management level LAN administrator recognizes the change, updates its own station directory and that of the other RTSs. The entries in the LWSPCs have to be made manually (see 5.5.1)

### 5.3.2 Editing the IP address

The IP address is entered as described under 5.2.2. The process management level LAN administrator recognizes the change the next time the RTS is booted and updates its own station directory and that of the other RTSs. The entries in the LWSPCs have to be made manually (see 5.5.1)

### 5.3.3 Editing the name and IP address at the same time

If both the name and the IP address are edited at the same time on the RTS, the administrator will interpret this as a new station and will proceed as described under 5.2.3. The obsolete information of the station that no longer exists must be deleted manually from the station directory (5.2.4.2). The entries in the LWSPCs must be changed manually (see 5.5.1).

## 5.4 Removing an RTS from the PM LAN

If an RTS is to be permanently disconnected from the PM LAN, proceed as follows:

- shut down RTS (see 3.2);
- electrically disconnect RTS from PM LAN;
- delete RTS name/address in the administrator's station directory (see 5.2.4.2);
- delete the name/address of the RTS in the `/etc/hosts` file of all LWSPCs (see 5.5.1);
- delete the station directory of this RTS (see 5.2.4.2).

### 5.4.1 Deleting the station directory of this RTS

To delete the station directory of this RTS, the RTS must first be configured as administrator as described under 5.2.3. All entries in the station directory can then be deleted (see 5.2.4.2). Finally, the IP address of this RTS is removed by entering `0.0.0.0` (see 5.2.2).

Any error messages relating to the PM LAN can be ignored.

All entries relating to the PM LAN on this RTS have now been removed.

### 5.4.2 Removing the administrator from the PM LAN

If the real time server administrator that is to be removed is in the process management level LAN, another RTS will first have to be configured as administrator (see 5.2.3).

Please make sure that all other RTSs are in operation so that they can be notified that the administrator has been changed.

If an RTS does not receive this information, the IP address of the new administrator will have to be entered manually (see 5.2.2).

## 5.5 Adding an LWSPC to the PM LAN

The name and IP address of an LWSPC are already assigned during the basic installation. For this reason, this information must be known prior to the installation at Invensys Systems.

The following steps must be taken once an electrical connection has been established between the LWSPC and the PM LAN.

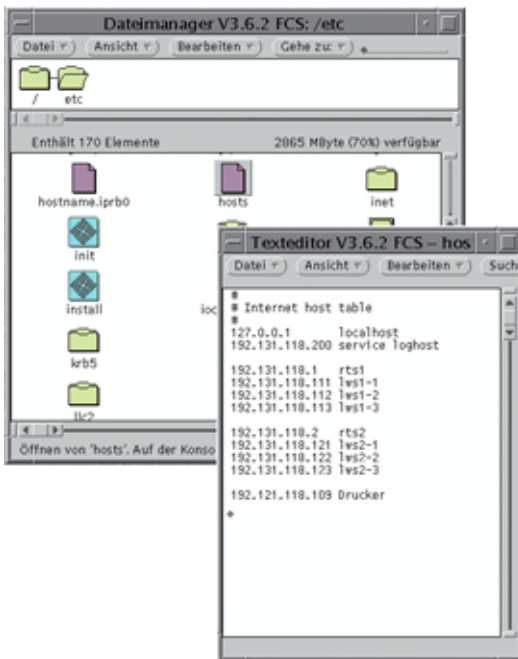


Figure 9

- Enter the name and IP address of the new LWSPC in the administrator's station directory (see 5.2.4.1)
- Enter the name and address of the new LWSPC in the `/etc/hosts` file of each of the other LWSPCs
- Enter the name and IP address of all RTSs, the other LWSPCs and the network printer in the `/etc/hosts` file of the new LWSPC
- Additional settings will have to be made for the PLS80E workstation, please refer to 6.2.1 [Editing the start file](#) and 7.2.4 [Distributing the object base to all LWSPCs](#) for further details.

### 5.5.1 Adapting the file `/etc/hosts`

To gain access to the names on all stations on the PM LAN it is essential that all the stations recognize each other. The corresponding assignment of names and IP addresses is saved in a file called `hosts` which can be edited manually. In the case of the LWSPC, this is carried out by entering all stations in the file `/etc/hosts`. This file can only be edited when logged in as root user (see 14.1.1 [Differences when logging in](#) and 14.2 [Opening and editing files under Solaris](#) and 14.3 [Return to login](#)).

The first line `127.0.0.1 localhost` is always the same, the second shows the IP address and the corresponding name of the LWSPC that has just had its `/etc` file opened. The IP address

## PLS80E, process management level with RTS & LWSPC: startup, maintenance

### Setting up the process management level LAN

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and name are now entered in all other stations in the same manner. An example of a `hosts` file and the path in the file manager is shown in Figure 9

## 5.6 Removing an LWSPC from the PM LAN

If an LWSPC is to be permanently disconnected from the PM LAN, proceed as follows:

- disconnect the LWSPC from the RTS (see [3.1](#));
- electrically isolate the LWSPC from the PM LAN;
- delete your entries in the administrator's station directory (see [5.2.4.2](#));
- delete your entries in the `/etc/hosts` files of all LWSPCs (see [5.5.1](#));
- delete the content of the `/etc/hosts` file of this LWSPC, with the exception of those entries at `localhost` and `loghost` (see [5.5.1](#));
- shut down the LWSPC and switch it off (see [3.3](#)).

## 6 Commissioning the stations

The settings and configurations, particularly of the RTS (and OS) are described in the standard documentation and will only be referred to briefly in the following without any claim to completeness.

### 6.1 RTS

If an RTS is to be integrated into the control system PLS80E (as an additional or replacement RTS), a number of settings and configurations will have to be considered or carried out to ensure error-free functioning.

- Communications control unit KSL21 or KSL25 (bus address, highest bus address)
- Electrical connection to PLS80E bus and PM LAN
- Logical integration into the PM LAN (see [5.2](#))
- Variant installation (see [6.1.1](#))
- Transfer of user data (customer-specific configuration) from backup tape streamer or via import (see [7.1](#))
- Configuration of process management level
  - Connection
  - Operator station
    - OS data
    - Daylight saving time (if time master)
    - Access
    - Horn
    - Update (if Automation Master, see [8.2.2](#)).
  - Horn acknowledgement
  - Configuration rights (see [8.1.2](#)).

#### 6.1.1 Variant installation

Variant installation defines some of the required parameters of the LWSPC and **must** be carried out when logged in as SUPER User (see [Appendix A Logging in and out of RTS](#)).

Variant installation (only in German language available) is started with the command `installvar`. This command triggers a series of self-explanatory queries in which certain parameters have to be entered or confirmed. Figure 10 shows the monitor display of an RTS during variant installation.

## PLS80E, process management level with RTS & LWSPC: startup, maintenance

### Commissioning the stations

By way of explanation:

- (Sprache) Language:
  - Determines the language in which the semi-graphic configuration mode is displayed, the default setting is German but English and French can also be selected.
- Anzahl IGC-Arbeitsplätze (Number of IGC consoles):
  - Here, a 0 is always entered for an RTS (Attention: default setting here is 1), as an IGC graphic board is not integrated into the standard RTS. This point only has to be considered in the case of LS130 and LS120V as these can also function as RTSs.
- Anzahl UNIX-Arbeitsplätze (Number of UNIX consoles):
  - The maximum number of LWSPCs that can be connected is entered here. Contrary to the list, a maximum of 3 LWSPCs can be connected. 3 can always be entered here.
- API server:
  - The API server contains functions which, for example, allow Windows applications to access the data of the RTS – currently, these include PLS80E Office and the LEICON KS server. Here, APILWS (2) should always be selected, as API80E (1) only offers a limited range of functions.



Figure 10

On completion of variant installation, it is important that you exit the SUPER User mode (with `exit`, see 14.4).

## 6.2 LWSPC

If an LWSPC is to be integrated into the control system (as an additional or replacement LWSPC), a number of settings and configurations will have to be considered or carried out to ensure error-free functioning.

- Electrical connection and logical integration into the PM LAN (see 5.5).
- Edit the start file (see 6.2.1).
- Set up the existing network printer (see 6.2.2).
- Copy the object base on this LWSPC (see 7.2).

### 6.2.1 Editing the start file

The start behavior of an LWSPC that serves as a PLS80E operator station is defined in the file `startlws`. The path of this file is `/export/home/lws/startlws`. If other PLS80E operators were created (e.g. emergency users), these emergency users have their own `startlws`. To edit this file, you must be logged in as an `sds` user (see [14.1.1 Differences when logging in](#) and [14.2 Opening and editing files under Solaris](#)).

Figure 11 shows an example of the file path in the file manager as well as the structure of the file `startlws` as displayed on the LWSPC when the text editor is open. (the file `startlws%` is a backup copy of the file `startlws` that is automatically generated each time a change is made).



Figure 11

The file `startlws` should only be edited in exceptional cases, e.g. when the LWSPCs of an RTS that has failed have to be temporarily assigned to other RTS.

The individual entries have the following meanings:

<code>#!/bin/sh</code>	Solaris instruction that must not be edited!
<code>printers &amp;</code>	This line is only required with an active hardcopy in connection with Solaris 8 and the software EasyPrint. This command opens the printer dialog in the background. This line was added as a workaround to prevent print problems within the PLS80E user interface.
<code>lws</code>	Also a command that must not be edited.
<code>rts1</code>	The name of the RTS to which this LWSPC is assigned.
<code>1</code>	This is the assigned workstation number. The entries 1, 2 or 3 are possible here (maximum three workstations per RTS).
<code>-o std</code>	Information relating to the folder in which this object base is located. In normal cases, the entry here is <b>always</b> <code>kunde</code> . In the example shown, the LWSPC is started with the standard object base.
<code>-x86</code>	Indicates that the LWSPC is an Intel (x86) PC.
<code>-dtwm</code>	Required entry for Solaris 8 with CDE interface.
<code>-t, -p</code>	These parameters are optional and necessary when the tool box (-t) is installed or when a password (-p) field should be shown in the PLS80E operating mode (not recommended for normal PLS80E operating mode).

### 6.2.2 Setting up the network printer

When ordering an operator workstation it will be necessary to indicate if a network printer should be set up and, if so, which network printer is required. The network printer is normally set up at Invensys Systems, but this can also be carried out later on site.

## 6.3 Network printer

When commissioning the network printer, please refer to the information in the manual that comes with the printer.

## 6.4 PLS80E Office computer

Detailed information relating to installation and commissioning of PLS80E Office is provided in the corresponding manual. To use the PLS80E Office functions, the API-Server must be defined on the RTS that will be accessed by PLS80E Office (see [6.1.1 Variant installation](#))

## 7 Backup and distribution of project data

The project data is available as user data (settings and parameters for automation) on the RTS and as an object base (process displays, colour tables, etc. display and operation) on the LWSPCs.

User data and object base are saved on separate tapes. These backup tapes are inseparable and must always be stored together like "Siamese twins"!

Notes on **small** DDS2 drives:

- only 120 meter / 4 gigabyte tape streamers are used;
- insert the tape carefully until it is drawn in by the drive.

### 7.1 Backup and distribution of user data

RTSs which should be redundant to each other must have identical user data. Changes to the user data are made on the ConfigMaster and then saved on a tape streamer via the tape streamer drive. Afterwards, all other RTSs, that are redundant to this ConfigMaster, have to be updated.

ConfigMaster

- In the case of database variant embedded, the RTS on which the settings are carried out (as defined by the customer)
- When using the client-server database variant, the RTS that was defined as Configuration Master when configuring the OS data (see 5.2.1).

#### 7.1.1 User data backup on tape streamer

The user data backup is carried out in the semi-graphic mode.

Operating mode menu: **-F1-** **-F5-** **-F4-** **-F1-**

(see the manual Display and Operation, Appendix, page A 8-11 ff)

Before the user data is actually saved, a mask is offered in which entries relating to the configuration, the project, the date, etc. can be made. Now the backup can be started with **-F8-** or cancelled with **-F7-**.

#### 7.1.2 Distributing the user data with the tape streamer

The restoration of the saved user data takes place in the semi-graphic mode.

Operating mode menu: **-F3-** **-F1-** **-F2-**

(see the manual Display and Operation, Appendix, page A 8-11 ff)

First, the RTS must be shut down (see 3.2). Before restoration commences, you will be asked - for safety reasons - whether the identification mask should be displayed. Restoration can also be started here with **-F8-** or cancelled with **-F7-**.

## PLS80E, process management level with RTS & LWSPC: startup, maintenance

### Backup and distribution of project data

During restoration, the existing user data is deleted before the tape streamer drive is accessed. This means that it will not be possible to start this RTS if the tape streamer cannot be read or is defect due to missing user data.

#### 7.1.3 Distributing the user data via the PM LAN (export / import)

Updating is carried out in three steps.

##### First step

- The modified database is exported via the ConfigMaster, i.e. it is copied to an automatically defined directory on its hard disk that is recognized by the other real time servers. This database copy is saved there until it is overwritten during the next export. This RTS must then be started in the operating mode Configuration or Automation so that its PM LAN functions can be started.

##### Second step

- This database is imported into the RTS that is to be updated, i.e. the database is copied via the PM LAN to an automatically defined directory on the hard disk of the RTS.

##### Third step

- On completion of the import, the imported data must be accepted. To accept the data, exit the operating mode Automation and accept the updated database using the Operating mode menu. Once the imported data has been accepted, the operating mode Automation can be started again.

##### Execution

- The **export** takes place in the semi-graphic mode.

Operating mode menu: **-F3-** **-F1-** **-F3-**

- and the mask described under 7.1.1 for entering the name, date and other details will be offered. Press **-F8-** to start the **export** or **-F7-** to cancel. The RTS will now have to be started in one of the operating modes Configuration or Automation

- The **import** is started in the full-graphic Dialogmenue of an LWSPC.

Dialogmenue: **[Operator station]**  
**[Configuration data]** **[import]**

- Once the RTS and the exported data have been selected and confirmed with ACK, the import will run in the background. The process can still be monitored and controlled.
- A hard disk symbol is displayed in the top line. The RTS must not be shut down as long as this symbol is visible. On completion of the import, the symbol disappears and a system message relating to the success or failure of the import is shown.
- The import can be executed for all RTSs at the same time.
- Alternatively**, the import can also be carried out in the Configuration mode:

Operating mode menu: **-F1-** **-F5-** **-F1-** **-F8-** **-F1-**

## PLS80E, process management level with RTS & LWSPC: startup, maintenance

### Backup and distribution of project data

- The query relating to whether or not the existing data should be overwritten must be answered accordingly and, after selecting the data source with the mouse, the import can be started with **-F8-** or cancelled with **-F7-**. If the import is carried out in the semi-graphic mode, process control via this RTS will not be possible.
- Data **acceptance** always takes place in the semi-graphic mode  
Operating mode menu: **-F3-** **-F1-** **-F4-**

### 7.1.4 Distributing the user data via the PM LAN (client-server variant) 8.3

#### 7.1.4.1 *The Configuration Master is also the Automation Master*

On completion of the configuration process and data backup, the RTS will be started in the full-graphic operating mode Automation.

The assigned Automation Slaves will then be updated as described under [7.1.4.3](#).

#### 7.1.4.2 *Configuration Master and Automation Master are not the same RTS*

On completion of the configuration process and data backup on the Configuration Master, the Automation Master will be updated (via tape streamer or export/import) and then started in the full-graphic operating mode Automation.

The assigned Automation Slaves will then be updated as described under [7.1.4.3](#).

#### 7.1.4.3 *Updating the Automation Slaves*

The slaves that are assigned to the Automation Master are shut down one by one (not simultaneously!) from the full-graphic operating mode Automation and then restarted.

The query relating to whether the configuration data should be collated must be answered with YES.

## 7.2 Backup and distribution of object base

The object base of LWSPCs - which are assigned to RTSs that are redundant to each other - must be identical. Any changes that have been made to the object base can be saved but must also be transferred to all other LWSPCs.

One LWSPC, on which the tool box and all the required licenses are installed, should be defined for the maintenance of the object base. The licenses for the tool box must be purchased separately. This defined LWSPC should be assigned to the configuration station.

On completion of the changes to the object base, please proceed as follows:

- reorganize and save modified containers (as described in the manual Process Graphics Design);
- transfer object base from the LWSPC to the RTS ([7.2.2](#));
- make a backup of object base on RTS on tape streamer ([7.2.3](#));
- distribute the object base from the LWSPC or RTS to the other LWSPCs ([7.2.4](#)).

## PLS80E, process management level with RTS & LWSPC: startup, maintenance

### Backup and distribution of project data

The object base can also be maintained externally by copying it to the RTS via a tape streamer (restore, see 6.2.5) and then distributing it to all LWSPCs.

#### 7.2.1 Directory structure for the object base on the LWSPC

The directory for the object base is predefined and must not be changed.

<code>/export/home/pls/obb/std</code>	An empty standard object base without graphics is saved here.
<code>/export/home/pls/obb/kunde</code>	The current object base with the project-specific graphics is saved in the kunde folder.

The object base comprises the following single files, known as containers (file ending .cnt) colours.cnt, desktops.cnt, imexdesk.cnt, imexpict.cnt, imexsymb.cnt, imexsyst.cnt, pictures.cnt, qualtabs.cnt, symbols.cnt, system.cnt

#### 7.2.2 Transferring the object base between LWSPC and RTS

##### 7.2.2.1 OBB transfer when RMX version < RMX3, Revision 2.3

The actions are carried out on the RTS. The RTS can continue to operate in the Automation mode. The LWSPC from which the object base is to be retrieved can continue to be the PLS80E workstation on its RTS. Please pay attention to the manner in which the command is entered (capitals and small letters). If current containers are already saved in the directory `:sd:work`, the object base can, in principle, be transferred from the RTS to the LWSPC in the same manner, the only difference being that the command `mget` is used instead of `mput`.

Prompt <b>command/input</b>	Description
- <b>af :sd:work</b>	Switches to the work directory of the system's hard disk :sd: (System device).
- <b>ls</b>	Shows the files in the work directory.
- <b>del *.cnt</b>	Deletes all container files (.cnt) in the work directory.
- <b>ftp &lt;lwsName&gt;</b>	Requests that an ftp connection <lwsName> be established.
Name (<lwsName>: lws): <b>sds</b>	Log in as sds user on the LWSPC.
Password: <b>sos</b>	Password entry (without echo).
ftp> <b>cd /export/home/pls/obb/kunde</b>	Switches to the object base directory of the connected LWSPC.
ftp> <b>pwd</b>	Check to see if the switch to the OBB directory was successful. If the switch was successful, the directory path referred to above will be displayed.
ftp> <b>ls -l</b>	Shows all the files in the selected directory.

## PLS80E, process management level with RTS & LWSPC: startup, maintenance

### Backup and distribution of project data

<code>ftp&gt; bin</code>	Instruction to the ftp program to transfer the files in binary format.
<code>ftp&gt; prompt</code>	Instruction to the ftp program to transfer the files without a prompt.
<code>ftp&gt; mget *.cnt</code>	Copies all container files (.cnt) of the object base from the LWSPC to the RTS in the directory <code>:sd:work</code> .
<code>ftp&gt; bye</code>	Terminates the connection between RTS and LWSPC.

#### 7.2.2.2 OBB transfer when RMX version >= RMX3, Revision 2.3 (see 14.5)

To transfer the object base, the user must be logged in on the LWSPC as sds user (see 14.1.1). First, the LWSPC is disconnected from its RTS as described under 3.1. The RTS, to which the object base is to be transferred can remain in the Automation mode. The commands are entered - as described under 14.1.1.3 - in the `xterm` window. The name used in the list, i.e. `lws`, is used instead of the name of the LWSPC which, together with the % sign, represents the sds user prompt. Please pay attention to the manner in which the command is entered (capitals and small letters). Here, the command `mput` can be entered to transfer the data to the RTS or the command `mget` to transfer the data from the RTS to the LWSPC. One prerequisite here, however, is that the corresponding containers are saved in the directory `:sd:work` of the RTS.

Prompt <code>command/input</code>	Description
<code>lws% cd /export/home/pls/obb/kunde</code>	Switches to the object base directory of the LWSPC.
<code>lws% ftp &lt;RTSName&gt;</code>	Establishes an ftp connection to the RTS with the name <RTSName>.
Name (<RTSName>:lws): <code>super</code>	Log in as SUPER User on the RTS.
Password: <code>passme</code>	Entry of password for the SUPER User. Password entries are hidden.
<code>ftp&gt; cd :sd:work</code>	Switches to the <code>work</code> directory of the RTS.
<code>ftp&gt; pwd</code>	This command is used to check whether the switch to the OBB directory was successful.
<code>ftp&gt; ls -l</code>	Shows all the files in the selected directory.
<code>ftp&gt; bin</code>	Instruction to the ftp program to transfer the files in binary format.
<code>ftp&gt; prompt</code>	Instruction to the ftp program to copy the files without a prompt.
<code>ftp&gt; mput *.cnt</code>	Copies all container files (.cnt) of the object base from the LWSPC to the RTS in the directory <code>:sd:work</code> .

## PLS80E, process management level with RTS & LWSPC: startup, maintenance

### Backup and distribution of project data

ftp> **bye**

Terminates the connection between RTS and LWSPC.

Figure 12 shows an example of all commands and outputs during an ftp transfer to the LWSPC as entered or shown in the **xterm** window.

On completion of the transfer, the LWSPC can once again be started as a PLS80E workstation.

```

service% ping rts1
rts1 is alive
service% pwd
/export/home/sds
service%
service% cd /export/home/pls/obb/kunde
service% ftp rts1
Connected to rts1.
220 FTP server (IRMX III / Version 1.3 / Nov 15 2001) ready
.
Name (rts1:lws): super
331 Password required for super.
Password:
230 User super logged in.
ftp> cd :sd:work
250 CWD command successful.
ftp> pwd
257 ".:sd:work" is current directory.
ftp> ls -l
200 PORT command successful.
150 Opening BINARY mode data connection for LS.
total 16580
-rwxrwx--- 1 super super 642 Mar 4 15:31 bsocket.bak
-rwxrwx--- 1 super super 112 Mar 4 15:31 bsocket.log
-rwxrwx--- 1 super super 65536 Dec 4 2003 desktops.cnt
-rwxrwx--- 1 super super 5668864 Dec 4 2003 imexpict.cnt
-rwxrwxrwx 1 super super 1261568 Dec 4 2003 imexsymb.cnt
-rwxrwxrwx 1 world world 1648 Aug 23 2004 renamedc.csd
-rwxrwx--- 1 super super 1490944 Dec 4 2003 symbols.cnt
226 Transfer complete
remote: -l
493 bytes received in 0,064 seconds (7,52 Kbytes/s)
ftp> mdel *.cnt
mdel desktops.cnt? y
250 DELE command successful.
mdel imexpict.cnt? y
250 DELE command successful.
mdel imexsymb.cnt? y
250 DELE command successful.
mdel symbols.cnt? y
250 DELE command successful.
ftp> bin
200 Type set to I.
ftp> prompt
Interactive mode off.
ftp>
200 PORT command successful.
150 Opening BINARY mode data connection for colours.cnt.
226 Transfer complete.
local: colours.cnt remote: colours.cnt
49152 bytes sent in 0,28 seconds (173,62 Kbytes/s)
200 PORT command successful.
150 Opening BINARY mode data connection for desktops.cnt.
226 Transfer complete.
local: desktops.cnt remote: desktops.cnt
65536 bytes sent in 0,021 seconds (3121,80 Kbytes/s)
200 PORT command successful.
150 Opening BINARY mode data connection for imexdesk.cnt.
226 Transfer complete.
local: imexdesk.cnt remote: imexdesk.cnt
32768 bytes sent in 0,0068 seconds (4674,26 Kbytes/s)
200 PORT command successful.
150 Opening BINARY mode data connection for imexpict.cnt.
226 Transfer complete.
local: imexpict.cnt remote: imexpict.cnt
32768 bytes sent in 0,0069 seconds (4666,08 Kbytes/s)
200 PORT command successful.
150 Opening BINARY mode data connection for imexsymb.cnt.
226 Transfer complete.
local: imexsymb.cnt remote: imexsymb.cnt
32768 bytes sent in 0,0069 seconds (4652,52 Kbytes/s)
200 PORT command successful.
150 Opening BINARY mode data connection for imexsyst.cnt.
226 Transfer complete.
local: imexsyst.cnt remote: imexsyst.cnt
32768 bytes sent in 0,0069 seconds (4667,44 Kbytes/s)
200 PORT command successful.
150 Opening BINARY mode data connection for pictures.cnt.
226 Transfer complete.
local: pictures.cnt remote: pictures.cnt
81920 bytes sent in 0,02 seconds (3134,95 Kbytes/s)
200 PORT command successful.
150 Opening BINARY mode data connection for qualtabs.cnt.
226 Transfer complete.
local: qualtabs.cnt remote: qualtabs.cnt
81920 bytes sent in 0,027 seconds (2961,54 Kbytes/s)
200 PORT command successful.
150 Opening BINARY mode data connection for symbols.cnt.
226 Transfer complete.
local: symbols.cnt remote: symbols.cnt
65536 bytes sent in 0,02 seconds (3130,66 Kbytes/s)
200 PORT command successful.
150 Opening BINARY mode data connection for system.cnt.
226 Transfer complete.
local: system.cnt remote: system.cnt
2441216 bytes sent in 2,9 seconds (827,51 Kbytes/s)
Ftp> bye
221 Goodbye.
service%
service%
service%

```

Figure 12

### 7.2.3 Backup of object base on RTS on tape streamer

The operating mode Automation on the RTS must be exited (see 3.2). The object base for which the backup is to be made is located - if copying was carried out as described under 7.2.2 - in the directory `:sd:work` on the RTS

The tape streamer should be labeled and write protect deactivated before the backup is carried out. Once the tape streamer has been inserted into the tape streamer drive of the RTS, a backup of the object base can be made with the following commands

Prompt <b>command/input</b>	Description
- <b>super</b>	Log in as SUPER User on the RTS.
Enter password: <b>passme</b>	Entry of SUPER User password, password entries are hidden.

## PLS80E, process management level with RTS & LWSPC: startup, maintenance

### Backup and distribution of project data

SUPER-		The input prompt switches to SUPER.
SUPER-	<b>af :sd:work</b>	Switches to the directory into which the object base was transferred.
SUPER-	<b>ls l</b>	This command is used to check if all containers were transferred.
SUPER-	<b>adtape</b>	Tape streamer drive is enabled as device:t:.
SUPER-	<b>backup :sd:work over:t:</b>	Backup command to copy the data to device :t: The copying process starts after confirmation with y(es).
SUPER-	backup completed	The copying process was successful.
SUPER-	<b>dd:t:</b>	Tape streamer drive is disabled as a device.
SUPER-	<b>exit</b>	Log out as SUPER User.

#### 7.2.4 Distributing the object base to all LWSPCs

Theoretically, there are three different ways of distributing the object base. The first two possibilities (7.2.4.1 and 7.2.4.2) are not very practical, unless you also want to copy the object base to a tape streamer. The third and most practical way of distributing the object base is described under 7.2.4.3. Here, the object base is copied from LWSPC to LWSPC. The commands are entered - as described under 14.1.1.3 - in the **xterm** window.

##### 7.2.4.1 OBB transfer (send) to LWSPC when RMX version < RMX3, Revision 2.3

The actions are carried out on the RTS on which the object base is saved in directory :sd:work. The RTS can continue to operate in the Automation mode. The LWSPC to which the object base is to be transferred **must** be disconnected from its RTS as overwriting during normal operation would lead to conflicts when copying the OBB containers. When in the PLS80E operating mode, deletion is, of course, not possible. Please pay attention to the manner in which the command is entered (capitals and small letters). You must be logged in on the RTS as a SUPER User (see 14.4).

Prompt <b>command/input</b>	Description
- <b>af :sd:work</b>	Switches to the work directory of the system's hard disk :sd: (System device).
- <b>ls</b>	Shows the files in the work directory.
- <b>del *.cnt</b>	Deletes all container files (.cnt) in the work directory.
- <b>ftp &lt;lwsName&gt;</b>	Requests that an ftp connection <lwsName> be established.
Name (<lwsName>: lws): <b>sds</b>	Log in as sds user on the LWSPC.
Password: <b>sos</b>	Password entry (without echo).
ftp> <b>cd /export/home/pls/obb/kunde</b>	Switches to the object base directory of the

## PLS80E, process management level with RTS &amp; LWSPC: startup, maintenance

## Backup and distribution of project data

	connected LWSPC.
ftp> <b>pwd</b>	Checks the current file path (...was the switch to the OBB directory successful?).
ftp> <b>ls -l</b>	Shows all the files in the selected directory.
ftp> <b>bin</b>	Instruction to the ftp program to transfer the files in binary format.
ftp> <b>prompt</b>	Instruction to the ftp program to transfer the files without a prompt.
ftp> <b>mput *.cnt</b>	Copies all container files (.cnt) of the object base from RTS to the LWSPC.
ftp> <b>bye</b>	Terminates the connection between RTS and LWSPC.

#### 7.2.4.2 OBB transfer (retrieval) from RTS when *RMX version* >= *RMX3, Revision 2.3*

The transfer takes place on the LWSPC on which you wish to update the object base. To carry out the transfer, you must log in as sds user on this LWSPC, the `target-lws` (see 14.1.1).

Prompt <b>command/input</b>	Description
lws% <b>cd /export/home/pls/obb/kunde</b>	Switches to the object base directory of the LWSPC.
Lws%> <b>mdel *.cnt</b>	Deletes all container files on the LWSPC. Alternatively, the container files can be deleted in the file manager.
Lws% <b>ftp &lt;RTSName&gt;</b>	Establishes an ftp connection to the RTS with the name <RTSName> .
Name(<RTSName>:lws): <b>super</b>	Log in as SUPER User on the RTS.
Password: <b>passme</b>	Entry of password for the SUPER User. Password entries are hidden.
ftp> <b>cd :sd:work</b>	Switches to the work directory of the RTS.
ftp> <b>pwd</b>	This command is used to check whether the switch to the OBB directory was successful.
ftp> <b>ls -l</b>	Shows all the files in the selected directory.
ftp> <b>bin</b>	Instruction to the ftp program to transfer the files in binary format.
ftp> <b>prompt</b>	Instruction to the ftp program to copy the files without a prompt.
ftp> <b>mget *.cnt</b>	Copies all container files (.cnt) of the object base from the LWSPC to the RTS in the directory :sd:work.

## PLS80E, process management level with RTS & LWSPC: startup, maintenance

### Backup and distribution of project data

ftp> **bye** Terminates the connection between RTS and LWSPC.

#### 7.2.4.3 Copying from (source) LWSPC to (target) LWSPC

The current or altered object base on the (source) LWSPC is retrieved for each of the LWSPCs that are to be updated (target) via ftp from the (source) LWSPC.

The LWSPC names used in the list `source-lws` and `target-lws` must be replaced by the real names of the LWSPCs. Here, `source-lws` is the LWSPC on which the current object base that is to be retrieved is located (e.g. `lws1-1`). `target-lws` is the LWSPC on which the current object base will be retrieved (e.g. `lws2-1`), i.e. the LWSPC on which you are working. The above procedure sounds more complicated than it actually is.

All RTSs can remain in the Automation mode. The `target-lws` must be disconnected from its RTS but all the others, including the `source-lws`, can continue to operate as PLS80E operator stations. Prior to executing the required actions, you must log in as `sds` user on the `target-lws` (see 14.1.1).

Prompt with <b>command input</b>	Description
target-lws% <b>cd</b> <b>/export/home/pls/obb/kunde</b>	Switches to the local OBB directory of the <code>target-lws</code> .
target-lws% <b>ftp source-lws</b>	Request to the ftp program to establish a connection to the LWSPC with the name <code>source-lws</code> .
Name (source-lws: lws): <b>sds</b>	Log in as <code>sds</code> user on the <code>source-lws</code> .
Password: <b>sos</b>	Entry of password for the <code>sds</code> user on the <code>source-lws</code> . Password entries are hidden.
ftp> <b>cd /export/home/pls/obb/kunde</b>	Switches to the remote OBB directory of the <code>source-lws</code> .
ftp> <b>pwd</b>	This command is used to check whether the switch to the OBB directory was successful.
ftp> <b>ls -l</b>	Check to see whether corresponding container files are available.
ftp> <b>bin</b>	Instruction to the ftp program to transfer the files in binary format.
ftp> <b>prompt</b>	Instruction to the ftp program to copy the individual files without a prompt.
ftp> <b>mget *.cnt</b>	Copies all container files ( <code>.cnt</code> ) of the object base from <code>source-lws</code> to the <code>target-lws</code> .
ftp> <b>bye</b>	Terminates the connection between RTS and LWSPC.

## PLS80E, process management level with RTS & LWSPC: startup, maintenance

### Backup and distribution of project data

#### 7.2.5 Restoring the object base from tape streamer on RTS

This can be necessary if, for example, the object base was created or edited externally. The operating mode Automation of the RTS must be exited (3.2). The tape streamer is inserted in the tape streamer drive and the data is restored from the tape streamer in the following manner

Prompt <b>command/input</b>	Description
- <b>super</b>	Log in as SUPER User on the RTS.
Enter password: <b>passme</b>	Entry of SUPER User password, password entries are hidden.
SUPER-	The input prompt switches to SUPER.
SUPER- <b>af :sd:work</b>	Switches to the directory into which the object base was transferred.
SUPER- <b>delete *.cnt</b>	Deletes all container files in the directory :sd:work.
SUPER- <b>adtape</b>	Tape streamer drive is enabled as device :t:.
SUPER- <b>restore :t: over :sd:work</b>	Restore command to restore the data from device :t: to the hard disk. The copying process starts after confirmation with y(es).
SUPER- backup completed	The copying process was successful.
SUPER- <b>dd :t:</b>	Tape streamer drive is disabled as a device.
SUPER- <b>exit</b>	Log out as SUPER User.

The tape streamer can now be removed and the object base transferred - as described under 7.2.2.1 and 7.2.4.2 - to the LWSPCs. Whether or not you can now start the RTS in the Automation mode depends on the transfer method that was selected.

### 7.3 Backup and restoration of trend data

These functions are carried out during normal operation and called via the Dialogmenue of the LWSPC. A backup to a tape streamer is, of course, carried out on the RTS.

A description of these functions can be found in the manual Display and Operation in Chapter 6.2 under Trend – Trend Data Archive.

## 8 Help, tips and tricks

### 8.1 Assigning an LWSPC to another RTS as workstation

When an RTS is shut down for configuration or maintenance work, the LWSPCs that are assigned to this RTS are no longer PLS80E workstations.

If certain prerequisites are met, it is possible to assign these to *other* RTSs as workstations. In most cases, the same object base is used (redundancy). The prerequisites are:

- fewer workstations are actually assigned to the *other* RTSs than the number defined during variant installation;
- the name and workstation number of the RTS were modified accordingly in the start file of the RTS;
- an additional login was first set up (e.g.: lwsnot).

If the *other* RTS expects another object base, e.g. because it automates another plant area with other user data, the other object base will have to be installed (see 8.1.3).

The procedures described below also apply when these LWSPCs are to be permanently assigned to another RTS. If this other RTS is in another PM LAN, the settings for the PM LAN will also have to be adjusted (see 5.5 and 5.6).

#### 8.1.1 Starting an LWSPC with a modified start file

The setup of the start file is described under 6.2.1. Once the modifications have been made and saved and the user has logged out as sds user, the LWSPC will be started again (see 4.2).

If the LWSPC is to be assigned to the original RTS again, the modifications in the start file will have to be undone.

#### 8.1.2 Adding an additional workstation login to the LWSPC

If the operating concept requires that an LWSPC can be assigned to one or the other RTS on the same PM LAN, this must be stated when ordering the LWSPC. Invensys Systems will then set up different operator logins (e.g.: lwsnot).

#### 8.1.3 Adding another object base to the LWSPC

If another object base is to be permanently added to an LWSPC, the original object base must first be deleted and the new object base must be installed in the same directory (see 7.2.4).

After modifying the start file – as described under 6.2.1 – for the *other* RTSs and, if necessary, the setup of the PM LAN, the LWSPC can be started again (see 4.2).

### 8.2 Interrupting the RTS starting procedure

When an RTS is switched on or following a reset via the Reset button, it always starts in the full-graphic operating mode Automation. This prevents unauthorized access to the Configuration and System Services modes.

This starting procedure can, however, be interrupted to gain fast access to the operating mode Configuration. This interruption can be carried out in different ways depending on the PLS80E release that is installed. Unfortunately, there are PLS80Es of the same version some of which are aborted with, and others without, the selection menu. Whether or not the selection menu is provided depends on the time of installation. Basically, it can be taken that all PLS80E versions lower than 5.031 are aborted without a selection menu and that versions from 6.x upwards are aborted with a selection menu.

At this point we can only advise the user to check whether a selection menu is displayed on the semi-graphic monitor of the RTS (system console) during the starting procedure. If it is necessary to abort at a later point in time, the corresponding variant [8.2.1](#) or [8.2.2](#) can be used.

### 8.2.1 Without a selection menu

The shortcut <CTRL> <C> can be used to abort when the line `sleep 3` is displayed on the RTS system console. If this shortcut is used earlier, the required operating system components will not yet be loaded and the RTS will have to be rebooted. This shortcut will also not work if entered too late as it will already have been blocked by the software for operating safety reasons.

If the starting procedure was successfully aborted in the manner described above, the command `jobs` should be entered to check if programs are already active in the background. Any background tasks that are running can be terminated with the command `kill *`. In the case of the database variant `client-server`, the database server may still be active in the background. This can be deactivated with the command `stopdbs`.

### 8.2.2 With a selection menu

The selection menu was introduced to prevent problems that arise when aborting with <CTRL> – <C>, particularly when using newer and faster hardware. This menu is displayed during the starting procedure for approx. 5 seconds

1. for the Configuration mode (starts in semi-graphic Operating mode menu).
2. for the Command Line mode (operating system prompt, e.g. for command input).

If no selection is made, the RTS starts in the Automation mode.

## 8.3 Operator workstation no longer reacts

When an LWSPC is connected to an RTS as a workstation, it is only possible to call process-related displays and enter PLS80E commands on this LWSPC. Other tasks can only be carried out on this LWSPC after it has been disconnected from the RTS (see [3.1](#)). If mouse actions are no longer to be carried out on the PLS80E user interface or the time is not to be updated any longer, it will not be possible to disconnect via the Dialogmenu.

**Do not simply switch the LWSPC off or reboot with the Reset button.**

First, you can try to disconnect the LWSPC via the system console of the RTS. The program `Telnet`, which allows remote access to the LWSPC, is used here.

## PLS80E, process management level with RTS & LWSPC: startup, maintenance

### Help, tips and tricks

Prompt <b>command/input</b>	Description
- <b>af :sd:</b>	Switches to the system device :sd:.
- <b>telnet remote-lws</b>	Request to the program Telnet to establish a remote connection to the device with the name <code>remote-lws</code> . In this case, to the LWSPC that is not reacting.
Login: <b>sds</b>	Log in as sds user.
Password: <b>sos</b>	Entry of password for the sds user, password entries are hidden.
Remote-lws%	If the Telnet command was successful, the input prompt will change to the name of the remote LWSPC <code>remote-lws%</code> , as it would also be displayed on the LWSPC itself.
Remote-lws% <b>cleanup</b>	The command <code>cleanup</code> ends the PLS80E session on the LWSPC and the login prompt is displayed again.
Remote-lws% <b>exit</b>	The Telnet connection will be terminated.
Remote-lws% <b>logout</b>	The termination was successful.
-	The standard RMX prompt will be displayed again.

This software-driven (remote) disconnection of the LWSPC from the RTS can also be carried out via any required LWSPC on the PM LAN. First, this LWSPC must be disconnected from the RTS (see 3.1) and you have to log in as sds user on the LWSPC (see 14.1.1.1.2). The Telnet program will also have to be opened on the LWSPC as described above.

The individual commands that have to be entered in the `xterm` window are shown in the following

Prompt <b>command/input</b>	Description
local-lws% <b>telnet &lt;remote-lws&gt;</b>	Request to the program Telnet to establish a remote connection to the device with the name <code>&lt;lwsName&gt;</code> .
Login: <b>sds</b>	Log in as sds user.
Password: <b>sos</b>	Entry of password for the sds user, password entries are hidden.
Remote-lws%	If the Telnet command was successful, the input prompt will change to the name of the remote LWSPC <code>remote-lws%</code> , as it would also be displayed on the LWSPC itself.
Remote-lws% <b>cleanup</b>	The command <code>cleanup</code> ends the PLS80E session on the LWSPC and the login prompt is displayed again.

## PLS80E, process management level with RTS & LWSPC: startup, maintenance

Help, tips and tricks

Remote-lws% <b>exit</b>	The Telnet connection will be terminated.
Remote-lws% <b>logout</b>	The termination was successful.
Local-lws%	The normal prompt of the LWSPC will now be displayed again.

The LWSPC should not be switched off until a Telnet connection to the LWSPC that is not reacting cannot be established or the `cleanup` command is not going to be executed.

### 8.4 Test to determine whether or not a station on the PM LAN can be accessed

The easiest command to determine whether or not a station in the PM LAN can be accessed is the `ping` command. This command is available in every operating system that supports TCP/IP protocol and can be executed on the RTS as well as on the LWSPC. The manner in which the command is entered does, however, differ. On the RTS, `ping` can be executed in the operating mode Automation on the system console.

Prompt <b>command/input</b>	Description
- <b>af :sd:</b>	Switches to the system device <code>:sd:</code>
- <code>ping remoteName 64 1</code>	Ping sends message <code>64</code> to the station <code>remoteName</code> <code>1</code> time

If the number of times is not defined on the RTS, an infinite number will be sent and the RTS hangs up and can only be operated normally once it has been switched off and on again (with the corresponding consequences for the connected LWSPCs)

On the LWSPC, `ping` is entered in the `xterm` window when logged on as `sds` user or Root User.

Prompt <b>command/input</b>	Description
- <code>ping remoteName</code>	Ping connection text to <code>remoteName</code> .

It is important to ensure that the name of the station that is to be tested is entered in the `hosts` file of the computer (RTS or LWSPC). If the name is not entered in the `hosts` file, a corresponding error message will be generated. In this case, the IP address of the device to be tested can be entered instead of the name, e.g. `ping 192.131.118.113`. On an RTS, the user knows that the `ping` was successful when a text that starts with

```
<number> packets transmitted, <number> packets received...
```

is shown.

On an LWSPC, a successful connection is shown by the text `remoteName is alive`.

If, however, further error messages are generated it will be necessary to check the PM LAN connection. The spelling of the name or the address entered for the `remoteName` should also be checked.

## 8.5 Manual backup of user data

If error messages occur when making a backup of the user data via the system services menu and the backup function does not execute the backup, an attempt can also be made to carry out the backup using the operating system commands. Here, the identification file `.idf` will, however, not be included in the backup. When restoring this tape streamer at a later point in time, the query as to whether the identification file should be displayed must be answered with NO.

In the case of the database variant client-server, a check must first be carried out to determine whether or not the database server is still active. If this server is still active, it must be deactivated (commands: `jobs` and `stopdbs`). A manual backup is carried out with the following commands:

Prompt <code>command/input</code>	Description
- <code>af :sd:</code>	Switches to the system's hard disk (system device <code>:sd:</code> ).
- <code>adtape</code>	Tape streamer drive is enabled as device <code>:t:</code> in the operating system.
- <code>backup :ad:mls/anw over :t:</code>	Starts the backup procedure on the tape streamer. The copying process starts after confirmation with y(es).
- <code>dd :t:</code>	Tape streamer drive is enabled as device <code>:t:</code> again.

The tape streamer can be removed and the write protect should be activated.

## 9 RTS with database version client-server

This database variant can be identified by the additional F in the version name of the RTS, e.g. L504 – S – AF 5.12 and offers two independent application possibilities:

- Distributed Engineering in the semi-graphic operating mode Configuration using the Configuration Master (CM) and Configuration Slaves (CS).
- Automatic Parameter Comparison in the full-graphic operating mode Automation using the Automation Master (AM) and Automation Slaves (AS).

### 9.1 Configuration Master and Configuration Slaves

When a plant (unit) is automated using several RTSs that are redundant to each other, all of these RTSs have the same user data (prerequisite for redundancy).

While in the operating mode Configuration, the shared database is kept on the Configuration Master and the Configuration Slave can edit and add to the data in this database in accordance with the configuration rights that they have been assigned. In this way, configuration data can be entered simultaneously via several RTSs thus significantly reducing the engineering time required for extensive projects.

On completion of the configuration tasks, the database of the Configuration Master is distributed among the Configuration Slaves (see 7.1), thus restoring the redundancy.

#### 9.1.1 Defining the CM and CS

The Configuration Master and/or Configuration Slave are/is defined – as already described under 5.2.1 [Configuring the name](#) – in the same mask in which the name of the RTS is defined.

If an RTS is *not* labeled Configuration Master, this RTS is the Configuration Slave and the name of the appropriate Configuration Master must also be entered. The entry will become effective after starting in the operating mode Configuration.

#### 9.1.2 Defining configuration rights

The configuration rights can only be defined in the semi-graphic mode.

Operating mode menu: **-F1-** **-F5-** **-F5-** **-F1-**

Here, each station is assigned rights by entering the OS designation. After pressing the function key **-F1-** it will be determined which functional unit(s) can be configured via which station. This assignment can, however, only be carried out after the names of the functional units have been configured. Please remember that from Release 7.0 onwards it is only possible to assign names for which a license exists.

This configuration right is a part of the database.

Note: Even if the Distributed Engineering functions are not or will not be used, this configuration right should still be entered on the RTS that was defined as the configuration station. The OS designation should be entered as the name for all functions.

### 9.1.3 Executing Distributed Engineering

To carry out the configuration tasks, the Configuration Master must be in the semi-graphic operating mode Configuration. In addition, Configuration Slaves that have been assigned the rights for the required type of configuration, must also be switched to the semi-graphic operating mode Configuration.

This can prove to be a bit of a hindrance when making minor modifications during normal operation. For this reason, it may be meaningful to disable Distributed Engineering after first engineering and plant commissioning.

### 9.1.4 Disabling Distributed Engineering

If the function Distributed Engineering is no longer required, all RTSs must be configured as Configuration Master. One of these RTSs will then be defined as configuring station and all of the configuration tasks will be carried out here. This station is then assigned configuration rights by entering the OS designation (see 9.1.2).

## 9.2 Automation Master and Automation Slave

When a plant (area) is automated using several RTSs, a prerequisite for redundancy is that all of these RTSs have the same user data. There are, however, constellations in which different plant areas have different user data. In this case, only the RTSs that are redundant to each other are those that have identical user data. If a parameter is now changed, e.g. limit value, in the operating mode Automation, this modification is entered in the functional unit, the redundancy unit and the database of the RTS that is to be modified. Normally, the remaining RTSs do not know that this modification has taken place; the databases are no longer identical (consistent). The Automation Master/slave concept was introduced to prevent this inconsistency.

This function is totally independent of the Distributed Engineering function. It ensures that the local databases of the participating RTSs

- are brought to the same status when starting;
- are held at the same status during operation.

### 9.2.1 Defining the AM and AS

The Automation Master and/or Automation Slave are/is defined - as already described under 5.2.1 [Configuring the name](#) - in the same mask in which the name of the RTS is defined. In addition to defining the AM and AS, the function Update must also be configured.

If an RTS is not labeled as Automation Master, it will automatically become an Automation Slave and the name of the corresponding Automation Master will also have to be entered. Any changes that have been made to the AM and AS only become effective after starting in the operating mode Automation.

### 9.2.2 Defining Update

If YES is selected in the configuration mask for the Automation Master, a new configuration option Update will be offered

## PLS80E, process management level with RTS & LWSPC: startup, maintenance

### RTS with database version client-server

- in the semi-graphic operating mode Configuration with function key **F5**;
- in the full-graphic operating mode Automation with the button Update.

Here, the RTS names that are to be updated as Automation Slaves by the Automation Master are selected from the station list (Message Routing).

#### 9.2.3 Message Routing during normal operation

After starting (first!) the AM and (then!) the AS, all RTSs that have been assigned to each other have the same database and are redundant to each other. If a parameter is changed on one of these stations during normal operation, the following procedure applies:

- new parameter is written to the corresponding functional unit and becomes effective;
- new parameter is written to the corresponding redundancy unit;
- new parameter is written to the database of the Automation Master and replaces the old parameter;
- new parameter is transferred by the Automation Master to all RTSs that have been assigned as slaves via PM LAN and is accepted in the respective local database.

This applies for parameters from automation blocks, data in the first-up signal archive and parameters in the variant parameter archive as well as parameters for horn assignment.

Recipe parameters are not a part of Message Routing; they are managed by the recipe master and the backup recipe master.

#### 9.2.4 Message Routing during booting procedure

Before an AS is started, the AM must be in the full-graphic operating mode Automation. When the AS has started, it establishes contact with the AM; the AM now attempts to update the database of the AS. The following situations are possible:

- the databases of both stations are identical, no update will take place;
- the databases differ in the archives named under 9.2.3; an automatic update will take place without a prompt;
- the databases differ in the other archives; the system will query whether this update should also be carried out. If the query is answered with No, the AS will abort Message Routing (see 9.2.5);
- the databases are not compatible (difference in designation, variant or status)
  - the Automation Master generates an error message:
    - database and Automation Master are not compatible
  - the AS does not participate in Message Routing and only works with its local database. This only happens when the wrong backup tape streamer was restored!
- the AS is not recognized by the master as this slave was not entered when configuring Update. The following error message is generated:
  - OP not prepared for update

- this slave does not participate in Message Routing (see 9.2.5).

### 9.2.5 Troubleshooting during Message Routing

If the AS cannot contact its Automation Master via the PM LAN, it will abort Message Routing.

- The parameter change will be saved in the functional unit and in its local database.
- As a result, the AM will not be able to update the other slaves.
- The AS generates the following messages in information field I:
  - Error during Message Routing.
  - OS connected to local database.
- In the AS, the designation **AS** in the message line is shaded in grey.
- The error code 1F6 is entered in the system log file of the AS.
- The AS generates a log file `:ad:m1s/mr.log`. The automation blocks in which the parameters have been changed are entered in this file. The type and value of the changed parameters are recorded in the operator log

The AS only recommences Message Routing after it has been restarted. The changed parameters must be manually entered in the AM before the starting procedure commences. For this purpose, the AS is shut down and the log file is read out at its system console with the command: `skim :ad:m1s/mr.log`. The new parameter values can be taken from the operator log. Afterwards, the AS can be restarted. The other ASs must also be restarted so that their databases can also be updated.

**When the AM has been shut down and can therefore no longer be contacted by the slaves, all the slaves will abort Message Routing. Consequently, parameter changes that are carried out on one or more ASs after the AM has been shut down always have to be entered manually!**

## 9.3 Distributed Engineering and Message Routing

A CM, and the CSs that are assigned to the CM, form a logical unit in the same way as an AM and its ASs.

As one database forms the basis for both functionalities, both logical units are formed by the same RTS. CM and AM can be different RTSs. Several logical units of this kind can exist within one PM LAN at the same time so that extensive plants can be automated with several databases (plant areas).

### 9.3.1 RTS is CM and AM

If this RTS is switched to the semi-graphic operating mode Configuration for the purpose of changing configuration data, the AM can no longer carry out its functions (see 9.2.5).

Later parameter changes on the AS have to be entered manually (see 9.2.5) to prevent a discrepancy between the database and the data in the functional units.

## PLS80E, process management level with RTS & LWSPC: startup, maintenance

### RTS with database version client-server

The parameter values can be entered immediately in the Configuration mode or later when the RTS is started in the Automation mode (detailed display). In any case, the ASs should only be updated after starting in Automation mode.

#### 9.3.2 CM and AM are different RTSs

If the CM is switched to the semi-graphic operating mode Configuration for the purpose of changing configuration data, the AM will still be able to carry out its functions.

Later parameter changes are recognized, saved and distributed to the other ASs by the AM. The changes are, however, not distributed to the CM as this is in the Configuration mode.

If the CM is started without first distributing the user data, a discrepancy will occur between the user data of the CM and the AM. For this reason, a dialog is displayed during the starting procedure. This dialog draws attention to the discrepancy and offers the user an opportunity to collate the data.

**This collation should not, under any circumstances, be carried out to overwrite the changed data on the CM.**

If this database is distributed to the other RTSs on completion of the configuration work, the new parameter values will be overwritten and there will be a discrepancy between the database and the data in the functional units!

**To prevent this, parameter values should not be changed during the configuration work.**

If changes are inevitable, these should be noted so that the CM can be updated manually. The ASs do not create a log file as there is a connection between the ASs and the AM.

## 10 Additional RTS jobs; strategies & consequences

Each RTS can be configured to handle one or more additional jobs. If only one RTS is installed in the control system, it will execute as many additional jobs as lie within the bounds of its possibilities. If several RTSs are installed, these additional jobs are distributed among the various stations. There is no simple, uniform answer to the question of which station the individual jobs should be assigned to. A job distribution strategy has to be defined individually for each project as various factors can play a role here.

The operating functions Load functional unit, Load redundancy unit and Switch back redundancy unit should only be executed via the RTS that has been defined as the ConfigStation or configured as the CM.

### 10.1 Process management level administrator

This job must be executed by one (and only one) RTS in the entire PM LAN system. This RTS should always be in operation when changes are made on the PM LAN (Configuration or Automation mode) as each RTS establishes contact with the administrator during the starting procedure and only receives the current station directory once contact has been established successfully.

This job should be executed by an RTS on which the operating mode is rarely changed. If this RTS is removed from the system permanently or for a longer period, another RTS must be defined as administrator (see 5.4.2).

### 10.2 Time master

Time synchronization of PLS80E is only carried out via the PLS80E bus. This synchronization must be executed by one (and only one) RTS in the PLS80E bus system. Each PLS80E bus to which one or more RTSs are connected must have a time master. This also applies when all RTSs are connected to the same PM LAN. Synchronization does not exist between different time masters unless, of course, they are equipped with a DCF77 radio clock module.

The time master should always be in operation (Configuration or Automation mode), as its unavailability over a longer period will lead to a *deviation* in the time stamps of the RTS and functional units.

**Once they have been RESET, a functional unit or a redundancy unit can only be loaded or switched back if a time master is available!**

If the RTS that is configured as time master is removed from the system permanently or for a longer period of time, another RTS must be defined as time master. The switchover to summer-time must also be entered in the absence of a radio clock module.

### 10.3 Recipe mode for batch applications

When using recipe-driven sequence control (batch), it is necessary to configure RTSs to execute this job. A logical unit is created for each database. Each unit comprises a recipe master (RM), a backup recipe master (SRM) and any required number of recipe slaves.

## PLS80E, process management level with RTS & LWSPC: startup, maintenance

### Additional RTS jobs; strategies & consequences

The RM and the SRM are redundant to each other and can therefore replace each other. The recipe slaves are only used to access and use the information of the *active* RM. The data exchange between the stations for recipe control and management takes place via the PLS80E bus irrespective of whether an PM LAN is available or not.

**When making a data backup, please note that recipe parameters and product definitions are only saved to the RM and the SRM. For this reason, the RM or the SRM should also be the Configuration Master for this database.**

**The RM and SRM should not, under any circumstances, be started simultaneously in the Automation mode as this could result in the loss of parameters sets and product definitions.**

#### 10.3.1 Recipe master (RM)

When using recipe-driven sequence control, one RTS **must** be configured as RM. For redundancy reasons, it is strongly recommended that a SRM also be operated.

If the RM is removed from the logical unit permanently or for a longer period of time, a slave of this logical unit must be defined as RM. This change must also be passed on to the SRM and all other recipe slaves to ensure that redundancy is restored for the recipe mode. Tip:

If redundancy is very important, e.g. in the event of an RM failing, and one or more slaves are available, the simplest way is to remove the defect RM from the PLS80E bus, shut down a slave, disconnect this slave from the PLS80E bus and reset the KLSxx address to the address of the defect RM. Now configure this computer in the semi-graphic Configuration Mode as RM, connect it to the PLS80E bus again and start the computer in the full-graphic Automation mode.

In this way, you can avoid the problem of having to pass on the address of the slave or the SRM to the new RM and, in so doing, avoid the problems that would arise if you had to configure the new address of the RM on all slaves as well as on the SRM. The above description relates to the RM but also applies, of course, for the SRM.

#### 10.3.2 Substitute recipe master (SRM)

When using recipe-driven sequence control one RTS should be configured as SRM. If the RM in this logical unit is not operational, e.g. because it is in the Configuration mode, the SRM must be in the full-graphic operating mode Automation as long as recipes are being executed in the functional units. Switching to a different operational state is only permissible when all recipes have been executed.

When the RM is available again and functions as the *active* RM, the SRM can be shut down even while recipes are still being executed.

If the SRM is removed from the logical unit permanently or for a longer period of time, a slave of this logical unit should be defined as SRM. The procedure adopted here is the same as when removing an RM as described under [10.3.1](#).

## PLS80E, process management level with RTS & LWSPC: startup, maintenance

### Additional RTS jobs; strategies & consequences

#### 10.3.3 Recipe slave

When using recipe-driven sequence control, the remaining RTSs of the same database can be configured as recipe slaves. These slaves are not necessary for recipe control and management but they do extend the possibility of parallel recipe control and therefore require an active RM.

If a slave is removed from the logical unit permanently or for a longer period of time, no measures are necessary with regard to the recipe mode. If the slave carries out additional jobs, e.g. time master, these must be considered accordingly!

#### 10.4 CM and CS, AM and AS

These additional jobs are only relevant when using the database variant client-server (see 9). Due to the similarity of the configuration masks and internal queries, these settings must also be entered for the database variant embedded as follows:

- all RTSs Configuration Master YES (see 9.1.1)
- all RTSs Automation Master YES (see 9.2.1),
  - no entry is made for Update (see 9.2.2).

#### 10.5 Recommended distribution of additional tasks

The shared database (user data) of RTSs that are redundant to each other forms the logical unit for the participating RTSs with regard to Distributed Engineering, Message Routing and Recipes. Notwithstanding the combinations that are listed below, an RTS that is configured as CM and AM also has advantages. In addition to the combinations listed below per logical unit, the following must always be defined:

1 PM LAN administrator for the entire PM LAN (in *one* of the logical units)

1 time master per PLS80E bus (in *one* of the logical units on this bus)

##### 10.5.1 Logical unit with database *embedded*, without recipe mode

Irrespective of the number of RTSs, no further additional jobs have to be configured. One RTS should be defined as ConfiStation. The combinations listed in the following are not binding and hence, the appropriate configuration of CM, CS, AM and AS should be discussed in each individual case. One important criterion is, for example, how often the configuration will be modified.

##### 10.5.2 Logical unit with database *embedded*, with recipe mode

###### 10.5.2.1 Logical unit is formed with just one RTS (not recommended!):

								Notes:
RTS1					RM			"Confi-Station"

###### 10.5.2.2 Logical unit is formed with two RTSs:

								Notes:
--	--	--	--	--	--	--	--	--------

## PLS80E, process management level with RTS & LWSPC: startup, maintenance

### Additional RTS jobs; strategies & consequences

RTS1					RM			"Confi-Station"
RTS2						SRM		(OLA) (TM)

#### 10.5.2.3 Logical unit is formed with three or more RTSs:

								Notes:
RTS1					RM			"Confi-Station"
RTS2						SRM		(TM)
RTS3							RS	(OLA)
RTSn							RS	

### 10.5.3 Logical unit with client-server database, without recipe mode

#### 10.5.3.1 Logical unit is formed with one RTS (which does not actually make sense!):

								Notes:
RTS1	CM		AM					(OLA) (TM)

#### 10.5.3.2 Logical unit is formed with two RTSs:

								Notes:
RTS1	CM			AS				(TM)
RTS2		CS	AM					(OLA)

#### 10.5.3.3 Logical unit is formed with three or more RTSs:

								Notes:
RTS1	CM			AS				
RTS2		CS	AM					(TM)
RTS3		CS		AS				(OLA)
RTSn		CS		AS				

### 10.5.4 Logical unit has a *client-server* database, with recipe mode

#### 10.5.4.1 Logical unit is formed with one RTS (which does not actually make sense!):

								Notes:
RTS1	CM		AM		RM			(OLA) (TM)

**PLS80E, process management level with RTS & LWSPC: startup, maintenance**

## Additional RTS jobs; strategies &amp; consequences

*10.5.4.2 Logical unit is formed with two RTSs:*

								Notes:
RTS1	CM			AS	RM			(TM)
RTS2		CS	AM			SRM		(OLA)

*10.5.4.3 Logical unit is formed with three or more RTSs:*

								Notes:
RTS1	CM			AS	RM			
RTS2		CS	AM				RS	(TM)
RTS3		CS		AS		SRM		(OLA)
RTSn		CS		AS			RS	

## 11 Mixed operation with OS and RTS/LWSPC

### Definition:

An operator station is a real time server with a local workstation (integrated DynavisX graphic board). In variant installation (see 6.1.1), "1" is entered as the number of IGC workstations, i.e. Number of IGC workstations = 1. Up to 2 UNIX workstations can also be assigned (place no. 2 and place no. 3)

Depending on the type of DYNAVIS-X graphic board used, a distinction is made between:

- operator station LS120V with XGA resolution (1024 x 768 pixels)
- operator station LS130 with SXGA resolution (1280 x 960 pixels)

The difference between operator station OS and real time server RTS in the case of workstation no. 1:

with OLS, the object base for the first workstation is saved on the local hard disk :ad: and the monitoring and operating functionality is provided via the DynavisX graphic board;

with RTS, the object base for the first workstation is saved on the hard disk of the LWSPC and the monitoring and operating functionality is provided by this OWS. There are no differences with regard to workstations 2 and 3.

### Effects:

The object base of the OS (workstation 1) and that of the LWSPC have different data formats and cannot be directly exchanged. The content of both object bases is identical as they should be redundant to each other. The different formats must be considered when maintaining the process displays and when making a backup of the data in the object base.

### Procedure:

The maintenance of the two object bases is simplified by using a conversion program. An overview of the procedure is provided in the following. 70 MB hard disk space must be available for the OS and a DynavisX graphic board must be integrated

Operator station (workstation 1) is the maintenance master; all changes are made here and, after data backup 11.3) and distribution to the other OSs, conversion from RMX to UNIX is carried out (**Rmx Nach Unix** = `rnu`: conversion command = `konvertgnu`). The conversion is executed in two steps. The transfer to an LWSPC takes place after the first step.

1. Conversion on OS in general format (.xdr) with `konvertgnu` (see 11.1.1)
2. Transfer of general format to an LWSPC using ftp program (see 11.1.2)
3. Conversion on LWSPC in Unix format with the command `konvertgnu`
4. Subsequent distribution of this object base to all other LWSPCs (see 7.2.4)

### Recommended procedure:

The entire object base (= 10 containers) has to be converted during initial commissioning. This will take approx. 1 to 1.5 hours on the operator station (depending on the size of the object base). The conversion time required on the LWSPC is negligibly short.

## PLS80E, process management level with RTS & LWSPC: startup, maintenance

### Mixed operation with OS and RTS/LWSPC

If subsequent changes are only made to the graphic display, it will only be necessary to convert these containers (pictures.cnt) and transfer (this saves time); attention should, however, be paid to the different command sequences.

## 11.1 Converting and transferring the entire object base

### 11.1.1 Converting the object base on the OS.

If LWSPCs are to be connected to the OS, these must first be disconnected from the OS (see 3.1) and the operating mode Automation on the operator station must be exited (see 3.2),

Prompt <b>command/input</b>	Description
- <b>af :ad:</b>	Switches to the application hard disk :ad:
- <b>dir</b>	Displays the directories. If the work directory already exists, the next command can be skipped.
- <b>createdir work</b>	Creates the work directory
- <b>af work</b>	Switches to the work directory
- <b>del *.xdr</b>	All existing format-independent .xdr files will be deleted.
- <b>konvertrnu</b>	Starts the conversion in the independent .xdr format. This command uses a script that already contains the source and target paths for the conversion of the files.

During the conversion, output is visible on the monitor. This output shows the current progress of the conversion. The conversion is completed when the RMX prompt is displayed again.

### 11.1.2 Transferring the object base to the LWSPC

The RMX version that is installed on the OS also leads to differences in the way the files have to be transferred (see 14.5). The appropriate procedures are described in the following.

#### 11.1.2.1 OBB transfer from RTS when RMX version < RMX3, Revision 2.3

The actions are executed on the RTS on which the conversion was carried out, i.e. on which the object base is located in the directory :ad:work. The LWSPC to which the object base is to be sent can remain in the Automation mode as the .xdr files will be copied to a separate directory so that conflicts cannot occur when copying these .xdr files.

Prompt <b>command/input</b>	Description
- <b>af :sd:</b>	Switches to the system's hard disk
- <b>ftp &lt;lwsName&gt;</b>	Requests that an ftp connection <lwsName> be established.
Name (<lwsName>: lws): <b>sds</b>	Log in as sds user on the LWSPC.
Password: <b>sos</b>	Password entry (without echo).

## PLS80E, process management level with RTS & LWSPC: startup, maintenance

### Mixed operation with OS and RTS/LWSPC

<code>ftp&gt; lcd :ad:work</code>	Switches to the directory with the system-independent files.
<code>ftp&gt; cd /export/home/pls/tmp/xdr</code>	Switches to the predefined directory that will be used in the next conversion step.
<code>ftp&gt; pwd</code>	Checks the current file path (...was the switching of directories successful?).
<code>ftp&gt; ls -l</code>	Shows all the files in the selected directory.
<code>ftp&gt; bin</code>	Instruction to the ftp program to transfer the files in binary format.
<code>ftp&gt; prompt</code>	Instruction to the ftp program to transfer the files without a prompt.
<code>ftp&gt; mput *.xdr</code>	Copies all files (.cnt) from the OS to the LWSPC.
<code>ftp&gt; bye</code>	Terminates the connection between RTS and LWSPC.

#### 11.1.2.2 OBB transfer from RTS when RMX version >= RMX3, Revision 2.3

The transfer takes place on the LWSPC on which you wish to update the object base. Prior to executing the required actions, you must log in as sds user (see 14.1.1).

Prompt <code>command/input</code>	Description
<code>lws% cd /export/home/pls/tmp/xdr</code>	Switches to the object base directory of the LWSPC.
<code>lws% pwd</code>	Checks whether the switching of directories was successful by indicating the current directory.
<code>Lws% ftp &lt;RTSName&gt;</code>	Establishes an ftp connection to the RTS with the name <RTSName>.
<code>Name (&lt;RTSName&gt;:lws): super</code>	Log in as SUPER User on the RTS.
<code>Password: passme</code>	Entry of password for the SUPER User. Password entries are hidden.
<code>ftp&gt; cd :ad:work</code>	Switches to the :ad:work directory of the RTS.
<code>ftp&gt; pwd</code>	This command is used to check whether the switch to the OBB directory was successful.
<code>ftp&gt; ls -l</code>	Shows all the files in the selected directory.
<code>ftp&gt; bin</code>	Instruction to the ftp program to transfer the files in binary format.
<code>ftp&gt; prompt</code>	Instruction to the ftp program to copy the files without a prompt.

## PLS80E, process management level with RTS & LWSPC: startup, maintenance

### Mixed operation with OS and RTS/LWSPC

ftp> <b>mget *xdr</b>	Copies all system-independent files (.xdr) from RTS to the LWSPC.
ftp> <b>bye</b>	Terminates the connection between RTS and LWSPC.

#### 11.1.3 Converting the object base on this LWSPC

Once the .xdr files have been transferred, the object base will be located on the LWSPC in a temporary directory in a system-independent data format. To use this object base on this and other LWSPCs, this system-independent data format must be converted to a UNIX format. As the transfer of the .xdr files and the conversion are closely related, it is assumed here that you did not log out in section 11.1.2.2 and that you are still logged in as sds user.

Prompt <b>command/input</b>	Description
lws% <b>konvertrnu kunde -f -b</b>	Starts the conversion in UNIX-Format (*.cnt) <b>kunde</b> corresponds to the target directory <code>/export/home/pls/obb/kunde</code> <b>-f</b> represents the predefined source directory <code>/export/home/pls/tmp/xdr</code> <b>-b</b> is only entered when the <i>old</i> containers will not be overwritten but renamed to <code>*.old</code>

The conversion is completed shortly after the LWSPC prompt (`lwsName%`) is shown. The LWSPC can now be started as a PLS80E workstation (see 4.2) and the object base can be distributed to other LWSPCs (see 7.2.4.3).

## 11.2 Converting and transferring a single container

The procedure shall be explained using the graphic container `pictures.cnt` as an example. This procedure applies for all other containers; the appropriate container name must be used.

### 11.2.1 Converting the container on the OS

The operating mode Automation on the operator station must be exited (see 3.2). The operator station is now at operating system level; the following commands are now entered:

Prompt <b>command/input</b>	Description
- <b>af :ad:</b>	Switches to the application hard disk.
- <b>dir</b>	Displays the directories. If the work directory already exists, the next command can be skipped.
- <b>createdir work</b>	Creates the work directory
- <b>af work</b>	Switches to the work directory
- <b>del *.xdr</b>	All existing format-independent .xdr files will be deleted.

## PLS80E, process management level with RTS & LWSPC: startup, maintenance

### Mixed operation with OS and RTS/LWSPC

```
- submit :config:cmd/konvrnu (:ad:mls/130/obb/pictures,:ad:work/pictures)
```

This command triggers the conversion of the file `pictures.cnt` into the system-independent format `pictures.xdr`. The file endings, `.xdr` or `.cnt` are not indicated.

The conversion is completed when the RMX prompt is displayed.

### 11.2.2 Transferring the container to an LWSPC

The RMX version that is installed also plays a role here (see 14.5). The appropriate procedures are described in the following.

#### 11.2.2.1 Transfer (send) to LWSPC when RMX version < RMX3, Revision 2.3

The actions are executed on the OS on which the conversion was carried out. Hence, the operating mode Automation should not yet be active. If this is not the case, it must be exited (see 3.2). The LWSPC to which the object base is to be transferred can remain in the Automation mode.

Prompt <code>command/input</code>	Description
- <code>af :sd:</code>	Switches to the system's hard disk
- <code>ftp &lt;lwsName&gt;</code>	Requests that an ftp connection <lwsName> be established.
Name (<lwsName>: lws): <code>sds</code>	Log in as sds user on the LWSPC.
Password: <code>sos</code>	Password entry (without echo).
<code>ftp&gt; lcd :ad:work</code>	Switches to the directory with the system-independent files.
<code>ftp&gt; cd /export/home/pls/tmp/xdr</code>	Switches to the predefined directory that will be used in the next conversion step.
<code>ftp&gt; pwd</code>	Checks the current file path (...was the switching of directories successful?).
<code>ftp&gt; mdel *.xdr</code>	Deletes existing .xdr files.
<code>ftp&gt; bin</code>	Instruction to the ftp program to transfer the files in binary format.
<code>ftp&gt; prompt</code>	Instruction to the ftp program to transfer the files without a prompt.
<code>ftp&gt; put pictures.xdr</code>	Copies the file <code>pictures.xdr</code> from the OS to the LWSPC.
<code>ftp&gt; bye</code>	Terminates the connection between RTS and LWSPC.

## PLS80E, process management level with RTS & LWSPC: startup, maintenance

### Mixed operation with OS and RTS/LWSPC

#### 11.2.2.2 Transfer (retrieval) of RTS when RMX version $\geq$ RMX3, Revision 2.3

The transfer takes place on the LWSPC on which you wish to update the file `pictures.xdr`. Prior to executing the required actions, you must log in as `sds` user (see 14.1.1).

Prompt <code>command/input</code>	Description
<code>lws% cd /export/home/pls/tmp/xdr</code>	Switches to the object base directory of the LWSPC.
<code>lws% pwd</code>	Checks whether the switching of directories was successful by indicating the current directory.
<code>ftp&gt; mdel *.xdr</code>	Deletes existing <code>.xdr</code> files.
<code>Lws% ftp &lt;RTSName&gt;</code>	Establishes an ftp connection to the RTS with the name <code>&lt;RTSName&gt;</code> .
<code>Name (&lt;RTSName&gt;:lws): super</code>	Log in as SUPER User on the RTS.
<code>Password: passme</code>	Entry of password for the SUPER User. Password entries are hidden.
<code>ftp&gt; cd :ad:work</code>	Switches to the <code>:ad:work</code> directory of the RTS.
<code>ftp&gt; pwd</code>	This command is used to check whether the switch to the OBB directory was successful.
<code>ftp&gt; ls -l</code>	Shows all the files in the selected directory.
<code>ftp&gt; bin</code>	Instruction to the ftp program to transfer the files in binary format.
<code>ftp&gt; prompt</code>	Instruction to the ftp program to copy the files without a prompt.
<code>ftp&gt; get pictures.xdr</code>	Copies all the <code>pictures.xdr</code> files from the RTS to the LWSPC.
<code>ftp&gt; bye</code>	Terminates the connection between RTS and LWSPC.

#### 11.2.3 Converting a container on the LWSPC

Once the file `pictures.xdr` has been transferred, it is located on the LWSPC in a temporary directory. To use the file on this and other LWSPCs, this system-independent data format must be converted to a UNIX format. As the transfer of the `.xdr` files and the conversion are closely related, it is assumed here that you did not log out in section 11.2.2.2 and that you are still logged in as `sds` user.

## PLS80E, process management level with RTS & LWSPC: startup, maintenance

### Mixed operation with OS and RTS/LWSPC

Prompt <code>command/input</code>	Description
<code>lws% konvertrnu kunde pictures -b</code>	<p>Starts the conversion in UNIX format.</p> <p><b>kunde</b> corresponds to the target directory <code>export/home/pls/obb/kunde</code></p> <p><b>-b</b> is only entered when the <i>old</i> containers will not be overwritten but renamed to <code>*.old</code>.</p>

The conversion is completed shortly after the LWSPC prompt (`lwsName%`) is shown. The LWSPC can now be started as a PLS80E workstation (see 4.2) and the container can be distributed to other LWSPCs (see 7.2.4.3). As only one container is being transferred, please make sure that the command `mget *.cnt` is replaced with `get pictures.cnt` in the command sequence.

### 11.3 Backup of object base on operator station

The object base for the first workstation of the operator station, i.e. the following description only applies for the LS120V and LS130, has a different data format to that of the LWSPC and, for this reason, this should also be saved on a tape streamer. This takes place via the tape streamer drive in the operator station. This backup is a part of the project similar to the backups carried out for the object base of the LWSPCs and the user data of the RTSs; they belong together and form *Siamese triplets!* The tape streamer should be labeled and the write protect deactivated before the data backup is carried out.

#### 11.3.1 Backup via the Dialogmenu in the Automation mode

Insert the backup tape streamer in the drive and start the backup.

Dialogmenu: `[Graphic data] [save (on Tape)]`

Click on the SET ALL button in the dialog box and acknowledge with Ack. Process control is not possible via this workstation during the backup. On completion of the backup, remove the tape streamer and activate the write protect.

**This data can now only be restored again in the Automation mode.**

#### 11.3.2 Backup at operating system level.

The operating mode Automation on the operator station must be exited (see 3.2). Insert the tape streamer in the drive and start the backup with the following command

```
backupobb
```

The backup is complete when the message `Backup completed` is shown on the screen. On completion of the backup, remove the tape streamer and activate the write protect. The operator station can be started again in the Automation mode.

**This data can now only be restored again at operating system level.**

## 11.4 Restoring the object base on the operator station

### 11.4.1 Restoring via the Dialogmenu in the Automation mode.

Insert the backup tape streamer in the drive and start the restoration process.

Dialogmenu:

[Graphic data] [restore (from Tape)]

**Read tape streamer data** will be displayed. All the containers that are found on the tape streamer will be selected and the Ack button will become available. Click on Ack to start restoring. Process control is not possible via this workstation during the restoration process. On completion of the backup, remove the tape streamer. The Automation mode must be exited and restarted so that the data of the object base that has just been restored can also be displayed on the OS.

### 11.4.2 Restoration at operating system level.

The operating mode Automation on the operator station must be exited (see 3.2). Insert the tape streamer in the drive and start the restoration process with the following command

```
- installobb
```

Restoration is complete when the message `Restore completed` is shown on the screen. The tape streamer can now be removed and the operator station restarted in the Automation mode.

## 11.5 Distributing the object base to other operator stations.

### 11.5.1 Restoring with a backup tape streamer.

Depending of the data backup method, the tape streamer will be restored in accordance with (11.4.1) or (11.4.2).

### 11.5.2 Restoring by import / export via the process management level LAN.

The procedures used here corresponds to the description under (7.1.3) with the following changes:

The term `graphic data` is used in the place of `database` or `configuration data`, `OS` (operator station) is used in the place of `RTS`, although an `OS` can also be an `RTS`. The import can only be carried out in the Automation mode and is started from (local) workstation no. 1.

## 12 External horn module for RTS/OS.

When events occur (system messages, process messages, recipe messages) an acoustic signal is activated by RTS/OS. Depending on the configuration, the signal transmitter is either the built-in loudspeaker (internal horn) in the RTS/OS or a series-interfaced horn module (external horn).

The external horn module is connected to the COM-2 interface via a serial interface cable. The maximum cable length is 15 m, the cable that is supplied has a standard length of 4 m. Greater distances can be realized if an interface converter (e.g. for optical waveguides) is used.

In addition, the external horn module requires a voltage supply of 12 VDC. This is included in the 8-channel version (adapter and 4 m-cable are supplied) or can be provided by the customer. A standard plug-in power supply unit is supplied with the 1-channel version.

### Important notes:

#### Message suppression (individual configuration for each RTS / OS)

Process messages from *suppressed* automation blocks are not signaled.

Recipe messages (INPUT, INOUT, INPROT, OUTPUT):

These control events are only recognized and signaled by an *active* recipe master; for this reason, the horn module must be connected to the recipe master.

For redundancy reasons, it is recommended that a second horn module be connected to the backup recipe master with parallel activation for the external signal transmitter.

#### Horn acknowledgement

If horn acknowledgement is actuated, all horn channels will return-to-normal. This also applies when another RTS / OS in the horn allocation is acknowledged.

#### Restoring user data:

When making a backup of the user data, the configuration data of the horn channels is also saved on the tape streamer. If this tape streamer is restored on an RTS/OS, the existing horn configuration data will be overwritten with the data on the tape streamer. In the case of redundant RTSS, this is the required behavior. If, however, the RTSS should have different horn settings (e.g. for different plant areas), this behavior should be taken into consideration!

### 12.1 8-channel horn module.

This module offers 8 floating relay contacts for the connection of signal transmitters. The voltage supply for these signal transmitters must be provided by the customer. The contact load capacity is: max. 30 volt, max. 1 amp. Max. make-brake capacity 30 watt, resistive load. When connecting inductive consumers, spark suppression must be provided by the customer.

When events occur, the RTS/OS activates each channel separately in accordance with the events that have been assigned. Signal transmitters can therefore be installed at different locations or signal transmitters with different tones / tone sequences can be used to differentiate between the respective events.

## PLS80E, process management level with RTS & LWSPC: startup, maintenance

External horn module for RTS/OS.

### 12.1.1 Configuring event assignment.

The configuration must be carried out in the semi-graphic mode via the menu in which the name is also configured (see 5.2.1). Press **-F4-** to select from one of two horn types.

An input mask is offered in which the possible events can be assigned to each of the 8 channels.

**Fault class**            Select Activation Yes / No for the horn channel

**Control:**                Select Activation Yes / No for the horn channel

**Messages:**            An additional filter function is provided for each message type. The filter is used to define the automation blocks from which the message should be signaled by the signal transmitter. This filter option can only be used if the applicable rules were adhered to when defining the names of the automation blocks.

The symbol ■ (wildcard) is entered with the function key **-F2-**.

**Note:** The external horn will not be activated if messages are *suppressed*.

#### Examples:

Channel 1 should only signal pre-alarms (message type = 3) from level functions and master alarms (message type = 4) from temperature controllers.

The configuration mask for HORN CHANNEL 1 is then as follows:

HORN CHANNEL 1	
Fail. class	01234
	00000
Sequence Control	
Input	0
Output	0
Messages	
Message type	Pattern
3	L■■■■■■■■■
4	TC■■■■■■■■■

Channel 2 should only signal bus faults (fault class = 0 and 3) and faults from the control cabinet (fault class = 2).

The configuration mask for HORN CHANNEL 2 is then as follows:

HORN CHANNEL 2	
Fail. class	01234
	<b>10110</b>
Sequence Control	
Input	0
Output	0
Messages	
Message type	Pattern

Channel 3 should signal all events. The configuration mask for HORN CHANNEL 3 is then as follows:

HORN CHANNEL 3	
Fail. class	01234
	<b>11111</b>
Sequence Control	
Input	1
Output	1
Messages	
Message type	Pattern
1	■■■■■■■■■■
2	■■■■■■■■■■
3	■■■■■■■■■■
4	■■■■■■■■■■

### 12.1.2 Connections, settings and signals of the horn module.

Terminal strips X1, X3 and X4:

**PLS80E, process management level with RTS & LWSPC: startup, maintenance**

External horn module for RTS/OS.

The plug-in connector with screw terminal is included in the scope of delivery; the connector assignment diagram is printed on the horn module. The function of the piezo buzzer (option) that can be connected at X1 is described below.

This piezo buzzer does not require an additional voltage supply. If a buzzer with three connections is used (continuous tone/intermittent tone), the connection for continuous tone should be used.

**Socket X2:**

The supplied serial interface cable (4 m) is connected here.

**Switch ALARM 1-8:**

When switched ON, all channels are active and can be activated by the RTS/OS. When switched OFF, all channels are deactivated; the contacts are always open.

**Switch: WD (watchdog):**

The horn module has self-monitoring capability. In the event of a fault, the watchdog is released. When the switch is

- ON all relay contacts will be closed (= all signal transmitters are active) and then the switch is
- OFF all relay contacts will be opened

**Switch: ALARM 7 and ALARM 8:**

ALARM 7	ALARM 8	Function:
EXT	EXT	The relays of channels 7 and 8 will be activated by the RTS / OS.
INT	EXT	Piezo buzzer generates an intermittent tone (relays 7+8 deactivated)
EXT	INT	Piezo buzzer generates a continuous tone (relays 7+8 deactivated)
INT	INT	Piezo buzzer generates a double tone (relays 7+8 deactivated)

**LED (red): ALARM OFF:**

Lights when switch "ALARM 1-8" is OFF.

**LED (green): 5 V:**

Lights when voltage supply is available.

**LED (green): WD:**

Lights when horn module is functional and watchdog is not released.

**LED (red): TEST:**

1. Blinks after receipt of a telegram from RTS / OS (as long as WD is good).
2. An error code is output by way of a blink sequence when WD is released. Here, the LED lights for 2 seconds and this is followed by a number of pulses each of which last 0.5 seconds.

1 pulse	error sending a telegram
2 pulses	error receiving a telegram

## PLS80E, process management level with RTS & LWSPC: startup, maintenance

External horn module for RTS/OS.

3 pulses	RAM error
4 pulses	watchdog error in phase 1 of the WD test
5 pulses	watchdog error in phase 2 of the WD test
6 pulses	watchdog error in phase 3 of the WD test
7 pulses	error when switching between C7 and C8, when both channels are set to INT.

### 12.2 1-channel horn module.

This module has a piezo buzzer and a relay with a floating contact for the connection of signal transmitters. The voltage supply for this signal transmitter must be provided by the customer.

The contact load capacity is: max. 30 volt, max. 1 amp. Max. make-brake capacity 30 watt, **resistive** load. When connecting inductive consumers, spark suppression must be provided by the customer.

The RTS/OS activates the horn module when configured events occur. Depending on the arrangement of the plug-in jumpers on the module, the buzzer, the relay or both will be activated.

Hence, the horn modules that are connected to the various RTSs can have different configurations or the signal transmitter can be installed at a different location (e.g. when the RTS and LWSPC are set up in different rooms/buildings).

The horn module comes with a mounting frame so that it can be built into the surface of a table or desk.

#### 12.2.1 Configuring event assignment.

Events are assigned, similar to the 8-channel module, in the Configuration mode (see [12.1.1](#)) but, in this case, **only horn channel 1 is configured**.

The description of the 8-channel module also applies for the 1-channel module. This also includes the examples quoted above.

When using a 1-channel horn module **all** events should be configured (example 3 in [12.1.1](#)), otherwise alarms that may occur will not be signaled acoustically.

#### 12.2.2 Connections, settings and signals of the horn module.

##### Connecting cable for buzzer:

These cables are not connected on delivery. Prior to commissioning, they must be connected as follows:

blue to port 2 of buzzer

red to port 1 (intermittent tone) or port 3 (continuous tone).

##### Socket D-Sub 9-pole:

The supplied serial interface cable is connected here.

##### Screw terminals:

**PLS80E, process management level with RTS & LWSPC: startup, maintenance**External horn module for RTS/OS.

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Relay contact; 1 = make, 2 = root, 3 = brake.

**Circular socket:**

The plug-in power supply unit is connected here.

**Plug-in jumpers: S1 and S2, indication via LED:**

S1	S2	Function:	LED indication
open	open	Buzzer and relay will be activated	off
jumpered	open	Only buzzer will be activated	red
open	jumpered	Only relay will be activated	green
jumpered	jumpered	No signal transmission	orange

### 13 Revision directory

Version	Modification date	Name	Modification
1.0 – 3.0			Original version without revision directory.
4.0		Gubbels	Accommodation of different hardware (Texas-Micro, DELL) and various adjustments.
4.1	25.11.04	Ruhm	Various adjustments and additions.
5.0		Ruhm	Complete revision. Texts taken from Version 4.1 and supplemented or revised. Directly became 5.1 without publication.
5.1	March 2005	Ruhm	Introduction of photos and graphics. Was not published.
5.11	April 2005	Ruhm	Spell-check and format changes.
5.12	August 2005	Ruhm	Page 21 Description of database import procedure modified
	November 2005	Ruhm	All Versions before 5.12 only available in German. Table of content moved to page 3. Final Version english

## 14 Appendix A

### 14.1 Different Solaris versions



Figure 13

Two different SOLARIS versions are currently in use, Version 2.5.1 and Version 8.

Version 2.5.1 reports with the text `<Name> console login` immediately after starting.

The `<name>` of the LWSPC is indicated in Figure 13, e.g. lws191.



Figure 14

Version 8 displays a full-graphic dialog box which greets you with the name of the LWSPC and prompts you to enter a user name. The name of the LWSPC, e.g. lws4-2, is in Figure 14.

### 14.1.1 Differences when logging in

Irrespective of whether you are using Solaris 2.5.1 or Solaris 8, the root user has all access rights and can destroy the software installation on the LWSPC by making incorrect entries!

#### 14.1.1.1 Solaris 2.5.1

##### 14.1.1.1.1 Logging in as root user

Once you have entered the login name `root` you will be prompted to enter a password. The standard password for the root user on PLS80E is `passme`. After a few short monitor outputs, the computer will indicate with the prompt `#` that you are now the root user.

The graphic interface can now be started with the command `/usr/openwin/bin/openwin` (see Figure on right)

##### 14.1.1.1.2 Logging in as sds-user

The login procedure only differs with regard to the name and password. Instead of `root` you enter `sds` and the password is `sos`. The graphic interface will start automatically when the password is entered.

##### 14.1.1.1.3 Logging in as PLS80E operator

Once again, the name and the password are different when logging in as a PLS80E operator. Enter the name `lws` and confirm the password query with `<Return>` (no password). After confirmation, the LWSPC starts with the PLS80E user interface.

#### 14.1.1.2 Solaris 8

Under Solaris 8, the full-graphic dialog box (Figure 14) is always used when logging in.

##### 14.1.1.2.1 Logging in as root user

Name and password as under Solaris 2.5.1. (14.1.1.1.1) Under Solaris 8, the full-graphic interface also starts automatically after logging in as root user.

##### 14.1.1.2.2 Logging in as sds user

Name and password as under Solaris 2.5.1 (14.1.1.2). The graphic interface also starts automatically.



Figure 15

### 14.1.1.2.3 Logging in as PLS80E operator

Name and password as under Solaris 2.5.1 (14.1.1.1.3). The LWSPC also starts automatically as PLS80E operator station.

### 14.1.1.3 The relevant windows in the graphic interface of Solaris

The graphic interface of Solaris used under PLS80E is nearly identical for Solaris 2.5.1 and Solaris 8. Figure 16 shows three of the windows that are most frequently used when working on the LWSPC.

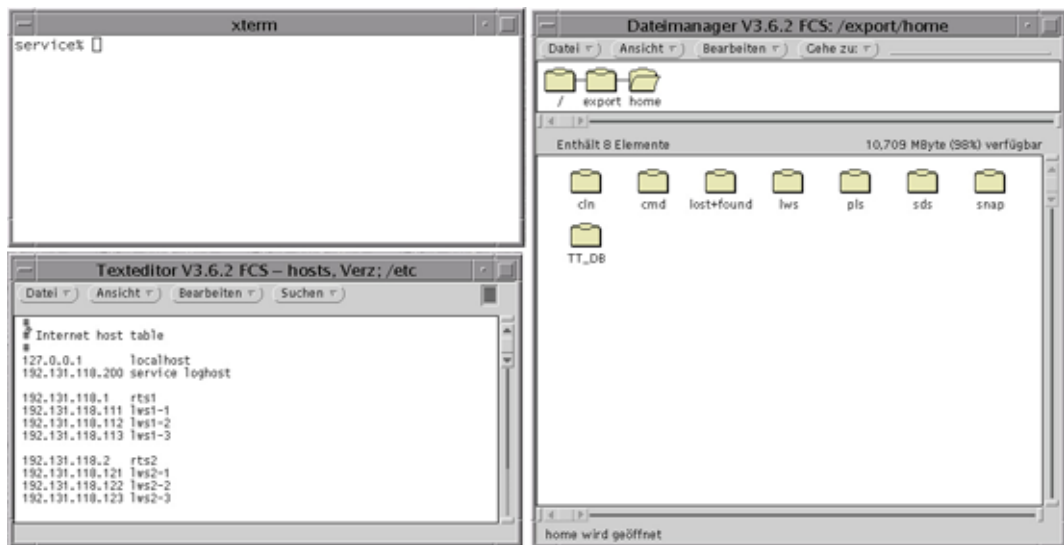


Figure 16

#### **xterm**

#### xTerminal

All command entries are made in this window, e.g. for ftp transfer.

#### **Text editor**

The text editor is used to edit files such as `/etc/hosts` (shown in photo) and `/export/home/lws/startlws`.

#### **File manager**

Directories and files can be selected and/or opened in the file manager, similar to Windows.

## 14.2 Opening and editing files under Solaris

There are files on the LWSPC which may have to be edited depending on the circumstances. The easiest way of editing a file is as follows.

- Depending on the file that is to be edited, log in as `sds` user or `root` user. All descriptions in this document relating to the procedure for editing files also state how you should log in.

- In the file manager, follow the path to the required file, i.e. open the folders that lead to the required file, e.g. /etc.
- Using the mouse, mark the file that is to be edited, e.g. `hosts` in the file manager.
- In the file manager, select `[File]` `[Open in Editor]` with the left mouse button.
- The marked file, e.g. `hosts` will now be opened in a new window that also indicates the content of the file. The `#` symbol denotes a comment
- Once all the required changes have been made, save the file by selecting `[File]` `[save]` with the left mouse button in the editor window.
- The editor can now be closed.

### 14.3 Return to login

If you wish to start the LWSPC as a PLS80E operator station on completion of your tasks, it will be necessary to return to the login.

To return to the login, click on the display background with the right mouse button (keep mouse button pressed) and select `[System verlassen]` / `[Exit Session]`. Depending on the Solaris version, the semi-graphic login prompt (Figure 13) or the login dialog box (Figure 14) will be displayed.

### 14.4 Logging in and out of RTS



Some actions on the RTS can only be carried out when logged in as SUPER User. To log in as SUPER User, proceed as follows.

- Enter `super` at the RMX prompt
- Enter the password `passme`
- The system reports as `SUPER`.
- On completion of all tasks as SUPER User, you must log

out again with the command `exit`.

### 14.5 Different hardware and different versions of the RMX operating system

Since PLS80E came on the market, there have been various changes to the hardware and the RMX operating system. Due to these differences in the hardware and software, some of the procedures described in this document require varying descriptions. These differences mainly centre on the direction in which data can be copied between the RTS and the LWSPC. As these differences only occur from RMX Release RMX3, Revision 2.3, the descriptions of RMX versions differ.

- All versions leading up to (<) RMX3, Revision 2.3
  - The data must be transferred/copied via ftp from the RTS to/from the LWSPC (`put`, `mput`, `get`, `mget`).
- (>=) RMX3, Revision 2.3 or higher

- The data must be transferred/copied via ftp from the LWSPC to/from the RTS (`put`, `mput`, `get`, `mget`).

A direct coherence exists between the hardware and the RMX operating system, particularly when using older or the latest hardware. In between, there is, however, hardware where this coherence is not always very clear. In the hardware list, the corresponding standard operating system version is stated for each hardware, but deviations are possible.

The command `sysinfo` allows you to identify which operating system has been installed. Once this command has been executed, various data will be displayed on the RTS monitor including details relating to the installed operating system version. If an error message is generated when the command is entered, the installed operating system can only be <RMX3, Revision 2.3 as the `sysinfo` command is not available in earlier RMX versions.



Figure 17 shows the monitor output of the latest RMX release after entry of the command `sysinfo`. The operating system is indicated in line 9, here Release 2.3. The last line provides additional information on the release, namely that Update 3 has also been installed.

Figure 17

## 14.6 PLS80E process management level hardware

The following list provides an overview of the various hardware that has been used for the PLS80E process management level. This overview is, however, not totally complete.



The Intel System120 was the first hardware used for PLS80E operator stations. At that time the semi-graphic mode was used exclusively. On the left, you can see the model with an Intel 386/25MHz processor. There was one earlier model which, although it looked very similar, was only equipped with a 16MHz processor without a coprocessor. Unfortunately, no photos of the 16 MHz model are available.

**Standard operating system:**

**RMX2**



These were succeeded by the Intel XSeries with various processors, the fastest of which was the Pentium 90. This computer was available as a tower or 19" built-in device.

**Standard operating system:**

**RMX2**





This was replaced by the TexasMicro computer of which there were two versions. The older version, with a practical frame size for service applications, is shown on the top left. This model is characterized by the cover which extends over the entire width of the device. The later model came with a modified housing which, unfortunately, was not quite so practical for service applications. The processor board was always equipped with an Intel 200MHz processor.

In the event of the processor board becoming defect in this computer, the Intel 200MHz board can, depending on the operating system installed, be replaced with a 1.7GHz Intel Celeron board.

Here, the standard RMX operating system was/is

**standard operating system:**

**RMX3, Version 2.2**

The operating system

**RMX3, Version 2.3 (Update 3)**

can also be installed on this computer:



The TexasMicro PC was succeeded by a Dell computer. On the left, you can see just two of many Dell models used. The large model number is attributable to the fact that Dell always sells the latest hardware in a new housing. Dell does, however, use unique type designations and hence, we can now provide a list of the Dell computers that have been used for the PLS80E:

- GX1
- GX110
- GX150
- GX260
- GX270

As can be assumed from the above, the various models are also equipped with different processors.

The earliest RMX operating system used in Dell computers is

#### **RMX3, Version 2.3**

The

#### **RMX3, Version 2.3 Update 3**

was introduced early in 2004.





Since mid-2004, the Dell computers no longer support ISA slots. For this reason, a new computer type had to be introduced for the PLS80E operator stations LS120V and LS130. This computer type was, similar to the TexasMicro computer, named after the manufacturer – Spectra.

The decision to move to Spectra turned out to be a very wise decision as from the end of 2004, Dell only supplied computers with connections for a USB keyboard and mouse and a serial interface was no longer integrated. Unfortunately, the USB keyboard and mouse are not at all supported by RMX and only partially supported by Solaris 8, i.e. massive problems occur when a USB keyboard **and** mouse are used together.

As can be seen on the left, these computers are also available as a tower or 19" built-in device.

The Spectra computers are equipped with an Intel Celeron 1.7 GHz processor.

The installed RMX operating system are identical to those installed in Dell computers:

The earliest RMX system used is

**RMX3, Version 2.3**

and

**RMX3, Version 2.3 Update 3**

was introduced from early 2004.

## 14.7 General and PLS80E-specific abbreviations

AM	<b>A</b> utomation <b>M</b> aster Only relevant for the client-server variant. The AM takes over the distribution of parameter changes, e.g. limit values, to all AS.
ANW	<b>ANW</b> enderdaten (Engl: user data) The project-specific configuration information. This data can be backed up on a tape streamer.
AS	<b>A</b> utomation <b>S</b> lave Receives all parameter changes from the AM and imports these changes into its local database (user data).
ftp	<b>F</b> ile <b>T</b> ransfer <b>P</b> rogram A computer program that can transfer data between different computers independent of PLS80E.
LS120V	<b>L</b> eit <b>S</b> tation <b>120V</b> a PLS80E operator station with integrated IGC graphic board that offers a resolution of 1024 x 768 pixels and 16 colours
LS130	<b>L</b> eit <b>S</b> tation <b>130</b> a PLS80E operator station with integrated IGC graphic board that offers a resolution of 1280 x 960 pixels and 256 colours.
LWSPC	<b>L</b> eit <b>W</b> ork <b>S</b> tation on <b>PC</b> Basis A PLSE operator station that receives data from an RTS. Only static process displays are saved locally.
OBB	<b>OB</b> ject <b>B</b> ase A number of files (.cnt) in which the entire full-graphic interface, including graphic displays, is saved.
PM LAN	<b>P</b> rocess <b>M</b> anagement level <b>LAN</b> (standard TCP/IP LAN) The PM LAN connects all of the relevant process management level components so that these can communicate with each other.
RM	<b>R</b> ecipe <b>M</b> aster Freely definable (through configuration) RTS that manages all recipe-relevant functions in the recipe mode.
RTS	<b>R</b> ea <b>T</b> ime <b>S</b> erver Provides the LWSPC with all the typical PLS80E functions and the database (user data) that was configured specifically for the project
SRM	<b>S</b> ubstitute <b>R</b> ecipe <b>M</b> aster Freely definable (through configuration) RTS that automatically takes over the functions of the RM when this is no longer available (defect or in ConfigMode)

## 14.8 List of selected RMX commands

An alias is a name for a predefined group of individual commands. When the alias name is entered as a command, the corresponding individual commands will be executed in succession.

Command/input	Description
<b>a</b>	Shows a list of all alias names.
<b>adfloppy</b>	Floppy disk drive enabled as :a:
<b>adtape</b>	Tape streamer drive enabled as :t:
<b>ls120, ls120v, ls130</b>	Starts the semi-graphic Configuration mode, the full-graphic mode 1024x768 and the full-graphic mode 1280x960 in the defined order. Depending on how the RTS is installed, the last two commands also start.
<b>savedump</b>	Automatically saves all the relevant data of a system dump. Expects disk.
<b>af :sd:</b>	Switches to system's hard disk.
<b>af :ad:</b>	Switches to user's hard disk.
<b>af :ad:mls/anw</b>	Switches to a specific directory.
<b>af ^</b>	Switches to the next higher directory.
<b>dd :a:</b>	Disables the floppy disk drive.
<b>dd :t:</b>	Disables the tape streamer drive.
<b>ls</b>	Shows the files of the current directory level.
<b>ls l</b>	Shows files of the current directory level in long format.
<b>ls l i</b>	Also shows hidden files in RMX versions < 2.3, no longer necessary from version 2.3 upwards.
<b>skim /pfad/name</b>	Shows the content of the file <name>, only useful for text files.



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