

T940(X) to T2750 Migration Guide



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Chapter 1

T940(X) to T2750 Migration

Overview

This document provides information on the procedure to migrate an existing control system using a T940(X) to a T2750 system, including the support for MODBUS and Profibus master functionality. The document provides information on those upgrade scenarios where a migration is applicable, and details both the hardware and database strategy migration process.

The migration process requires the removal of an existing T940(X) controller, and installation of a T2750 Programmable Automation Controller (PAC). For Profibus master support, at least one (two for redundant systems) netHOST devices can provide the necessary communication support. Where an ALIN T940 is used, a T225 ALIN/ELIN bridge will also be required.

Migration to a T2750 system is a natural step to the latest generation in PAC product and not just a legacy replacement exercise. It is a low risk process that allows you to maintain the I/O wiring, use the same application software, same tools (such as LINtools), and requires no or minimal manual HMI changes.

Chapter 2

Migration Path

There are multiple ways that an existing T940(X) controller solution can have been installed. This chapter shows a common scenario that can be migrated, and lists scenarios that cannot be easily migrated to a T2750 solution.

Migration Requirements

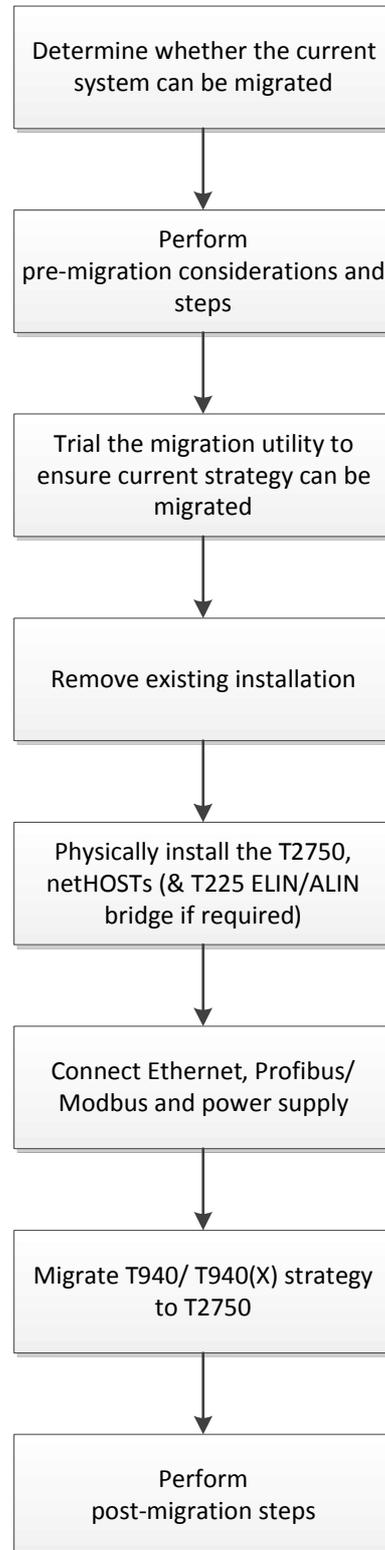
For a T940(X) installation to be migrated automatically to a T2750 installation, Foxboro PAC 7.1 (or later) must be installed on your computer. In addition to this software requirement, appropriate hardware must be available to support the migration, including:

- A minimum of a zero-IO base Foxboro PAC T2750, in either a simplex or duplex configuration.
- Additional Ethernet (and Profibus, if required) cabling, as outlined in the Hardware Migration chapter, starting on page 15.
- For Profibus supported installations, either one or two netHOST gateways, depending on whether the T2750 is configured with one (simplex) or two (duplex) IOCs.

Important: It is highly recommended that a backup of the entire project be performed prior to starting the migration (refer to "Instrument backups" on page 24 for additional information).

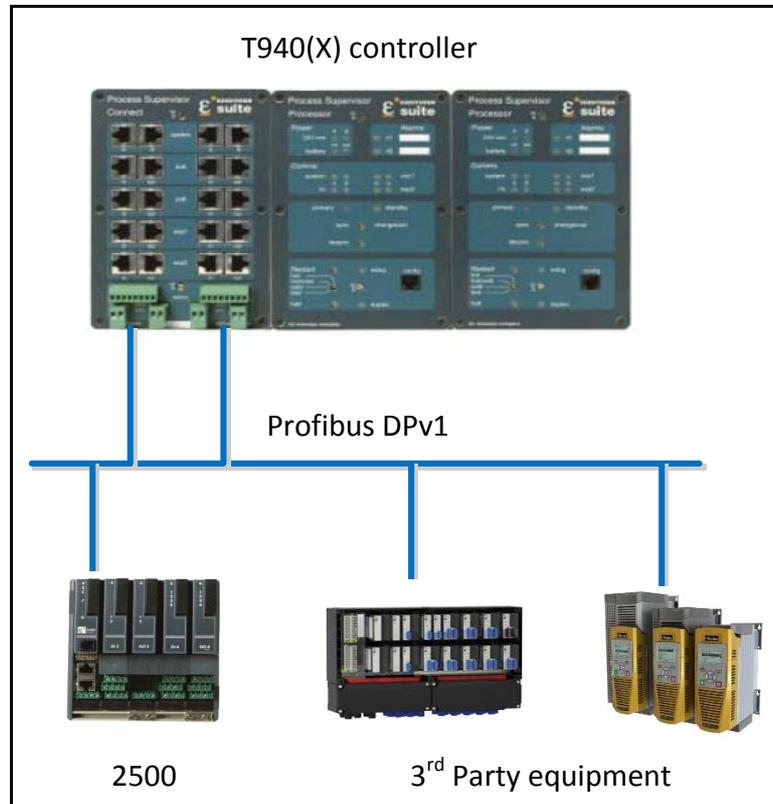
Migration Overview

The following flowchart shows the main steps required for migration from the T940(X) to the T2750.



Example installation suitable for migration

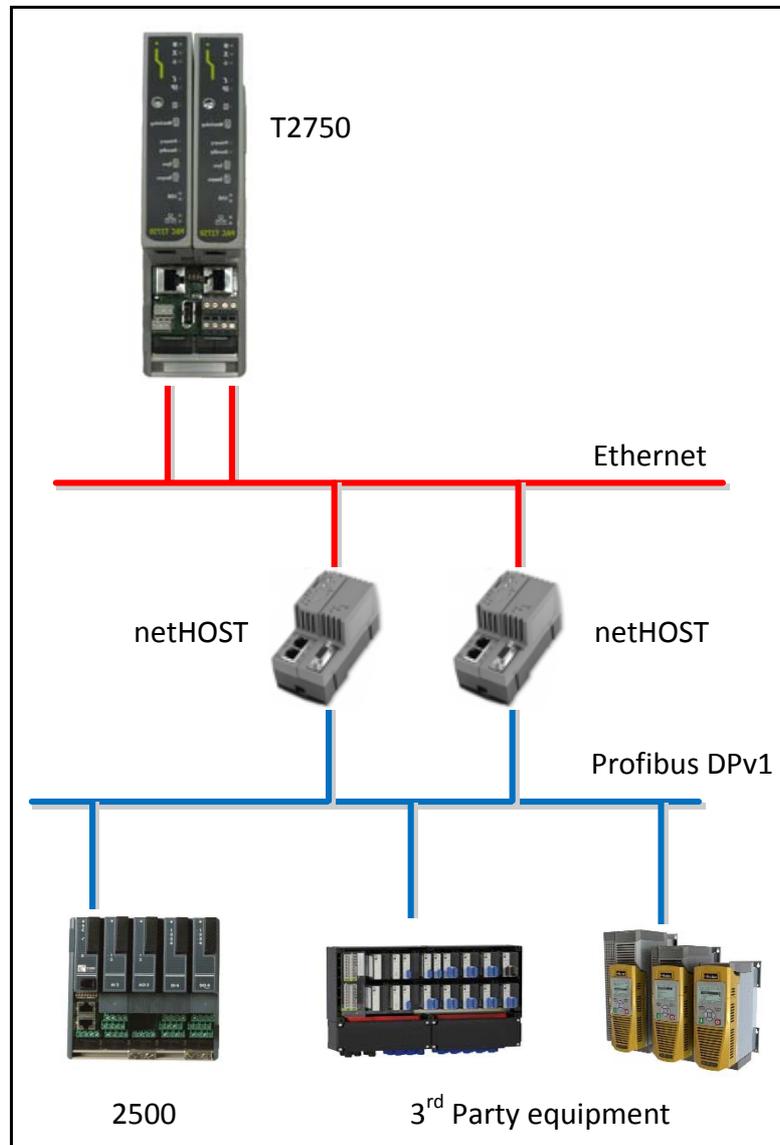
A example installation suitable for migration consists of a T940(X) connected directly to a 2500 and/or other third party equipment, perhaps communicating over a standard Profibus DPv1 network as shown in the following figure.



Different installations may have a varying degree of complexity, with or without Profibus requirements, or perhaps using Modbus. Typically, the system is controlled by one or more T940(X) process controllers, and have one or more items of equipment connected to the controller - often over Profibus or Modbus - but sometimes with other protocols. In the example installation above, the T940(X) communicates using the Profibus protocol via its internal Profibus gateway cards.

Note: The T940(X) uses RJ45 connectors to connect to the Profibus network.

The same installation can be migrated to a T2750-controlled system as shown in the following figure. The T940(X) is replaced by the small T2750 zero I/O base controllers (shown in a dual, redundant configuration) and optional Profibus support is provided by means of two netHOST gateways that are external to the T2750. The principle of operation remains the same except that the Profibus gateways are external and connected to the instrument via Ethernet.



Note: The T2750/netHOST combination uses standard 9-pin D-connectors to connect to the Profibus network.

Chapter 3

Pre-Migration Considerations

This chapter provides some information to be considered prior to migrating a T940(X) installation. It also provides the pre-migration steps that need to be performed before being able to trial the migration utility to ensure that the process proceeds smoothly.

Migration limitations

There are a few limitations that could be experienced during a migration and should be considered prior to any migration project. These are listed below:

- The T940(X) has two serial ports, whereas the T2750 has only one. Where a T940(X) has been configured to operate both as Modbus Master and Modbus Slave via the serial ports, this combination is not possible on the T2750. In this case, the serial port will be assigned as Modbus Master during migration and the strategy should be edited to cope with the lack of Modbus Slave functionality on the serial port.
- If a Modbus DCM configuration uses a normalised data type, this is not supported in Modbus GW (the parameter will be migrated to the nearest equivalent non-normalised type). Manual strategy edits will be required.
- On a T940(X), the six single-channel DCM I/O block types that support a *Mode* field (see the list below) could have previously been set to LOCAL Mode. On the T2750, setting *LOCAL Mode* is **not** possible.

D25_AI	D25_AI_T	D25_AO	D25_DI
D25_DI_T	D25_DO		
- REAL fields mapped to unsigned 16-bit integers can only be treated as signed numbers in Modbus GW.

- T940-specific diagnostic blocks will not function after migration. These blocks are:

ALINDIAG	PS_TASK	MDTUNE	NET_DIAG
PS_TUNE	FT_TUNE	SDX_RSRC	SDX_IDLC
MDBDIAG	AMC_DIAG	PMC_DIAG	PBUSDIAG

You may wish to replace these with more appropriate T2750 diagnostic blocks. Refer to Section 9 of the LIN Blocks Reference Manual (HA082375U003) for more details about the various available diagnostic blocks.

- DCM Instrument number and profile field will be replaced by mappings in the Profibus editor.
- DCM blocks contain (at least some of) the following fields: Instr_No, Slot_No and Chan_No. In the T940(X), these values explicitly control the mapping of comms parameters, and these values are also used during the migration to device the comms mapping used in the T2750's GW system. After migration, the D25_*DCM blocks may be manually edited as ongoing strategy development. However, please observe the important note below.

Important: The instrument number, slot number and channel number are stored within the DCM blocks *and* the GW mappings table. It is imperative that if a change to a DCM block is made, that the same change is made to the GW mappings table.

- Version 5.x of the T940(X) has an obscure bug in its Structured Text execution. If an integer is assigned to a bitfield, instead of resulting in 0 (if the integer is zero) or 1 (if the integer is non-zero), the upper bits of the integer are instead truncated and bit 0 is assigned.

For example, consider the following Structured Text:
Wfield0.Bit 0 = IO

The following results will be calculated:

- If IO is 0x00, the value assigned to Wfield0.Bit 0 is 0, which is correct.
- if IO is 0x35, the value assigned to Wfield0.Bit 0 is 1, which is correct.
- If IO is 0x34, the value assigned to Wfield0.Bit 0 is 0, which is incorrect.

Caution: This bug does not exist in other versions of T940(X), nor in any version of the T2750. If migrating from a T940(X) version 5.x, the Structured Text should be examined for this use case and you should be aware that the logic may function differently once migrated to a T2750 (or different version of the T940(X)).

Pre-Migration steps

There are two steps that must be performed whilst the T940(X) hardware is still installed. They are outlined below:

- 1 If your existing T940(X) strategy uses Profibus master functionality, then it is important to ensure that you have a copy of the relevant GSD files from the T940(X) instrument to the local instrument folder on your computer. The GSD files contain information about the basic capabilities of a device. A typical migration from a T940(X) system will require the `t940.gsd` file and possibly a `2500.gsd` file (if a 2500 controller is being used). Both of these files should be located on the T940(X) instrument itself, and can be copied to your computer using the Network Explorer tool.

These files should be copied to the local instrument folder on your computer; the default path is:

```
c:\EuroPS\<<Project>\<networks>\<network>\<instrument>
```

- 2 Use the *Instrument Options Editor* to upload the '`_system.opt`' file from the instrument to the computer. This file is not always present in the instrument folder on the computer.

The ability to migrate a T940(X) strategy to a T2750 is only supported from Foxboro PAC version 7.1 and onwards, so systems with older installations will need to be upgraded in the usual manner. The upgrade should be performed in the following order:

- Install the latest version of Foxboro PAC.
- Upgrade any Operations Server project using the *Update Project DB* program. Run this directly by double-clicking it from within the project folder, or select **Project Database update** from within the *System Checking tool*.
- Build the project. There are several ways to do this. For example, you can right-click on the top folder in a project tree and click **Build**, or build the complete project through the *Project Organiser tool*.
- Within the project tree, search for a `*.ubl` file. If one exists (only for blended databases), ensure the full filename is `buildlst.ubl`. If it is not, rename this file.

After these steps have been completed, it is recommended that you perform a trial database migration to confirm the migration utility completes successfully prior to removing the existing T940(X) hardware. Refer to the Database Migration chapter, starting on page 23.

Chapter 4

Hardware Migration

This chapter provides information on the installation of the T2750 and netHOSTs (if required to support Profibus master functionality).

Overview

The T2750 and two netHOST Profibus gateways occupy slightly less space than an ELIN T940(X) controller and so can be mounted in the same cabinet area. If Profibus support is not required (for example, if Modbus is being used instead), the T2750 occupies considerably less space than the T940(X). The netHOSTs feature a 2-port switch, and so the T2750 can be connected to the IP network using this switch. A short CAT5 Ethernet cable is provided with each netHOST for this configuration.

Caution: Using the integrated 2-port switch to link a single Ethernet feed to the T2750 introduces a single point-of-failure and is therefore not recommended.

Alternatively, and if more appropriate, the netHOSTs do not need to be located in close proximity to the T2750 and can be connected to any switch or hub as appropriate.

If, however, you are replacing an ALIN T940 controller, then an ALIN to ELIN bridge (T225X) will be required. This is because the T2750 only supports Ethernet LIN (ELIN) communication. In this instance, there is sufficient space to mount only the two netHOSTs and the ALIN to ELIN bridge in the space created by removing the ALIN T940. The T2750 will therefore need to be housed elsewhere.

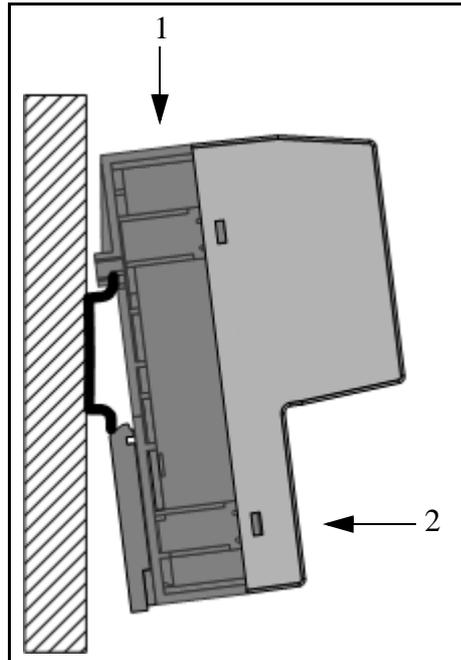
The T2750 and two netHOSTs have a low combined power consumption and can be powered from the same power supply as was used for the T940(X).

Caution: Check the total power consumption required is less than the power supply rating.

Mount the netHOST on a horizontally mounted DIN rail. The top hat rail must be connected with the potential equalisation conductor (PE).

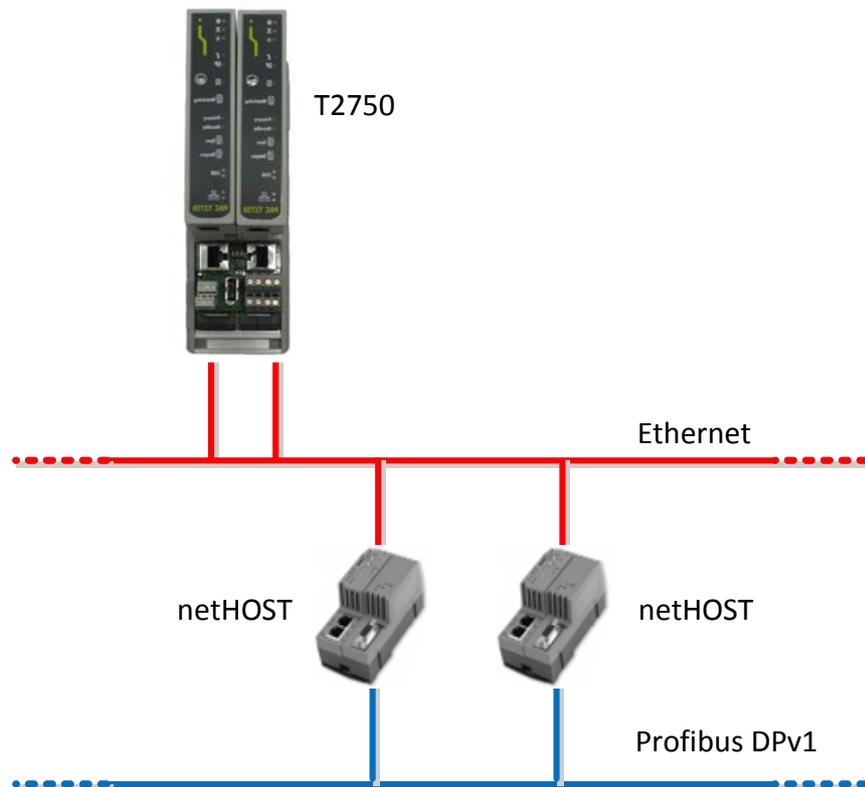
It is recommended that in a duplex system (a T2750 with two IOC processors), the left netHOST is connected to the left IOC, and the right netHOST be connected to the right IOC. This simplifies the software configuration where both the IOCs and netHOSTs are referred to as the *left* and *right* devices.

With reference to the following figure, push the netHOST onto the top hat rail from above (1), and then press against the mounting surface (2).



Ethernet Connection

The netHOST communicates with the T2750 using standard 100Mbps Ethernet through either one of the RJ45 connectors of the integrated two-port switch. Typically, the output of netHOST would feed a network switch or hub before being routed to the T2750 (though technically – but not advised – the output of the netHOST could be connected directly to the T2750). Consideration to redundancy on the Ethernet network should be given when designing the Ethernet system.

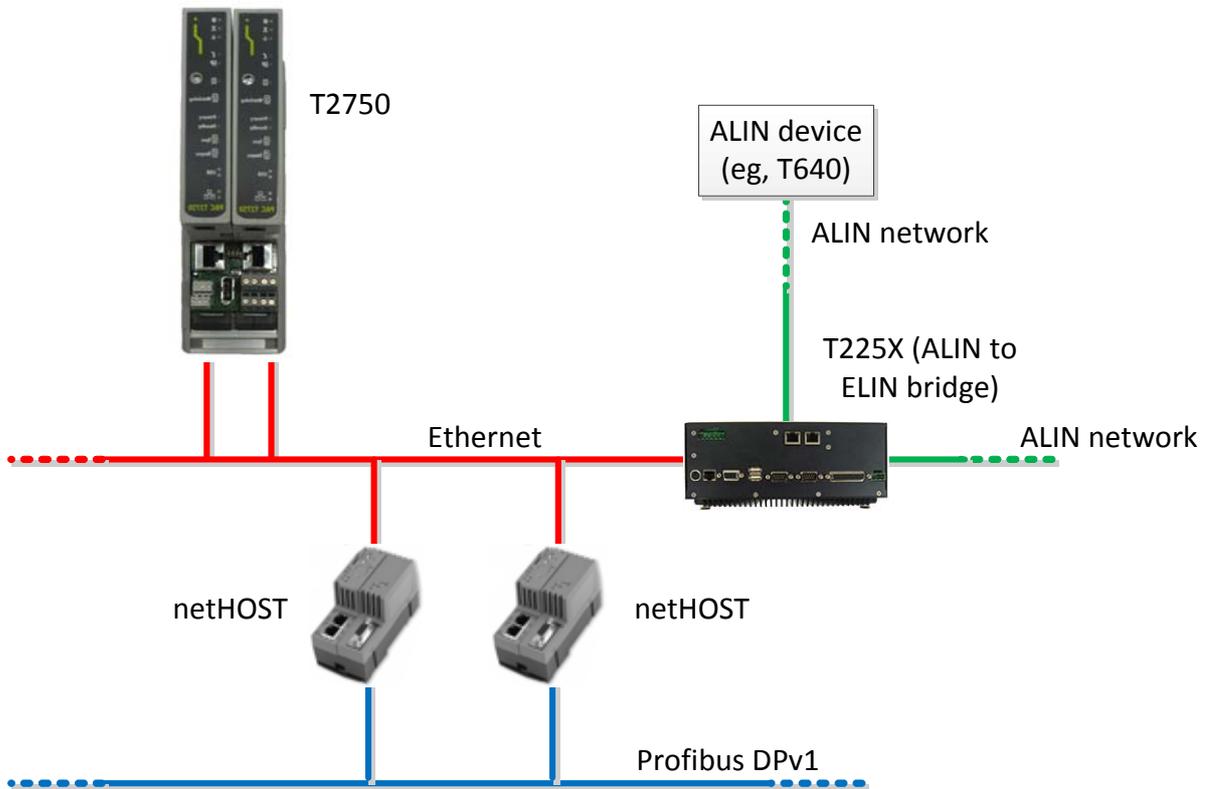


The above figure shows a typical Ethernet network connecting each netHOST to its corresponding T2750 processor card. A total of four network feeds would be required for this setup.

If the number of Ethernet feeds is severely limited, the netHOST's 2-port switch can be used to distribute a single feed to the netHOST and a single T2750 processor card.

Important: Using the netHost's built-in 2-port switch to distribute an incoming Ethernet feed introduces a single-point-of-failure and is therefore not recommended practice.

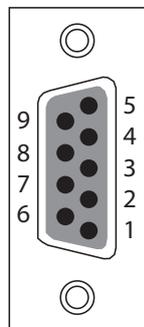
If migrating from an ALIN T940 controller, an ALIN to ELIN bridge is required, as shown in the following figure.



Profibus Connection

The netHOST's Profibus port is a single 9-way female D-connector. The pin out details for this connector is shown below.

Profibus 9-way D	Pin	Signal	Description
	3	Rx/Tx +	Receive / Transmit data positive
	4	CNTR-P	Control signal repeater (direction control)
	5	ISO GND	Data ground
	6	VP	Power supply positive 5V for terminating resistor. Max current 100mA.
	8	Rx/TX -	Receive / Transmit data negative
	Shield	PE	Metal shell on PE

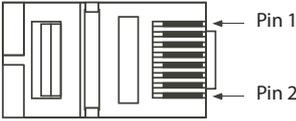


The T940(X) uses RJ45 connectors to expose its Profibus communication. As this is different to the netHOST's standard D-connector, a change of cable termination is required. The recommended practise is:

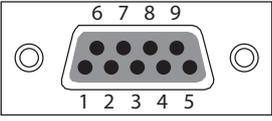
- If the Profibus cables are short (within the cabinet), the cables should be replaced with correct connectors at both ends.
- If the Profibus cables are not short, they should be reterminated with connection to the netHOSTs.

The table below shows the pin out details for both the netHOST's 9-way D connector and the T940(X)'s RJ45 connector to aid the wiring of any replacement connector.

RJ-45 Connector (T940X)		9-Way female D-connector		Description
Pin	Signal	Pin	Signal	
1	B-line	3	Rx/Tx +	RxD/TxD Positive Data (B-line)
-	-	4	CNTR-P	Direction control
5	Data ground	5	ISO-GND	Data ground
6	+5V	6	VP	+5V pull up for resistor
2	A-line	8	Rx/Tx -	RxD/TxD Negative Data (A-line)
Shroud	Ground	Shield	PE	Ground



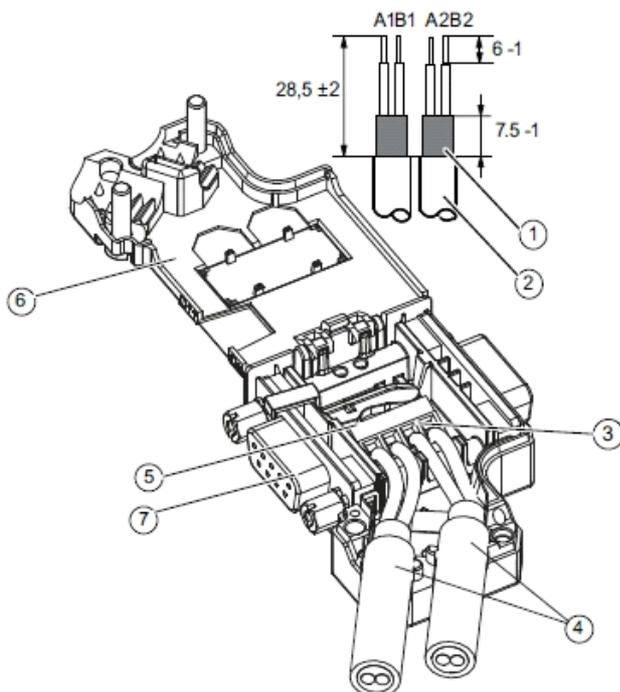
RJ45 plug: view on underside



Converting existing Profibus cables

Existing profibus cables can be converted to a 9-way D connector using an adapter made by Siemens (part 6ES7972-0BB41-0XA – Bus Connector F. Profibus, With PG Socket). This adapter provides the ability to bring terminate two cable ends (part of the Profibus bus) to screw terminals (in and out), and comes complete with terminator resistors built-in. Two 9-way female D-connectors can then feed both netHOSTs.

Note: Using this adapter is only recommended if terminating longer Profibus cable runs (that extend outside the cabinet). If the Profibus cables are of a short length (within the cabinet), it is recommended to replace the cables with suitable connections at both ends.



Bus cable installation

- (1) Cable shield
- (2) Bus cable (e.g. 6XV1 830-0EH10)
- strip insulation, e.g. with stripping tool
6GK1905-6AA00
- (3) Screw-type terminal block on connector p.c.b. for
connecting the bus cable
Insert the green and red cores in the screw
terminal block
(A1, B1 or A2, B2; Recommendation: A = green,
B = red)
- (4) Press the cable sheath between the two cable
clips. The cable shield must lie bare on the
contact.
- (5) Screw the green and red cores tightly in the screw
terminal.
- (6) Close the housing cover and screw it shut.
- (7) PG socket (only with 6ES7972-0BB42-0XA0)

Power Supply

The power supply requirements for the T2750 (zero I/O base configuration), 2 x netHOSTs and T225X (ALIN to ELIN Bridge) are shown in the following table.

Device	Power consumption	Typical quantity	Total power consumption
T2750 IOC (zero I/O base)	170mA @ 24VDC	2	340mA @ 24VDC
netHOST	130mA @ 24VDC	2	260mA @ 24VDC
T225X ALIN to ELIN bridge	500mA @ 24VDC	1	500mA @ 24VDC
TOTAL			1100mA @ 24VDC

The T940(X) requires around 2050mA each (4100mA for two), so it is possible to reuse the power supply already installed for the T940(X).

Note: These figures will be different if a none zero I/O base configured T2750 is used. Refer to the T2750 User Guide (HA030047) for detailed power consumption details for each module that can be installed in a T2750 base.

Chapter 5

Database Migration

This chapter provides information on the database migration steps required to convert a T940(X) database to a T2750 database.

Introduction

A T940(X) database file (DBF) cannot be loaded into a T2750 instrument directly, but must first be migrated using a special tool from within LINTools. The migration tool quickly and efficiently converts the existing strategy that is capable of then being downloaded to a T2750 and running as before. The migration tool effectively:

- replaces the T940(X) header block with a TACTICIAN equivalent.
- scans all T940(X) Modbus and Profibus communications and creates equivalent gateway contexts for the T2750
- reports any warnings and errors using the standard LINTools build window
- preserves the DCM blocks which are carried through to the T2750.

Note: The migration utility is only available in Foxboro PAC version 7.1 (and upwards). Earlier versions do not support this migration.

Database migration

Instrument backups

Before the migration tool runs, a backup of the current T940(X) strategy is performed. This backup is put into a newly created folder (named with the current date and time) within a folder called Backup, within the local instrument folder. If the migration tool encounters an error, it uses this backup to automatically revert the instrument back to its previous state. Should you need to manually revert to the original T940(X) configuration, copy the files from this folder into the top-level local instrument folder.

Although the migration tool automatically performs a backup of an individual instrument, it is prudent to first back up the whole project.

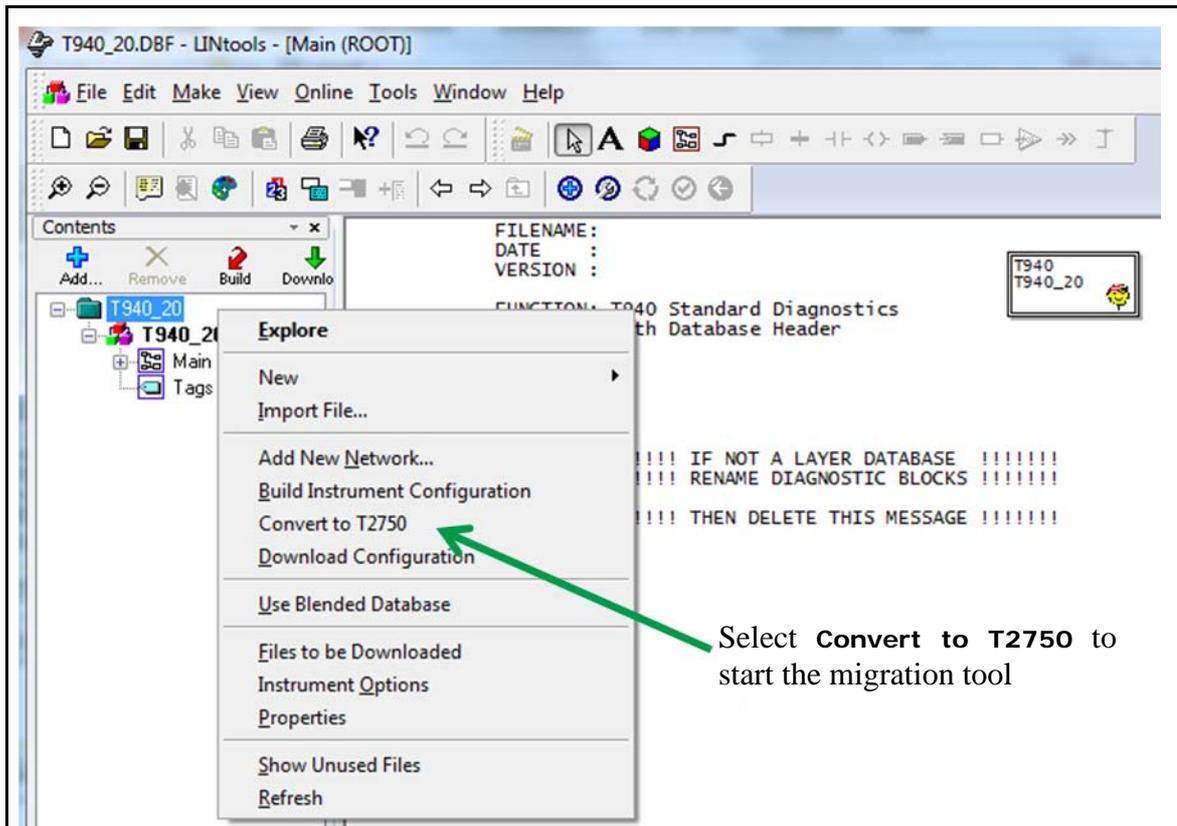
Running the migration tool

The T940(X) to T2750 migration tool is accessed from within LINTools. Follow the procedure below.

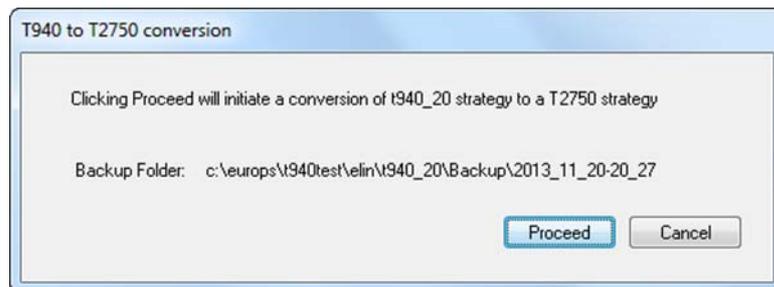
To migrate a T940(X) to a T2750 database:

- 1** For Profibus Master functionality, ensure all relevant .gsd files have been copied from the instrument and placed into the local instrument folder (see "Pre-Migration steps" on page 13).
- 2** Launch LINTools and open the relevant T940(X) database (.dbf).

- 3 Right-click on the instrument, and select **Convert to T2750** (see figure below).

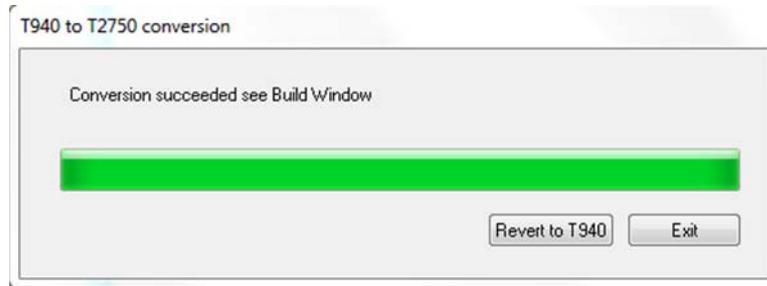


- 4 A confirmation screen appears showing that a backup of the existing strategy will be made (and shows where these files will be put), as in the following figure. Click on **Proceed** to start the migration.



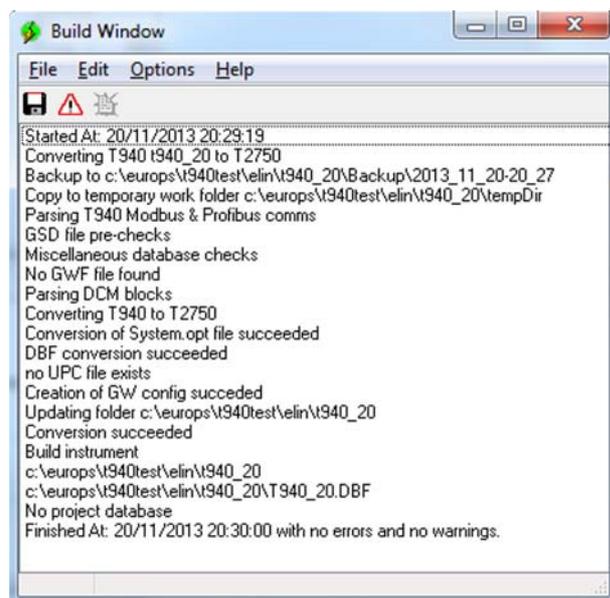
- 5 The migration dialogue window appears and displays status or error messages as appropriate during the migration. In addition, the build window opens (if not already open), and a log of status, warnings or errors are recorded in it.

- 6 After the migration tool finishes, and status of the conversion is shown in the migration dialogue window. Any error messages should be read and acted upon (see "Migration errors" on page 27). If you wish to revert the files back to the original T940(X) version, click on **Revert to T940**. Otherwise, click the **Exit** button.



Note: The Revert to T940 button moves the backup files taken prior to migration back into the instrument folder, leaving the files untouched prior to running the tool.

- 7 Examine the contents of the Build Window to check for any warnings or errors that occurred during the migration (refer to "Migration errors" on page 27 if necessary for additional information on the meaning of the warnings and errors).



- 8 If the migration completed successfully, the current loaded database shown in LINTools is the new T2750 version, with a correct Tactician header block (rather than the T940 header block) and appropriate DCM blocks.

All LIN names preserved so that external cached block comms works as before

Shows the strategy is now for a T2750

Block: T940_20	Comment	Connections			
TagName	T940_20		LIN Name	T940_20	
Type	TACTICIAN		DBase	<local>	
Task	4 (110ms)		Rate	0	
Time	00:00:00		Alarms		1/0 (P)
Date	01/01/00	DD/MM/YY	Node	=00	
IP_type	>0000		Cluster		
IO_mode	>0000		Options	>0000	
BrownOut	0.000	minutes	Status	>0020	
ColdStrt	1.000	minutes			
Model	T2750-16w				

Having completed a migration, the new T2750-version of the database can be downloaded to a T2750 instrument when/if one is attached.

The migrated strategy can be onward developed using the standard set of tools, in the same manner as a T2750 strategy developed from scratch can be. The LINTools Profibus Master Configurator replaces the T940's DCM profiles.

Caution: Care must be exercised when editing migrated DCM blocks. Information for instrument number, slot number and channel numbers are stored not only within the DCM block fields, but also within the gateway mappings table. These two areas must be kept in step.

Migration errors

During the migration process, pertinent information, warning and errors are displayed in the migration dialogue window and also in the build window (the build window opens during the migration if not already open). After migration completes, it is recommended you examine the build window for any information, warning and errors concerning the migration process.

The status of the migration is initially visible in the migration dialogue window, and are classified by severity:

- Status messages – show the current status of the migration and are normally displayed during the process.
- Error messages – show significant errors encountered during the migration process. These errors need to be resolved before the migration tool is ran again.

Note: Many of the migration dialogue messages flash very briefly during the migration process, and thus are not readily visible. This is normal. Only errors, successful or unsuccessful migration messages remain in the dialogue at the end of the process.

The possible status and error messages are shown below, together with an explanation and suggested user action (if applicable).

Genre	Message	Description	Action
Status	Converting T940 <instrument name> to T2750	Starting the conversion of a T940 to a T2750 strategy.	None
Status	Backup to <backup folder path>	The instrument folder has been backed up to the named folder.	None
Status	Copy to temporary work folder <temporary work folder>	The instrument folder has been copied to the named temporary work folder.	None
Status	Build layered DFB	Starting the build of layered DBF. This will b e followed by the standard build output.	None
Status	Migration phase 1	Starting migration phase 1.	None
Status	Migration phase 2	Starting migration phase 2.	None
Status	Updating folder <instrument folder path>	The files in the temporary folder have been successfully converted and are about to be copied into the named instrument folder.	None
Status	Conversion succeeded	The conversion succeeded.	None
Status	Conversion failed	The conversion failed.	Examine the build window to determine the reason for failure.
Status	Build instrument	Starting a full build of the instrument folder. This will be followed by the standard build output.	None

Genre	Message	Description	Action
Status	Recovering from <folder path> to <folder path>	Starting the recovery of the named instrument folder from the named backup folder (if the user clicks the Revert to T940 button)	None
Status	Recovery complete	Successfully completed the recovery operation (happens if the user clicks the Revert to T940 button after migration finishes).	None
Error	Failed to recovery from backup. <Windows error message>. To manually recover the instrument folder, copy the backup folder <folder path> to the instrument folder <folder path>.	The automatic recovery operation has failed. Follow the instructions to manually recover the instrument folder.	Examine the <Windows error message> to determine the reason for the failure Manually recover the instrument folder by copying the backup folder to the instrument folder.
Error	Backing up to <backup folder path> <Windows error message>	Failed to backup instrument folder.	Examine the <Windows error message> to determine the reason for the failure.
Error	Copying to temporary work folder <temporary work folder> <Windows error message>> <Windows error message>	Failed to copy temporary work folder to instrument folder.	Examine the <Windows error message> to determine the reason for the failure.
Error	Updating folder <instrument folder path>	Failed to update instrument folder to temporary work folder.	Examine the <Windows error message> to determine the reason for the failure.
Error	Building layered DBF	Failed to build the a layered DBF.	Examine the build window to determine the reason for the failure.

The build window contains a log of status, warning and error messages that can provide useful diagnostic information for any migration failures, and to confirm the migration successfully completed without any warnings or errors. After migration, carefully study the build window to ensure the migration completed as expected.

The information added to the build window are classified by severity:

- Status messages – show the current status of the migration and are normally displayed during the process.
- Warning messages – show any warnings during the migration process, but indicate that the database may not have been completely migrated. These warnings should be investigated.
- Error messages – shows significant errors encountered during the migration process causing the process to abort. Rectify the cause of these errors and run the migration utility again.

The status, warning and error messages are shown below, together with an explanation and suggested user action.

Genre	Message	Description	Action
Status	GSD file pre-checks	Any GSD files in the source directory are being checked for inconsistencies. These will be checked regardless whether they are used by the strategy.	None
Status	Miscellaneous database checks	The DBF file has been loaded and is being checked to ensure it is suitable for migration.	None
Status	Parsing GWF file	A GWF file was found in the source directory with the same base filename as the DBF file. This is now being parsed and converted into a UJG file (the configuration file type used by the current configuration tools for Modbus Gateway).	None
Status	No GWF file found	No GWF file was found in the source directory with the same base filename as the DFB file. This is not an error – it just means the configuration does not contain a Modbus slave.	None
Status	Parsing DCM blocks	The database is being parsed to locate any DCM blocks, and to derive a map of fields that are requested to be transferred via Modbus or Profibus (master) communications.	None

Genre	Message	Description	Action
Status	Deriving Profibus Cyclic data	If any fields are to be transferred via Profibus communications, this process determines which of these will be transferred as Profibus cyclic. This determines the structure of the cyclic data buffers and generates the GSD files for any 2500 slaves.	None
Status	Exporting GW tables – AMC line <n> (where n is 1 or 2)	For each discrete T940 DCM communications line defined in the source database, a GW configuration file is generated. For Modbus DCM, a UJG file is generated. For Profibus, a UPC file is generated (and then further processed in the second half of database migration).	None
Warning	Non-standard 2500.gsd in source directory	There is a 2500.gsd file in the source directory but it differs from the standard version of the file shipped with the T940.	Inspect and compare against standard. Knowledge of GSD file format required.
Warning	Non-standard t940.gsd in source directory	There is a t940.gsd file in the source directory but it differs from the standard version of the file shipped with the T940.	Inspect and compare against standard. knowledge of GSD file format required.
Warning	Eurotherm extensions in <filename>.gsd	There is a GSD file in the source directory which contains Eurotherm extensions.	Inspect and check against requirements. Knowledge of the GSD file format and T940 Eurotherm keywords is required.
Warning	T940 database is single block server task	Early T940s had a single task for block execution; later T940s had four tasks for block execution. The T2750 also has four tasks for block execution. The source database is the single task style.	None – all blocks will be placed on task 3 which is the most direct equivalent. Restructuring of the database is not necessary, but worth investigating.
Warning	<block>.ExtDgOff non-zero (PBUSDIAG extended diagnostics)	There is a PBUSDIAG block in the source database which has a non-zero value in its ExtDgOff field. This implies extended diagnostics were being used. This form of extended diagnostics is not migrated.	If extended diagnostic support is required in the migrated strategy, it will have to be re-implemented manually via the Profibus Master configuration tool.

Genre	Message	Description	Action
Warning	<block>.ExtDgX_Y connect source (PBUSDIAG extended diagnostics)	There is a PBUSDIAG block in the source database which has connections sourced from one of its ExtDgX_Y fields. This implies extended diagnostics were being used. This form of extended diagnostics is not migrated (although the connections remain unchanged).	If extended diagnostic support is required in the migrated strategy, it will have to be re-implemented manually via the Profibus Master configuration tool.
Warning	Non-base DCM digital channel block has been mapped to comms	There is a class of DCM blocks where each block represents a single digital point. Several of these (up to 8) can be assigned to different channels on the same slot number of the same slave. The block corresponding to the lowest numbered channel is known as the "base" block. Only the base block should be mapped to the comms (these blocks contain a "hidden" field which packs the individual bits into a single parameter). This message is generated if one of these hidden fields on a non-base block is mapped. This should not occur. If it does, the mapping is ignored.	This suggests either a corruption of the source database or an inconsistent slave / slot / channel configuration in these single channel digital point DCM blocks. Check the configuration of these block types in the source database. If necessary correct and run the migration tool again.
Warning	ENUM <block.field> mapped to slave <number>	The referenced ENUM field has been mapped to write to a parameter in the referenced slave device. The behavior of such mappings differs between DCM and GW. In DCM, just the enumeration value is written. In GW, the lower written byte is the enumeration value and the upper written value is the enumeration limit. Note DCM & GW behave the same when reading ENUMs.	Migration sets the T2750 to emulate DCM behavior by default. However, if there is one of these fields in a GW Modbus slave configuration you may wish to adopt the GW behavior. See the Options.GwDcmEmu bit in the TACTICIAN header block.

Genre	Message	Description	Action
Warning	TIME <block.field> mapped to slave <number>	The referenced TIME field has been mapped to a parameter in the referenced slave device. The behavior of such mappings differs between DCM and GW. In DCM, time values are transferred as a 32-bit value representing milliseconds. In GW, time values are transferred in ISO8601 format.	Migration sets the T2750 to emulate DCM behavior by default. However, if there is one of these fields in a GW Modbus slave configuration, you may wish to adopt the GW behavior. See the Options.GwDcmEmu bit in the TACTICIAN header block.
Warning	REAL <block.field> mapped to UNIT16 in slave <number>	The referenced REAL field has been mapped to an <i>unsigned</i> 16-bit integer in the referenced slave device. The behavior of such mappings differs between DCM and GW. In GW Modbus, integers are always treated as signed. Different clipping arrangements apply when converting from REAL to unsigned integers. In DCM the value is clipped to the range 0 to 65535 before conversion. In GW the value is clipped to the range 0 to 65536; and if outside that range, is limited to the range 0 to 65535 These differences cannot be migrated.	The impact of these differing clipping arrangements should be investigated on a case-by-case basis. If necessary, limiting blocks may have to be added to the migrated FBD strategy.
Warning	REAL <block.field> mapped to INT16 in slave <number>	The referenced REAL field has been mapped to a <i>signed</i> 16-bit integer in the referenced slave device. The behavior of such mappings differs between DCM and GW. Different clipping arrangements apply when converting from REAL to signed integers. In DCM the value is clipped to the range -32768 to +32767 before conversion. In GW the value is clipped to the range +/-65536; and if outside that range are limited to the range 0 to 65535 These differences cannot be migrated.	The impact of these differing clipping arrangements should be investigated on a case-by-case basis. If necessary, limiting blocks may have to be added to the migrated FBD strategy.

Genre	Message	Description	Action
Warning	REAL <block.field> is normalised/scaled slave <number>	The referenced REAL field has been mapped to an integer in the referenced slave device using normalisation/scaling. This is not supported in Modbus GW.	The required normalisation will have to be added to the FBD.
Warning	ALARM <block.Alarms.alarm> mapped to slave <number>	The referenced alarm has been mapped in the referenced slave device. It is believed this was rarely (if ever) done. The behavior was not consistent in the T940 if this was done.	The migration will work & the alarm should function correctly.
Warning	Unable to locate Modbus Master in _system.opt	The (DCM) Modbus master on T940 uses COM2. The COM2 parameters are expected to be defined in _system.opt in the source directory. If this file is missing, or the COM2 definition within this file is missing or incorrect, the migration process cannot determine the serial line settings.	The contents of the migrated GWF will default to 9600 baud, 1 stop bit, 250 ms time-out. Edit if these if different values are required.
Warning	Invalid Modbus Master parity in _system.opt	The T940's (DCM) Modbus master COM2 parity in _system.opt appears to not be valid (it should be none, odd, or even).	The contents of the migrated GWF will default to EVEN parity. Edit if a different value is required.
Warning	Unable to locate Profibus Master in _system.opt	The (DCM) Profibus master port on T940 is defined in _system.opt. If this file is missing, or the Profibus master definition within this file is missing or incorrect, the migration process cannot determine the Profibus Master node number.	The migrated Profibus master configuration will default to a master node number of 2. Edit if a different value is required.
Warning	Profibus Master node < 2	The T940's (DCM) Profibus master port in _system.opt is defined with a node number < 2. This is not valid in the migrated strategy.	Check & edit the Profibus master node number in the migrated strategy.
Warning	Invalid baud rate in GWF file	The Modbus slave strategy in the GWF file in the source directory has an invalid baud rate.	The migrated Modbus slave will default to 110 baud. Edit if a different value is required.

Genre	Message	Description	Action
Warning	Invalid parity in GWF file	The Modbus slave strategy in the GWF file in the source directory has an invalid parity.	The migrated Modbus slave will default to NONE parity. Edit if a different value is required.
Warning	GWF file specified serial link using 0 stop bits	The Modbus slave strategy in the GWF file in the source directory defines 0 stop bits. This is not valid.	The migrated Modbus slave will default to one stop bit. Edit if a different value is required.
Warning	<block> Profibus acyclic transactions used	Profibus cyclic transactions were requested, but acyclic transactions actually used.	This is the same behavior as would have occurred on the T940.
Warning	<block> No data groups installed	A DCM block was found which had no fields mapped to comms parameters (probably due to them all being removed via the profile file (UYP/UYM)).	This is the same behavior as would have occurred on the T940.
Warning	AMC memory full on port <port>	The available AMC memory has been exhausted on the specified <port>.	This is the same behavior as would have occurred on the T940.
Warning	<block> Failed to install cyclic <read/write> data group	A requested data group of read or write parameters on the specified block failed to install.	This indicates an error in the source configuration. Inspect and correct as necessary.
Warning	<block.field> Invalid data type	An attempt has been made to map the specified field to an incompatible comms data type.	This indicates an error in the profile file (UYP/UYM). Inspect and correct as necessary.
Warning	<block> No such port	A DCM block was found which was attempting to map fields to an invalid comms port. This is most likely due to a missing or incorrect _system.opt file.	Correct the _system.opt file and run the migration tool again.
Warning	<block> Attempted to add block to unknown Profibus node.	A DCM block was found which specified an invalid Profibus slave node number.	Correct the slave node number in the block and run the migration tool again.

Genre	Message	Description	Action
Warning	<block> Missing profile file <filename>	A DCM block specifies a profile file (UYP/UYM) which cannot be found in the source directory.	Put the missing file in the source directory and run the migration tool again.
Warning	<block> Error in <filename> Line <number>: <error> <keyword>	There is a syntax error with the <keyword> in the profile file (UYP/UYM) associated with the block on the specified line. The <error> text can be one of the following: <ul style="list-style-type: none"> • Bad field name • Bad address • Bad type • Bad function code / service • No db pool memory left • Bad normalised data range 	Correct the syntax error. In the case of "no db pool memory left", this means too many fields from this block have been mapped to comms parameters and should be reduced. Run the migration tool again once corrected.
Warning	<filename> Missing mandatory entry <keyword>	The specified GSD file is missing the mandatory <keyword>.	Correct the GSD file and run the migration tool again.
Warning	<filename> Invalid entry <keyword>	The specified GSD file has a syntax error associated with <keyword>.	Correct the GSD file and run the migration tool again.
Warning	<filename> Errors in GSD file <text>	The specified GSD file has a syntax error associated with <text>.	Correct the GSD file and run the migration tool again.
Warning	<filename> Missing GSD file	The specified GSD file is missing from the source directory.	Put the missing file in the source directory and run the migration tool again.
Warning	<filename> Invalid master GSD file	The specified GSD file contains errors. NOTE: Typically during a migration, the default t940.gsd would be used, which cannot generate this error.	Correct the master GSD file and run the migration tool again.
Warning	<block.field> mapped to already mapped comms parameter	The specified block.field has been mapped to a comms parameter which has already been mapped to another block.field. This is not supported in the GW.	Manually resolve this one-comms-to-many-fields mapping after migration.

Genre	Message	Description	Action
Error	No free drive letters	The migration tool needs to find a spare drive letter (A to Z) which it uses during the migration process. All 26 drive letters are already in use.	Free up any drive letter and run the migration tool again.
Error	Invalid template directory path	The migration feature has been instructed to use a non-standard directory path to source its template library set.	Indicates a faulty LINtools installation. Try installing LINtools again.
Error	File not found <DBF file name>	The specified DBF file was not found in the source directory.	Locate the missing DBF file and place in the correct folder.
Error	Cannot access source directory	The migration tool was not able to perform a directory scan for *.GSD in the source directory.	Indicates a faulty LINtools installation. Try installing LINtools again.
Error	More than 50000 mapped fields in DCM blocks	The migration tool has found more than 50000 mapped fields in the source database.	Run the migration again. If this error occurs again, contact support for further help.
Error	GWF table <number> is invalid type	The Modbus slave GWF file in the source directory specifies an invalid table type.	GWF file in source directory is corrupt. Replace with a valid version of the file and run the migration tool again.
Error	No header block in database	The source DBF file does not contain a header block	Correct the source and run the migration toll again.
Error	Header block is not T940	T940s could be configured to use header blocks other than the T940 header block. The migration tool will only migrate DBFs that use the T940 header block.	Replace the header block with a T940 header block and run the migration tool again.
Error	DCM -> GW Modbus requires 64 tables.	The DCM Modbus, when migrated, requires greater than 64 tables. This exceeds the capacity of the T2750 GW Modbus system.	

Genre	Message	Description	Action
Error	Error <error> loading from file <filename>	The specified GWF file generated an error when attempting to load. This indicates a corrupt/invalid GWF file.	The <error> is a standard LIN error code.
Error	INTERNAL ERROR refer to Eurotherm: <text>	An unexpected error was encountered during migration.	Contact Eurotherm. You will be asked to provide a copy of the strategy you were attempting to migrate.

Rolling back to the original version if the migration fails

After a successful migration, the original T940(X) version of the database can be restored by clicking on the **Revert to T940** button within the migration dialogue box.

If the migration dialogue box has been closed, or the migration failed, it will be necessary to restore the backed up files manually. Close LINTools and locate the appropriately named backup folder inside the instrument folder where the database is located. The backup folders are named by date and time at the point of migration. Copy all the files from the backup folder over the top of the existing instrument files.

Finally, fix any issues that stopped the migration from completing successfully, and run the migration tool again.

Post-migration steps

If any of the limitations outlined in "Migration limitations" on page 11 affected your strategy, make sure corrective action has been applied. Then:

- Use the *Instrument Options Editor* to configure the netHOST connected to the T2750.
- Open the *ProfibusEditor*, either from *LINTools* or by double-clicking on the .upm file, and save the Profibus configuration.
- Use the *Instrument Options Editor* to download the '_system.opt' file to the instrument as this file is not included in the files when a download is issued from *LINTools*.
- From *LINTools*, download the strategy to the instrument.

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