Diagnostics Tool

Introduction

This chapter explains how to use the Controller Application, which is a PC-based tool that helps to troubleshoot and repair the printer.

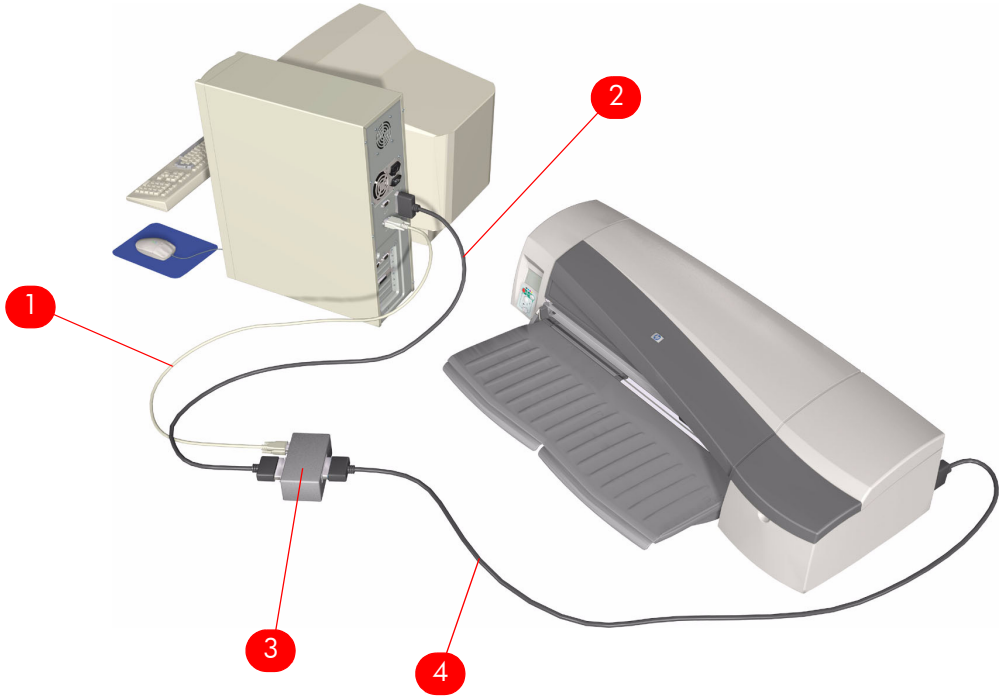
Diagnostics - Self Test

Initialization Sequences

Whenever the Printer is switched ON, it automatically performs a series of internal self tests and mechanical initialization sequences. If any of the parts fail, a system error will appear and you should consult the **System Error Codes** chapter.

Controller Application - Connection Instructions

In order to connect the computer to the printer, you will need a Serial to Parallel adapter, and you connect as shown in this illustration:



1 Serial Cable.

2 Centronics (parallel) Cable.

3 Parallel-Serial Adapter.

4 Centronics (parallel) Cable.

Controller Application - Explanation

The Controller Application consists of 5 different stations, each station serving a specific function:

1 **SE10** = Troubleshooting ⇒ Page *4-6*

The purpose of this station is to troubleshoot the different systems of the printer, which are:

- Paper-Axis (checks the skew and margins, Out-of-Paper Sensor and the Paper-Axis Accuracy).
- Scan-Axis (Checks the Scan-Axis Servo and the Scan-Axis length).
- Group Check-Axis (Checks certain systems of the Printer).
- Service Station (Checks the functionality of the Service Station).

2 **SE20** = Repair ⇒ Page *4-14*

The purpose of this station is to perform the Paper Advance Calibration after the printer has been repaired and, if necessary, upgrade the printer firmware.

3 **SE30** = Final Setup ⇒ Page *4-22*

The purpose of this station is to prepare the printer for the final setup.

4 **SE40** = Modular ⇒ Page *4-26*

The purpose of this station is to exercise all the printer subsystems in order to detect any problems.

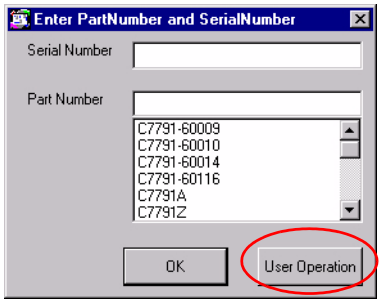
5 **SE50** = PRS Calibration ⇒ Page *4-31*

The purpose of this station is to adjust the PRS (pen-to-rib spacing).

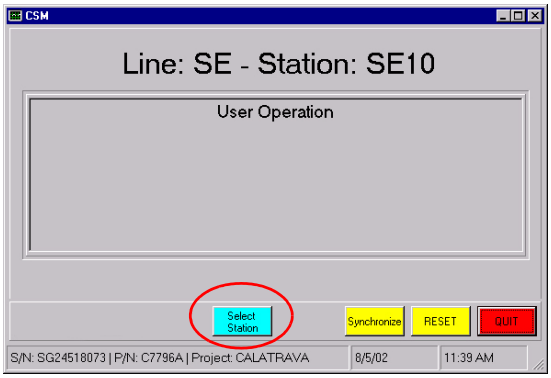
Controller Application - Using

1 Double-click on the **Calatrava topLine CSM** icon to start the application.

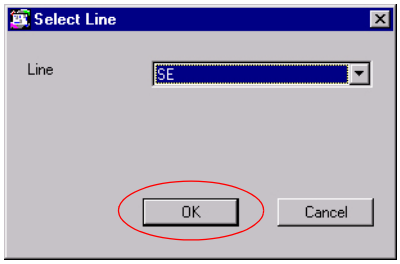
2 Click on **User Operation**.



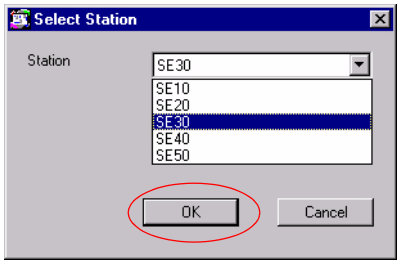
3 Click on **Select Station** in order to select the Line and Station.



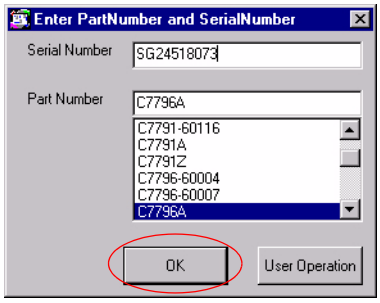
4 A box will appear prompting you to select the Line. Select **SE** and then click on OK.



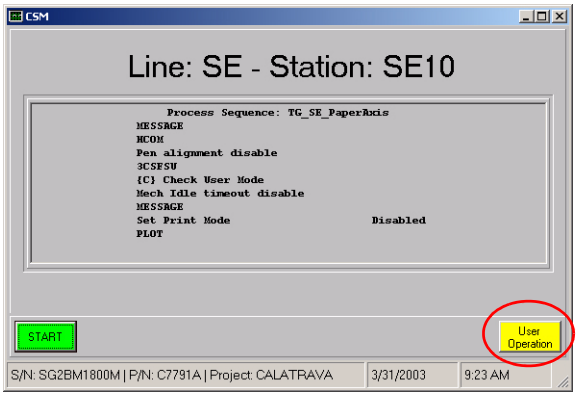
5 A box will appear prompting you to select the Station. Select the station that you require, either SE10, SE20, SE30, SE40 or SE50 and then click OK.



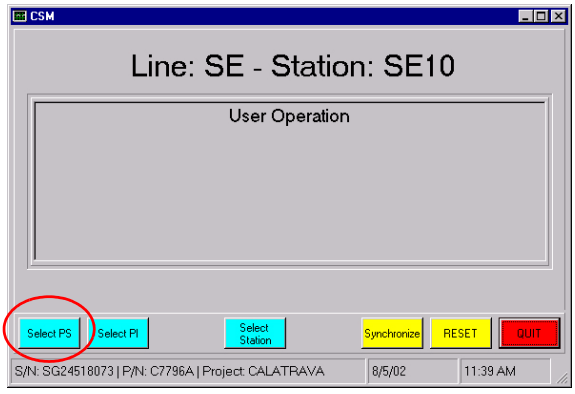
6 A box will appear prompting you to select the Printer Model and to type in the Printer Serial Number. Click **OK** when done.



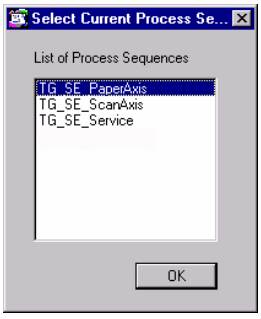
7 Once you are inside the Station that you require, click on **User Operation**.



8 Click on **Select PS** in order to select the Process Sequence.



9 Click on the Process Sequence you want to start and then click on **OK**.



STATION SE10 = Troubleshooting

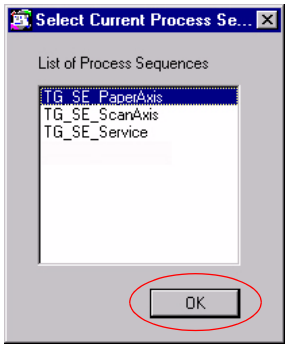
The purpose of this station is to troubleshoot the different systems of the printer, which are:

- **TG_SE_PaperAxis** (checks the skew and margins, Out-of-Paper Sensor and the Paper-Axis Accuracy).
- **TG_SE_ScanAxis** (Checks the Scan-Axis Servo and the Scan-Axis length).
- **TG_SE_GroupCheckAxis** (Checks certain systems of the Printer).
- **TG_SE_Service** (Checks the functionality of the Service Station).

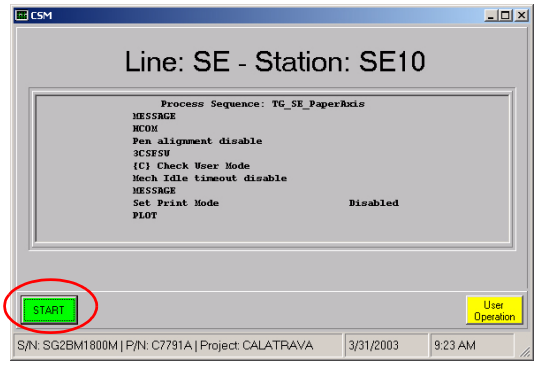
TG_SE_PaperAxis

Perform the Paper-Axis test as follows:

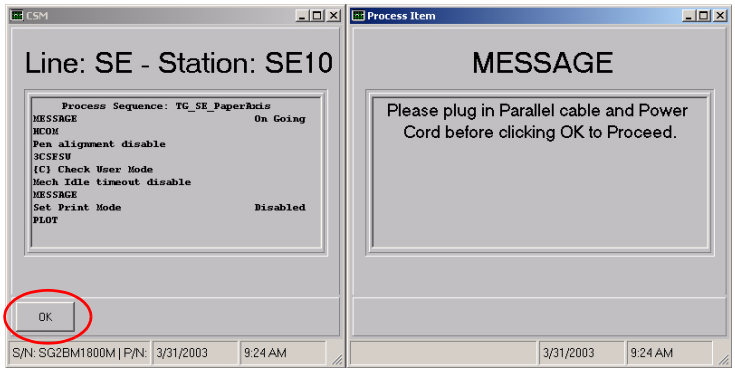
1 Switch to Station **SE10** and select Process Sequence **TG_SE_PaperAxis**.



2 To start the Paper-Axis test, click on **Start**.

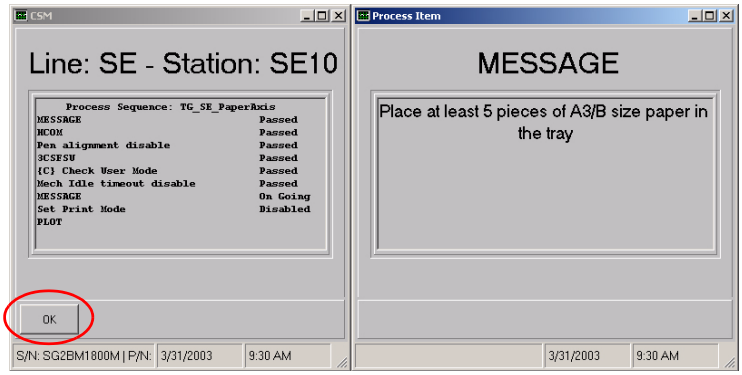


3 A message will appear requesting you to make sure that the computer is connected to the Printer via the parallel cable and that the Printer is switched On. Click on **OK** when done.

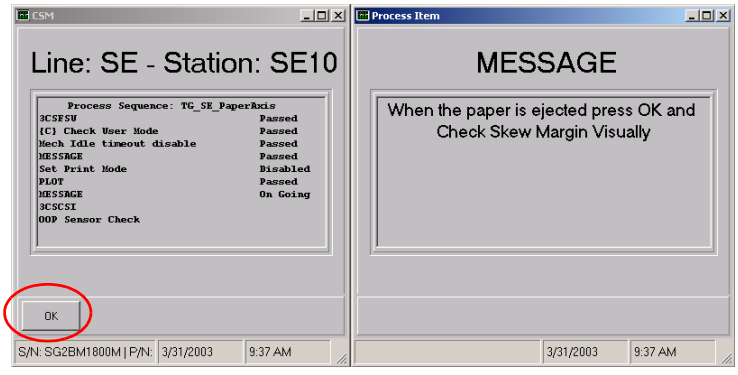


4 If the printer is in MFG mode, then you will have to manually switch Off the printer and then switch it On again in USER mode. Click on **OK** when done.

5 A message will appear requesting you to load at least 5 sheets of A3/B size media in to the input tray. Click on **OK** when done.



6 The printer will print the skew margin plot and the following message will appear. Once the plot has been completed check that the skew margin is correct and then click on **OK**.

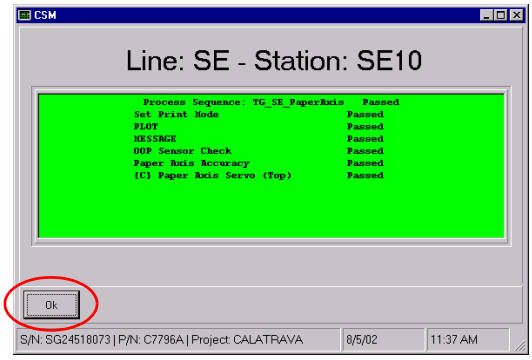


7 If you click on Ok before the skew margin plot has been completed, then the following message will appear. Wait until the plot has been printed before clicking on **OK**.

8 The Paper-Axis test will perform the following tests:

- Skew and Print Margins - The printer will print an A3/B size plot containing a cross in each corner of the page. You have to manually align the top left cross with the top right cross and the bottom left cross with the bottom right cross.
- Out-of-Paper Sensor - The printer checks if media can correctly pass through the Paper Path and whether media is detected correctly.
- Paper-Axis Accuracy - The printer calculates any positioning error in the Paper-Axis. This check requires media loaded in tray 1.

9 If the test is completed correctly, then the following message is displayed on the computer screen. Click on **OK**.



10 If during the Paper-Axis test an error message appears, refer to the following table in order to troubleshoot it:

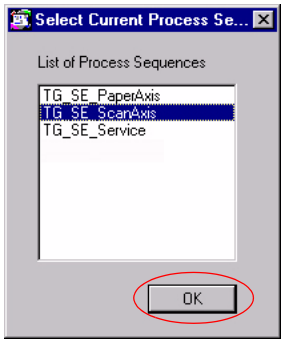
TG_SE_Paper-Axis			
Test name	**Error Message**		**Troubleshooting**
HCOM	NONE	CIMation failed to communicate with the Printer.	Repeat the test after checking that ALL the cables are correctly connected.
Check User Mode	Unit booted in 1 mode while expected 0	Printer initialized in a different mode than the expected.	Initialize the Printer in the correct mode (user) and click on "Retry".
PLOT	NONE	PC is unable to communicate to the Printer.	Check the connections in the Parallel (Centronics) cable
OOPS Sensor Check	NONE	Paper not present.	Insert paper in to the tray and click on "Retry".

TG_SE_Paper-Axis			
Test name	**Error Message**		**Troubleshooting**
Paper Axis Accuracy	Unable to initialize SubSystem	Printer is hanged.	Restart the Printer and click on "Retry".
Paper Axis Servo (Top)	1. ERROR_1: Max pre-picking PWM out of limits: 2. Max picking PWM out of limits: 3. Max pre-picking PWM out of limits:	Printer out of Spec.	Repeat the test one more time.

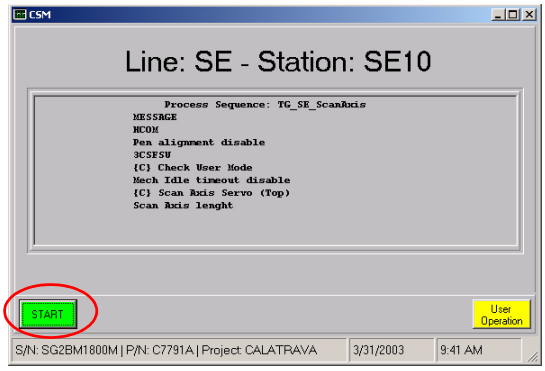
TG_SE_ScanAxis

Perform the Scan-Axis test as follows:

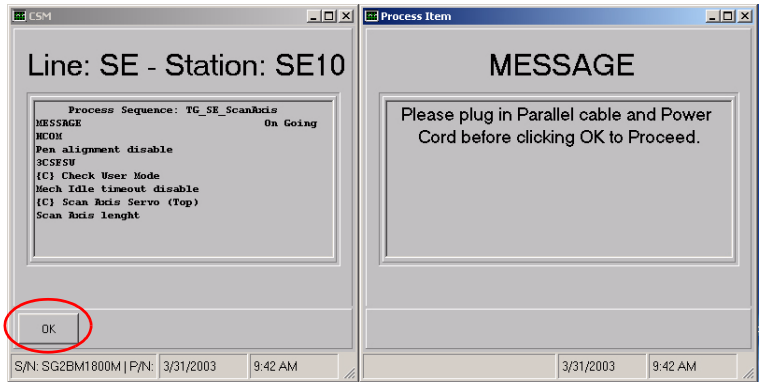
1 Switch to Station **SE10** and select Process Sequence **TG_SE_ScanAxis**.



2 To start the Scan-Axis test, click on **Start**.



3 A message will appear requesting you to make sure that the computer is connected to the Printer via the parallel cable and that the Printer is switched On. Click on **OK** when done.

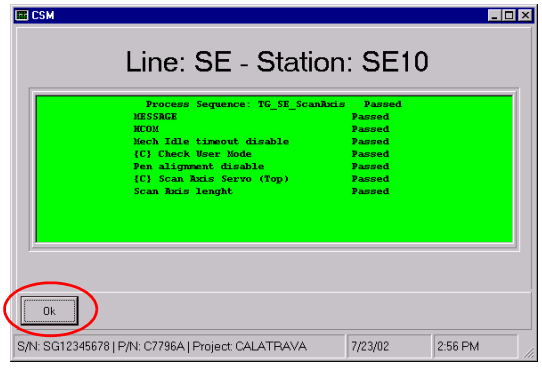


4 If the printer is in MFG mode, then you will have to manually switch Off the printer and then switch it On again in USER mode. Click on **OK** when done.

5 The Scan-Axis test will perform the following tests:

- Scan-Axis Servo - The printer checks the movement of the Carriage through the Scan-Axis at 4 different speeds.
- Scan-Axis Length - This checks the length of the printer to make sure it is correct.

6 If the test is completed correctly, then the following message is displayed on the computer screen. Click on **OK**.



7 If during the Scan-Axis test an error message appears, refer to the following table in order to troubleshoot it:

TG_SE_Scan-Axis			
Test name	**Error Message**		**Troubleshooting**
HCOM	NONE	CIMation failed to communicate with the Printer.	Repeat the test after checking that ALL the cables are correctly connected.
Check User Mode	Unit booted in 1 mode while expected 0	Printer initialized in a different mode than the expected.	Initialize the Printer in the correct mode (user) and click on "Retry".
Scan Axis Servo (Top)	1. in average PWM at speed direction: 2. in maximum PWM at speed direction: 3. in stab. position at speed direction: 4. in stop position at speed direction:	Printer out of Spec.	Repeat the test one more time.
Scan Axis Length	1. Scan Axis Length out of limits:	Printer out of Spec.	Repeat the test one more time.

TG_SE_GroupCheckAxis

The Group Check Axis test will do the following:

- Check the Firmware version of the Printer.
- Check the functionality of the Front Panel.
- Check the functionality of the Main Door Sensor.
- Check the functionality of the Media Handler.
- Check if Paper Advance Calibration has been performed.
- Check if Color Calibration has been performed.
- Check if the Rollfeed Module is installed.
- Perform a backup of the Carriage EEROM.

Perform the Group Check Axis test as follows:

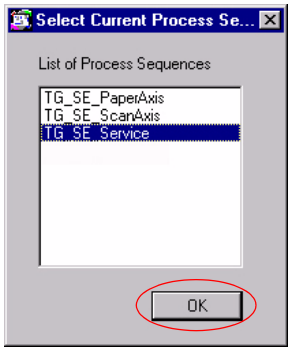
1 Switch to Station **SE10** and select Process Sequence **TG_SE_GroupCheckAxis.**

2 To begin the test, click on **start**.

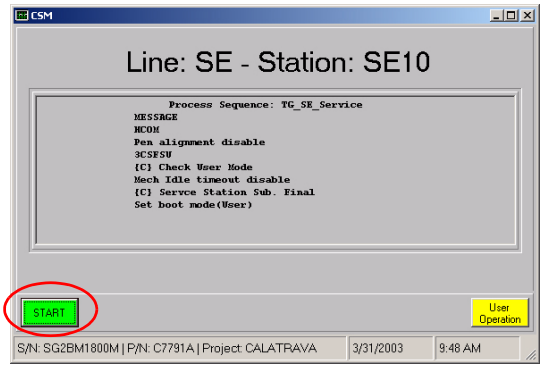
TG_SE_Service

Perform the Service test as follows:

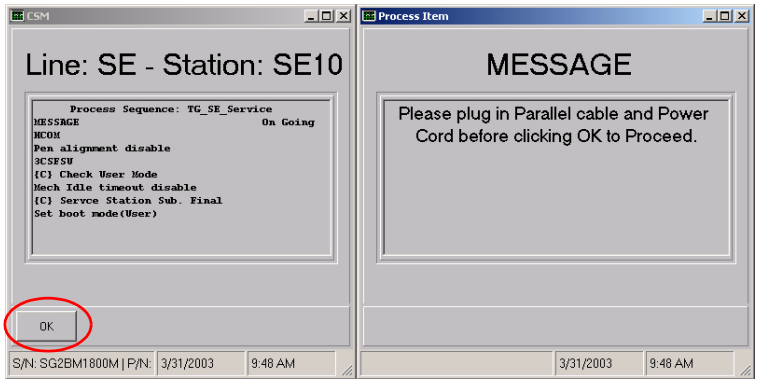
1 Switch to Station **SE10** and select Process Sequence **TG_SE_Service**.



2 To start the Service test, click on **Start**.



3 A message will appear requesting you to make sure that the computer is connected to the Printer via the parallel cable and that the Printer is switched On. Click on **OK** when done.

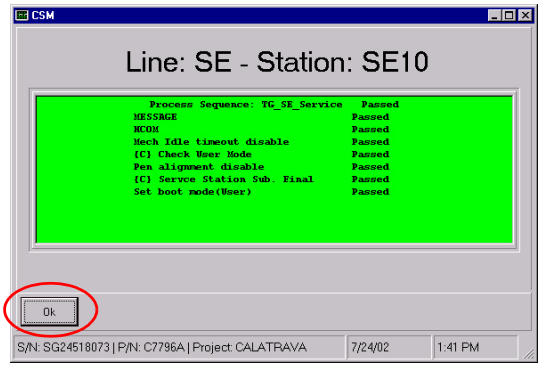


4 If the printer is in MFG mode, then you will have to manually switch Off the printer and then switch it On again in USER mode. Click on **OK** when done.

5 The Service test will perform the following test:

- Service Station - The printer moves the Service Station to obtain the necessary values (maximum and minimum) and checks that these values are within the specifications.

6 If the test is completed correctly, then the following message is displayed on the computer screen. Click on **OK**.



7 If during the Service test an error message appears, refer to the following table in order to troubleshoot it:

TG_SE_Service			
Test name	**Error Message**		**Troubleshooting**
HCOM	NONE	CIMation failed to communicate with the Printer.	Repeat the test after checking that ALL the cables are correctly connected.
Check User Mode	Unit booted in 1 mode while expected 0	Printer initialized in a different mode than the expected.	Initialize the Printer in the correct mode (user) and click on "Retry".
Service Station Sub. Final (Top)	1. PWM average over limits! 2. PWM max. over limits!	Service Station out of Spec.	Repeat the test one more time.

STATION SE20 = Repair

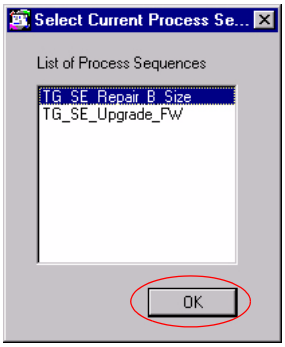
The purpose of this station is to perform the following Process Sequences:

- **TG_SE_Repair_B_Size** (perform the Paper Advance Calibration after the printer has been repaired).
- **TG_SE_Upgrade_FW** (upgrades the firmware version of the printer).

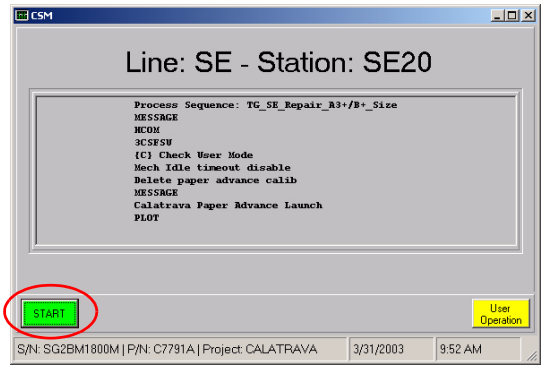
TG_SE_Repair_B_Size

Perform the Paper Advance Calibration as follows:

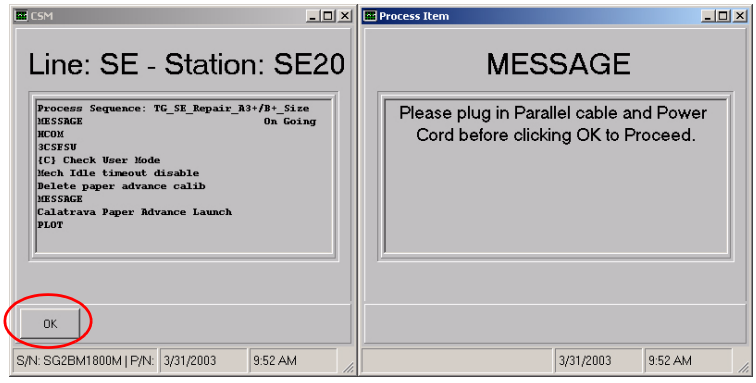
1 Switch to Station **SE20** and select Process Sequence **TG_SE_Repair_B_Size**.



2 To start the Paper Advance Calibration, click on **Start**.

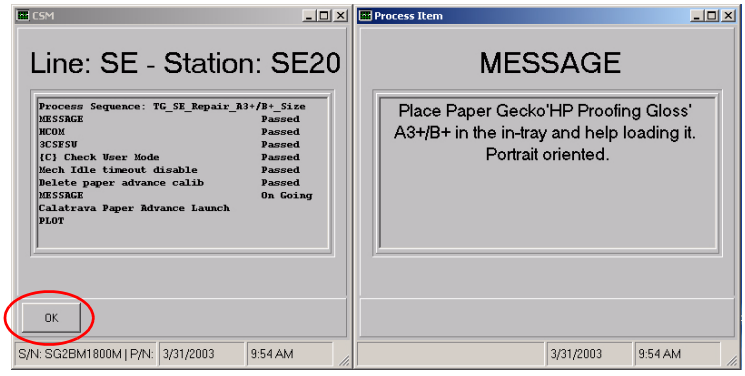


3 A message will appear requesting you to make sure that the computer is connected to the Printer via the parallel cable and that the Printer is switched On. Click on **OK** when done.

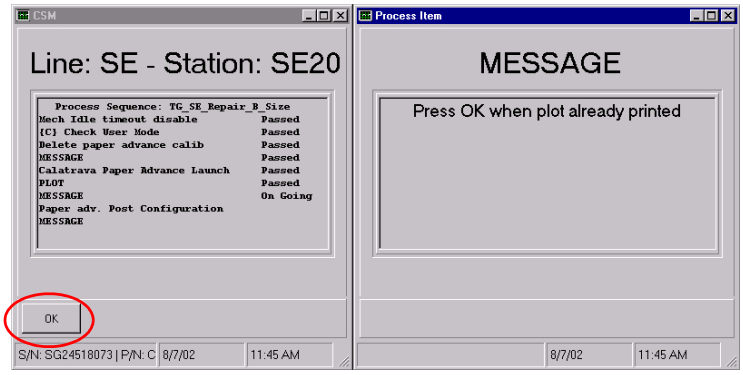


4 If the printer is in MFG mode, then you will have to manually switch Off the printer and then switch it On again in USER mode. Click on **OK** when done.

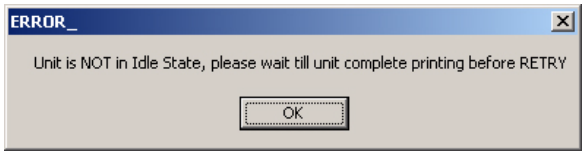
5 A message will appear requesting you to load a sheet of A3/B size media (HP Proofing Gloss) in to the input tray. Click on **OK** when done.



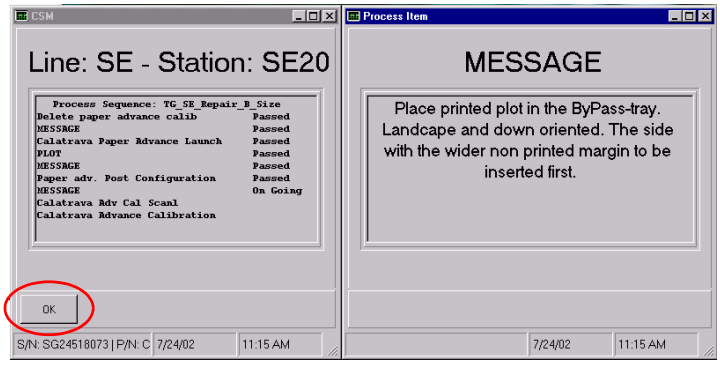
6 This message will appear, click on **OK** once the Advance Calibration plot has been completed.



7 If you click on Ok before the Advance Calibration plot has been completed, then the following message will appear. Wait until the plot has been printed before clicking on **OK**.



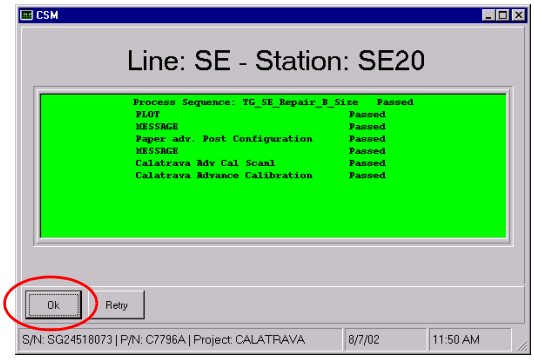
8 Once the Advance Calibration plot has been completed, place the plot in to the input tray as explained on the screen message. Click on **OK** when done.



9 This Process Sequence will perform the Paper Advance Calibration in the following order:

- Delete Paper Advance Calibration - The printer deletes the old paper Advance Calibration values and activates the media loading process.
- Paper Advance Launch - The printer begins the Paper Advance calibration.
- Media Advance Calibration Plot - The printer prints the Paper Advance plot.
- Paper Advance Post Configuration - The printer activates the picking mechanism so that the Paper Advance plot that was created can be reloaded into the printer.
- Paper Advance Calibration Scan - The printer scans the Paper Advance plot in order to perform the calibration.
- Paper Advance Calibration - Once the calibration is finished, the printer checks that the values are within the specifications.

10 If the test is completed correctly, then the following message is displayed on the computer screen. Click on **OK**.



11 If during the Repair test an error message appears, refer to the following table in order to troubleshoot it:

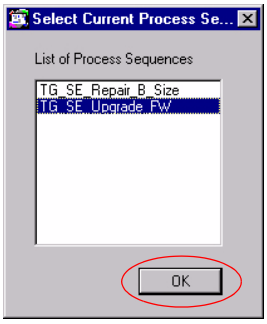
TG_SE_Repair_A3+/B+_Size			
Test name	**Error Message**		**Troubleshooting**
HCOM	NONE	CIMation failed to communicate with the Printer.	Repeat the test after checking that ALL the cables are correctly connected.
Check User Mode	Unit booted in 1 mode while expected 0	Printer initialized in a different mode than the expected.	Initialize the Printer in the correct mode (user) and click on "Retry".
Calatrava Paper Advance Launch	1. Unable to find zero paper.	The motor encoder cannot reach the zero position.	Click on "Retry". If it still fails, initialize the printer and repeat the entire test.
	2. Unable to enable/ disable picking.	Uncertain.	Click on "Retry". If it still fails, initialize the printer and repeat the entire test.
PLOT	NONE	PC is unable to communicate to the Printer.	Check the connections in the Parallel cable.
Calatrava Adv. Cal. Scan	1. Can't fit valleys.	■ Bad printed plot. ■ Plot mispositioned while scanning. ■ Problems in the line sensor/electronics.	■ Repeat the entire test. ■ Repair electronic problem.
	2. Firmware tcl function paxEject.	Problems while ejecting the paper. Printer problem.	Repeat the entire test by switching OFF and ON the printer.
	3. Firmware tcl function lscontrolLeds	Unable to switch off the line sensor Leds. Printer problem.	Repeat the entire test by switching OFF and ON the printer.

TG_SE_Repair_A3+/B+_Size			
Test name	**Error Message**		**Troubleshooting**
Calatrava Advance Calibration	1. Can't open plotter communication. Problems communicating with the unit. Problems storing advance calibration on the unit.	Communication problem between the PC and the printer.	Check connections and/or cables. Retry the test.
	2. Data from the log file erroneous.	File generated by previous test TCL_CPCG contains corrupted or incorrect data.	Repeat the entire test by switching OFF and ON the printer.
	3. Average Step Error out of limits! Stdev Step Error out of limits! Maximum Step Error out of limits! Error in Paper Advance fitting. Calibration Correlation below Limit.	Printer out of specs.	Repeat the entire test one more time.

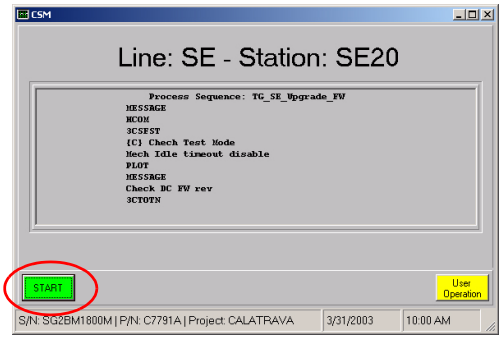
TG_SE_Upgrade_FW

Upgrade the firmware version of the Printer as follows:

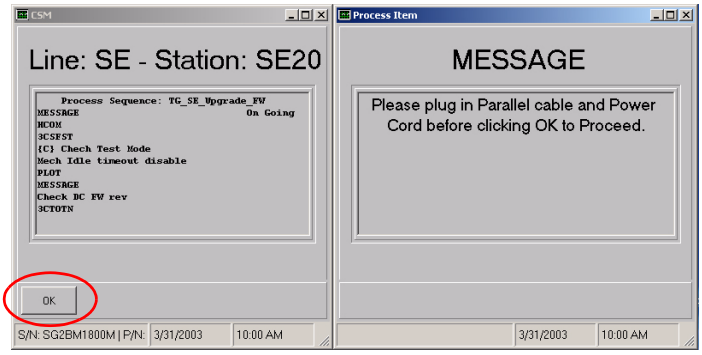
1 Switch to Station **SE20** and select Process Sequence **TG_SE_Upgrade_FW**.



2 To start the firmware upgrade, click on Start.

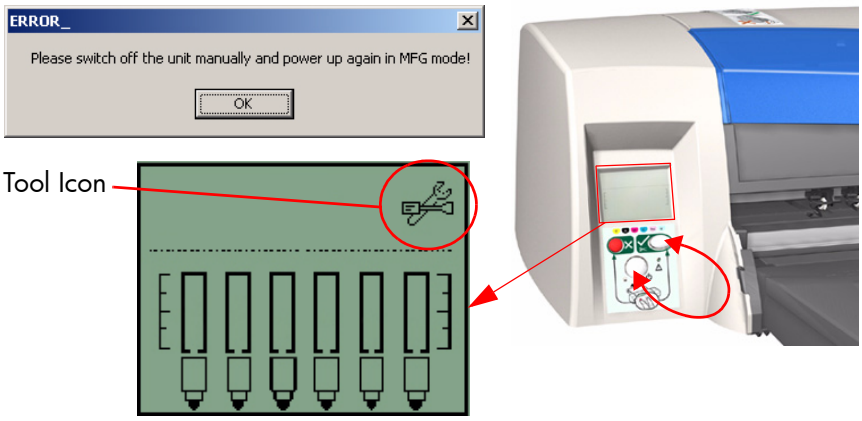


3 A message appears requesting you to make sure that the computer is connected to the Printer via the parallel cable and is switched ON in **MFG mode**. Click on **OK** when done.

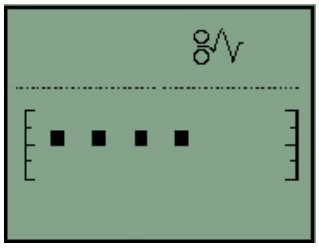


4 If the printer is in USER mode, then you will have to manually switch Off the printer and then switch it On again in MFG mode. To do this, while the printer is switched OFF, press both the **resume** and **power** buttons

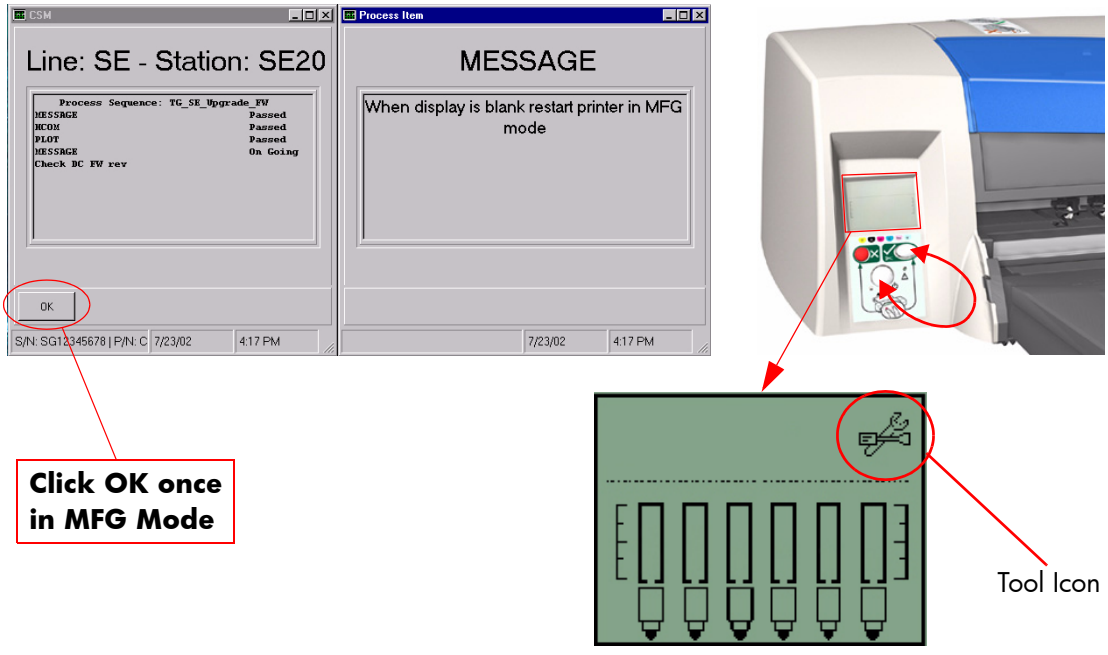
together until the Tool icon appears on the front panel. Click on **OK** when done.



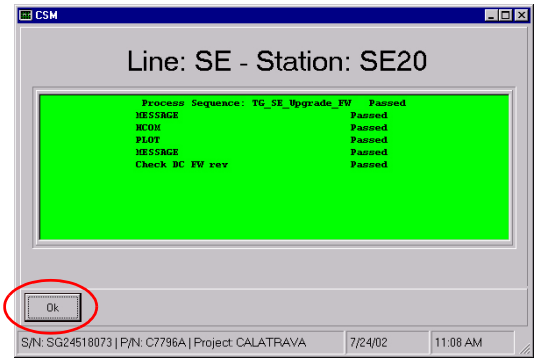
5 The firmware upgrade process will start and the Printer's front panel will show the progress (as shown below).



6 Once the printer's front panel display goes blank, restart the printer in **MFG mode**. To do this, while the printer is switched OFF, press both the **resume** and **power** buttons together until the Tool icon appears on the front panel. Click on **OK** once the printer is in **MFG mode**.



7 If the firmware is upgraded successfully, then the following message is displayed on the computer screen. Click on **OK**.



8 Make sure you switch OFF the printer after completing this Process Sequence.

9 If during the Firmware Upgrade an error message appears, refer to the following table in order to troubleshoot it:

TG_SE_Upgrade_FW			
Test name	**Error Message**		**Troubleshooting**
HCOM	NONE	CIMation failed to communicate with the Printer.	Repeat the test after checking that ALL the cables are correctly connected.
Check User Mode	Unit booted in 0 mode while expected 1	Printer initialized in a different mode than the expected.	Initialize the Printer in the correct mode (MFG) and click on "Retry".
PLOT	NONE	PC is unable to communicate to the Printer.	Check the connections in the Parallel cable.
Check DC FW Rev	None	The Firmware of the printer is not the one that should be, the Firmware Upgrade has not been performed correctly.	Repeat the Test Group.

STATION SE30 = Final Setup

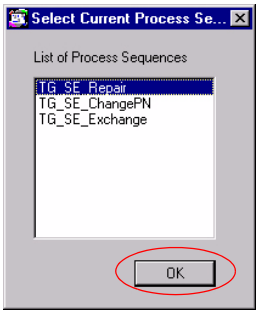
The purpose of this station is to prepare the printer for the final setup.

Process Sequence TG_SE_Repair should ONLY be performed when the printer is to be repaired and returned to the customer. Process Sequence TG_SE_Exchange should ONLY be performed when the printer is to be repaired and then exchanged.

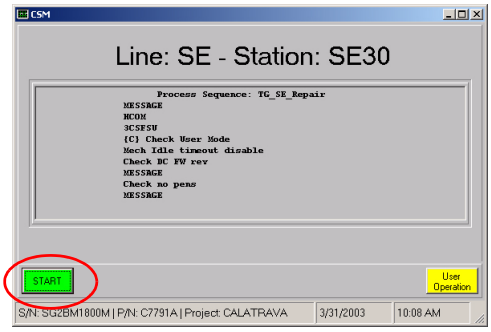
TG_SE_Repair

Perform Process Sequence **TG_SE_Repair** as follows:

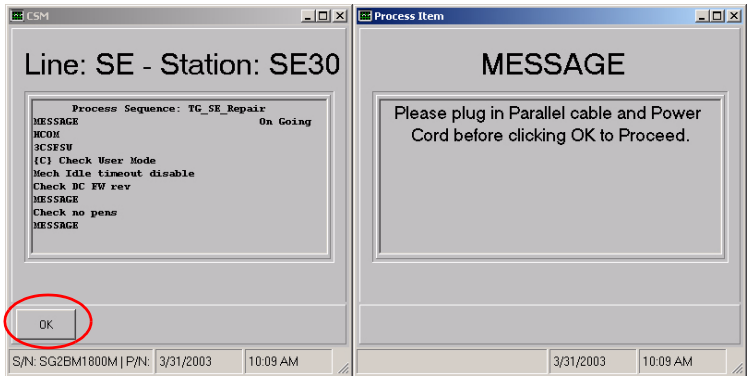
1 Switch to Station **SE30** and select Process Sequence **TG_SE_Repair**.



2 To start the Process Sequence, click on **Start**.

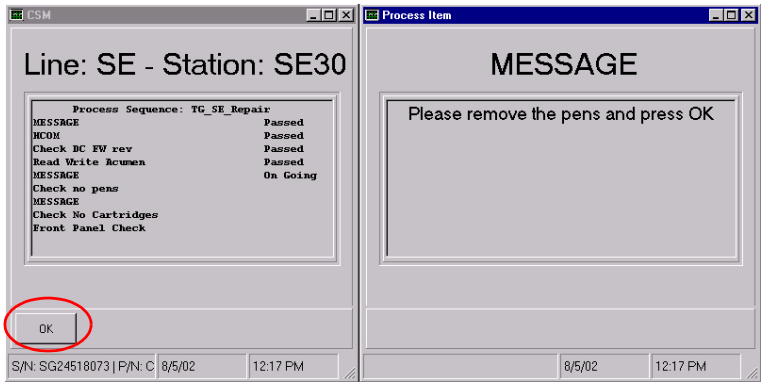


3 A message will appear requesting you to make sure that the computer is connected to the Printer via the parallel cable and that the Printer is switched On. Click on **OK** when done.

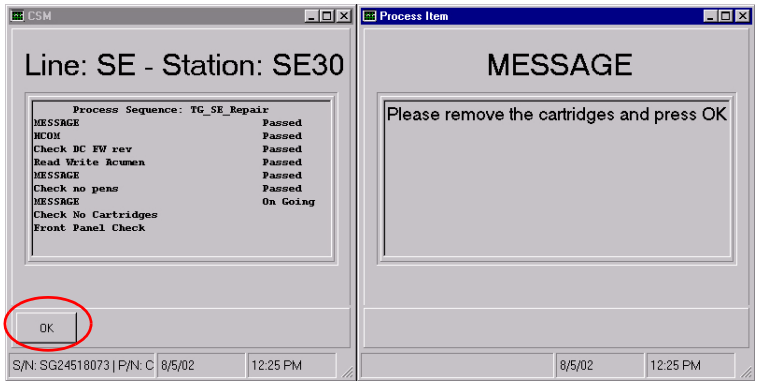


4 If the printer is in MFG mode, then you will have to manually switch Off the printer and then switch it On again in USER mode. Click on **OK** when done.

5 A message will appear requesting you to remove the Printheads from the printer. Click on **OK** when done.



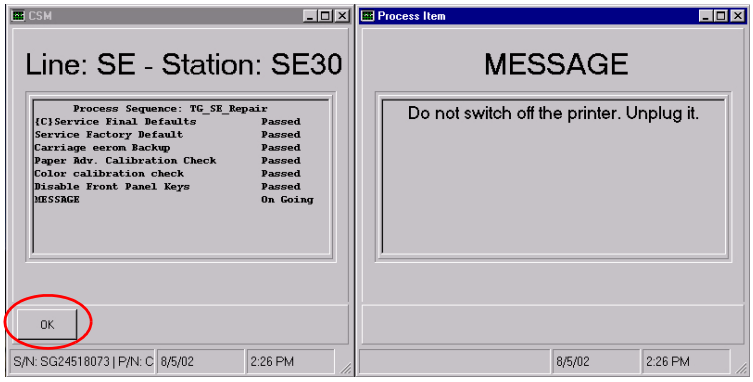
6 A message will appear requesting you to remove the Ink Cartridges from the printer. Click on **OK** when done.



7 The printer will try and check that the Front Panel is working correctly and after a 10 seconds delay it will put the Carriage in the Transport Position. Follow the instructions on the computer screen, pressing the appropriate keys when requested.

8 After putting the Carriage in the Transport position, the printer will try and check that the main Door Sensor is working correctly. Follow the instructions on the computer screen, opening and closing the Printhead Access Door when requested.

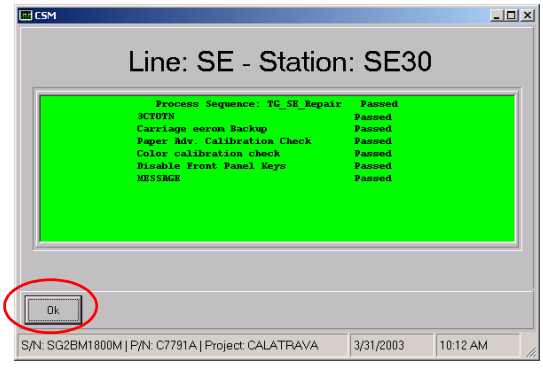
9 The following message will appear on the computer screen. Make sure that you unplug the printer instead of switching it OFF. Click **OK** when done.



10 The Repair Process Sequence is performed in the following order:

- Firmware Release - The printer checks the date and version of the firmware to make sure it is correct.
- Check no pens - The printer checks that no printheads are installed.
- Check no cartridges - The printer checks that no printheads are installed.
- Front Panel - The printer checks if the Front Panel LEDs and buttons function correctly.
- Transport Position - The printer ejects any media that is loaded and then puts the Carriage into the capping position. The printer then leaves the lifters in the up position and then activates the Pen Alignment so that it is automatically performed when Printheads are inserted into the printer.
- Main Door Sensor Check - The printer check that the Main Door Sensor is functioning correctly.
- Check Media handler - The Printer checks that the media handler (Cleanout Assembly) is installed and functioning correctly.
- Service Final Defaults - The printer records the model number and deletes the USB identifiers and everything else that is not required from the memory.
- Carriage EEROM backup - The printer copies the data from the Electronics Module to the Carriage Assembly.
- Paper Adv. Calibration Check - the Printer checks that the paper Advance Calibration has been performed and stored.

11 If the Repair Sequence is completed correctly, then the following message is displayed on the computer screen. Click on **OK**.



12 If during the Repair Sequence an error message appears, refer to the following table in order to troubleshoot it:

TG_SE_Repair			
Test name	**Error Message**		**Troubleshooting**
HCOM	NONE	CIMation failed to communicate with the Printer.	Repeat the test after checking that ALL the cables are correctly connected.
Check User Mode	Unit booted in 1 mode while expected 0	Printer initialized in a different mode than the expected.	Initialize the Printer in the correct mode (User) and click on "Retry".
Check DC FW Rev	None	The Firmware of the printer is not the one that should be.	Go to Station SE20 and execute TG_SE_Upgrade_FW.
Check no pens	Please, remove the pens!	There are Printheads inserted in the printer.	Remove the Printheads and click on "Retry".
Check no cartridges	Please, remove the cartridges!	There are Cartridges inserted in the printer.	Remove the Cartridges and click on "Retry".
Front Panel Check	None	Can't finish test as there is no response when front panel buttons are pressed.	Check connection of the Front Panel cable and repeat test.
Paper Adv. Calibration Check	None	The printer has never passed the paper advance calibration.	Go to Station SE20 and execute TG_SE_Repair_A3+/ B+_Size.

TG_SE_Exchange

Refer to Process Sequence TS_SE_Repair for more information.

TG_SE_ChangePN

This Process Sequence allows the Model Number, Serial Number and Manufacturing Date to be reconfigured.

STATION SE40 = Modular

The purpose of this station is to exercise all the printer subsystems in order to detect any problems.

Make sure that the Ink Cartridges have been removed from the Printer before starting the Modular Test.

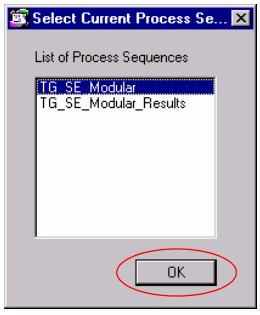
A few things you need to remember about the Modular Test:

- In order for the Modular Test to be finished successfully, it needs to complete 10 continuous cycles without a subsystem failing.
- If a subsystem fails, stop the Modular Test, resolve the problem with the failing subsystem and then repeat the Modular Test.
- The Printer cannot be taken out of the Modular Test mode until 10 continuous cycles have been successfully completed. Powering Off and On will NOT take the Printer out of the Modular Test.
- Once the Modular Test has been completed, you must execute Process Sequence **TG_SE_Modular_Results** to completely finish the Modular test. If this is NOT done, every time you unplug the Printer and plug it in again, the Printer will start itself and run a cycle of the Modular Test.

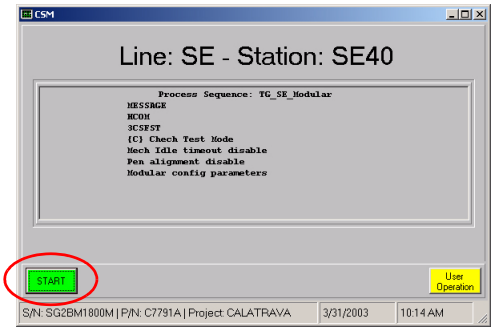
TG_SE_Modular

Perform the modular test as follows:

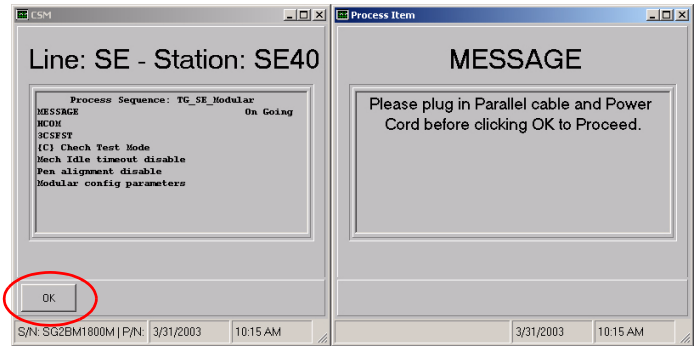
1 Switch to Station **SE40** and select Process Sequence **TG_SE_Modular**.



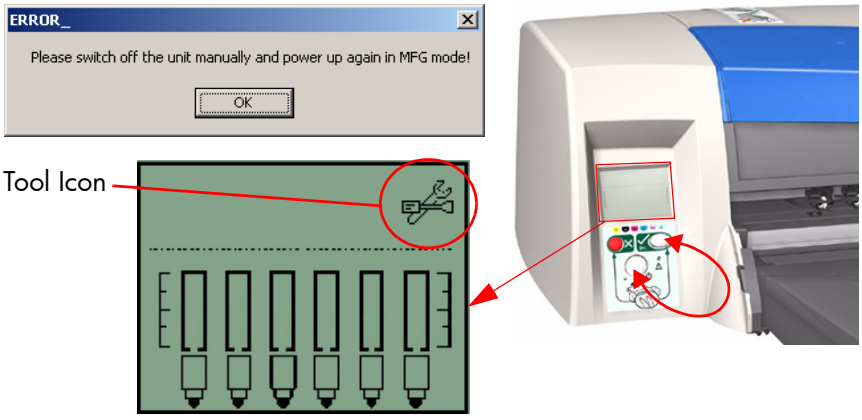
2 To start the Process Sequence, click on **Start**.



3 A message appears requesting you to make sure that the computer is connected to the Printer via the parallel cable and is switched ON in **MFG mode**. Click on **OK** when done.

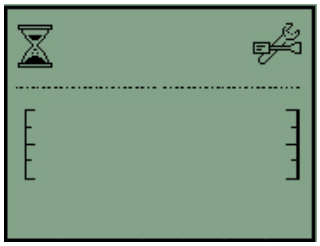


4 If the printer is in USER mode, then you will have to manually switch Off the printer and then switch it On again in MFG mode. To do this, while the printer is switched OFF, press both the **resume** and **power** buttons together until the Tool icon appears on the front panel. Click on **OK** when done.

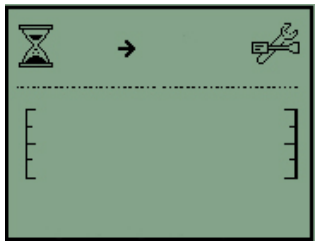


5 Unplug the printer and plug it in again in order begin the modular test.

6 Once the test starts, the front panel will display the following:

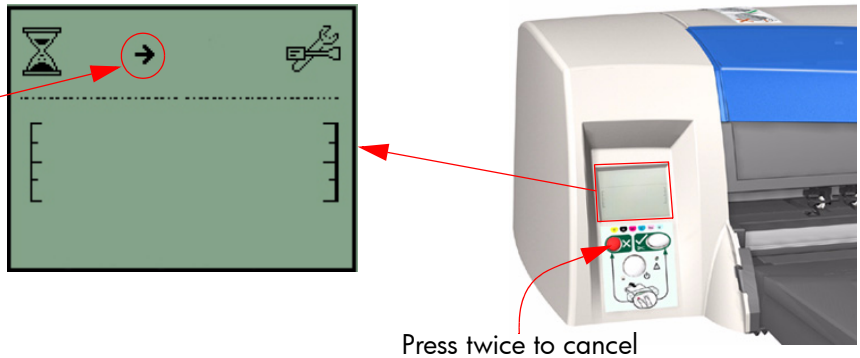


7 The modular test needs to finish 10 cycles without failing in order to be completed correctly. Each time a new cycle is started, the front panel will display the following:



8 If the modular test needs to be stopped, press the CANCEL button twice ONLY when the Arrow icon appears. If the CANCEL button is pressed once by mistake, press the RESUME button to continue with the modular test.

You can ONLY stop the test when the Arrow icon appears



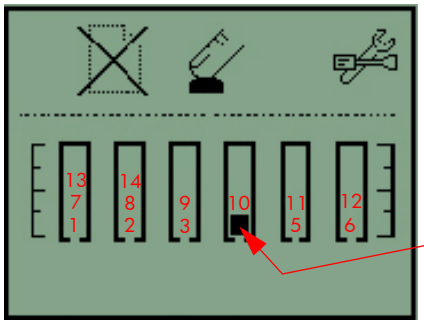
Press twice to cancel

9 Once the Printer actually stops the Modular Test cycles, you may get one of the following results:

- Faulty subsystem.
- Repaired subsystem without resetting.
- No faulty subsystem.

Faulty Subsystem

If one of the squares on the front panel is highlighted and the **no-paper** icon is displayed (as shown below), it means that the Modular Test has failed. In order to interpret the code (subsystems 1 to 14) you need to count the position of the highlighted black square reading from left to right, bottom to top. Once you have the code, refer to the table on Page *4-30* for the failing subsystem.

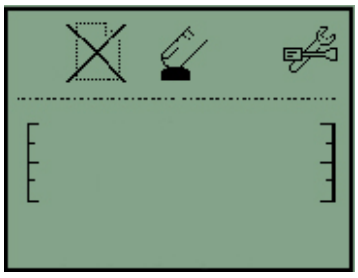


e.g. Subsystem 4 failure Ink Supply Station

You should unplug the Printer and repair the failing subsystem. Once repaired, plug in the Printer and it will switch itself ON in the manufacturing mode and continue with the Modular Test. In order to setup the Modular Test again, you should cancel the Modular Test by pressing the CANCEL button twice ONLY when the Arrow icon appears. If you don't perform this step, it is possible that the Printer will never pass the Modular Test. Once the Modular Test is cancelled, use the Controller Application to switch to Station **SE40** and start Process Sequence **TG_SE_Modular**. Switch Off the printer and the Modular Test will automatically begin.

Repaired Subsystem Without Resetting

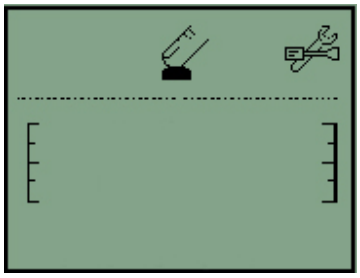
If none of the squares on the front panel is highlighted and the **no-paper** icon is displayed (as shown below), it means that the you have run the Modular Test, you have experienced a problem, you have repaired the Printer **but** you have not run Process Sequence **TG_SE_Modular** again in the Controller Application in order to setup the Modular Test.



Use the Controller Application to switch to Station **SE40** and start Process Sequence **TG_SE_Modular**. Switch Off the printer and the Modular Test will automatically begin. After 10 cycles the Printer will stop the Modular Test and the front panel will only show the **press continue button** and **tool** icons.

No Faulty Subsystem

If none of the squares on the front panel is highlighted and the **press continue button** and **tool** icons are displayed (as shown below), it means that the Modular Test has been completed corrected and that all the subsystems of the Printer are OK.



You should now use the Controller to execute the Process Sequence **TG_SE_Modular_Results** to completely finish the Modular test by getting the test results. After this you can switch Off the Printer and it will not automatically switch itself On in the manufacturing mode in order to run the

Modular Test.

If you switch Off or unplug the Printer before executing the Process Sequence **TG_SE_Modular_Results**, you will have to wait until a cycle of the Modular Test ends because the Printer always starts itself and automatically performs a cycle if the Modular Test ended correctly.

10 If during the Modular Sequence an error message appears, refer to the following table in order to troubleshoot it:

TG_SE_Modular			
Test name	**Error Message**		**Troubleshooting**
HCOM	NONE	CIMation failed to communicate with the Printer.	Repeat the test after checking that ALL the cables are correctly connected.
Check User Mode	Unit booted in 0 mode while expected 1	Printer initialized in a different mode than the expected.	Initialize the Printer in the correct mode (MFG) and click on "Retry".
Modular Retrieve	None	The printer did not pass the modular test.	1. Solve the problem indicated by the modular test. 2. Run TG_SE_Modular testgroup again. 3. Wait until the modular test has finished successfully. 4. Repeat TG_SE_Modular_Results.

Modular Test Subsystem Code

Modular Test		
Subsystem Code	**Subsystem**	**Troubleshooting**
1	Trailing Cable	■ Replace the Carriage Assy.
2	Scan-Axis	■ Check that the Carriage Assembly is able to move out of the Service Station. ■ Replace the Carriage Assembly. ■ Replace the Carriage Belt. ■ Replace the Turnaround Assembly. ■ Replace the Carriage Rod.
3	Service Station	■ Replace the Service Station.
4	Ink Supply Station	■ Replace the Ink Supply Station.

Modular Test		
Subsystem Code	**Subsystem**	**Troubleshooting**
5	Media-Axis	■ Replace the Paper-Axis Drive Motor Assembly.
6	PSU Fan	■ Replace the Power Supply Unit.
7	Ramps	■ Replace the Output Mechanism Assembly. ■ Replace the Ramp Motor Assy.
8	Not Used	■ Not Applicable.
9	PCI Bus	■ Replace the Electronics Module.
10	Carriage PCA	■ Replace the Carriage Assy.
11	Not Used	■ Not Applicable.
12	Main PCA ASICS	■ Replace the Electronics Module.
13	Main PCA EEROM	
14	Main PCA RAM	

STATION SE50 = PRS Calibration

The purpose of this station is to adjust the PRS (pen-to-rib spacing).

Refer to the PRS Adjustment document for further information.