

Engineer^{IT}
Control Builder F

Engineering Manual
Operate^{IT} B Integration



ABB

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1 Operate^{IT} B Integration

In addition to the DigiVis software package, a Operate IT B System can also be used to operate and monitor a Freelance 2000 System. The connection of the Freelance 2000 System with Operate IT B is achieved via an OPC Interface. The project configuration procedure on DigiTool determines which data is to be available on Operate IT B. During the commissioning process, the appropriate parts of the project are transferred from DigiTool to Operate IT B.

1.1 System overview

In a Operate IT B System, all the data is stored in a Operate IT B configuration server. This database exists in every Operate IT B System exactly once. The Freelance AddOn package is available for the integration of a Freelance 2000 system. This software contains the class descriptions and faceplates for the Freelance function blocks and also the program with which the configured Freelance project data is transferred to the Operate IT B System. This program is referred to in the following as the TagImporter.

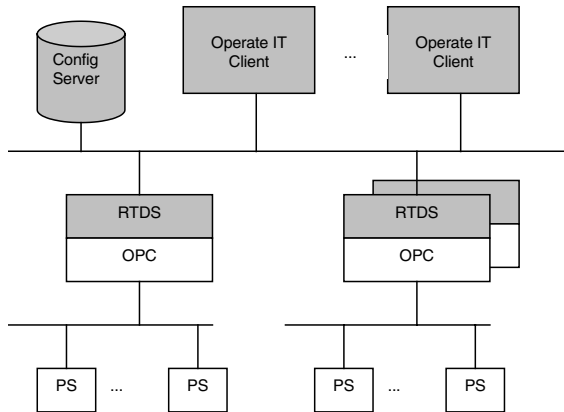
In order to operate the system, it is necessary to install the Operate IT B Navigator at each operator terminal. The required configuration data are read from the Operate IT B Configuration Server via an Ethernet connection.

The data of a subordinate system is read using a RTDS (RealTimeDataServer). The integration of a Freelance 2000 system is carried out via the OPC interface. The RTDS for a Freelance 2000 system contains the OPC client software. A dedicated RTDS must be installed for each Operate IT B– Freelance 2000 system connection.

A Freelance 2000 system places its data at the disposal of Operate IT B in an OPC server. In the Freelance 2000 project, an OPC gateway is configured for the integration in Operate IT B. The Freelance OPC server software is installed on the gateway PC. An OPC gateway must be configured and an OPC server installed for each Operate IT B - Freelance connection.

The RTDS can be operated redundantly. The definition of the OPC interface does not provide for the redundancy. A redundant coupling to a Operate IT B System is achieved in Freelance as an application redundancy, with two OPC gateways having to be identically configured. Correspondingly, two OPC servers have to be installed.

An Ethernet connection is required for both the exchange of data and in loading the project data from DigiTool to Operate IT B.



Name	Description	Number required
Operate IT B Config Server	Configuration Server, Database for all Operate IT B data	One for the complete system
Operate IT B Freelance AddOn	Classification descriptions and faceplates for the Freelance function blocks on the Operate IT B Freelance TagImporter (program for conversion of the Freelance configuration to Operate IT B data and storage in the ConfigServer)	One for the complete system
Operate IT B Navigator	Basic software for operation on Operate IT B	One for each Operate IT B operator terminal
Operate IT B Freelance RTDS	Contains the OPC client software, Operate IT B component for the data connection between Operate IT B and Freelance	One for each Freelance – Operate IT B connection
Freelance OPC Server	OPC server software, Freelance component for the data connection between Operate IT B and Freelance	One for each Freelance – Operate IT B connection
Freelance DigiTool	Enables the configuration of a Freelance 2000 system	One for each Freelance 2000 system
Freelance DigiVis	For operation of a Freelance 2000 system with the Freelance operating software	One for each local operator terminal

1.2 Hardware

All the software components are produced as stand-alone packages and can be operated on any suitable PC. The performance requirements of the PCs depend on the number and type of software packages installed. All the PCs must be linked together via Ethernet.

For smaller systems and laboratory applications all the necessary software components - Config Server, Operate IT B Navigator, RTDS, OPC Server, DigiTool and DigiVis – can be installed on a single PC.

For larger installations and in order to increase system security, a number of PCs should be used. It is recommended that the Operate IT B-Config Server be installed on a separate PC. Likewise, a separate PC should be used for each Operate IT B operator terminal.

The Freelance OPC server and the related Operate IT B RTDS – that are the Freelance and the Operate IT B program components for the data communication – should be installed together on one PC. This PC must at least satisfy the recommended requirements for Operate IT B.

To achieve a redundant coupling, two PCs should be used, each having one RTDS and one OPC server.

In general, one OPC server is adequate for the coupling of one Freelance system to Operate IT B. For higher requirements a more powerful PC can be used or the data to be coupled can be divided between two OPC gateways.

1.3 Data link

1.3.1 Reading of values

When the configuration from DigiTool is loaded, all variables and block data that can be read and written from Operate IT B is made known to the OPC gateway. The configured objects with their names and addresses on the process stations are inserted in a table in the gateway. The maximum number of variables is only limited by the size of the available memory on the gateway PC.

Operate IT B logs-on to the gateway the variables that are to be read for updating, as soon as their values are required (for archiving, for representation in the faceplate, in a free graphic, etc.) and logs them off again when the updating is no longer required.

After an updating interrogation, lists for reading the values from the process stations are built up in the gateway and from this point in time onwards the current values are buffered in the gateway with an update cycle of 1000 ms.

The data from a Freelance 2000 process station are communicated via lists. Depending on the data types of the variables and on the assumption that no values of string data types are communicated, on average 250 values can be transported in one list.

A maximum of 10 lists is available for communication between a process station and a gateway. Thus approximately 2500 variables can be read from each process station, via a gateway, at a given point in time. Using modified Operate IT B interrogation, other variables can be read at another point in time – i.e. from other addresses.

1.3.2 Writing of values

In general, the writing of a value in the Freelance 2000 process station is initiated by an operator action.

The writing of values has no affect on the performance of the read facility in the gateway, i.e. the values to be written are processed in the gateway in parallel with the values to be read.

1.3.3 Messages to Operate IT B

All the messages generated at the process stations are sent to the gateway, where they are filtered before being forwarded to Operate IT B. All system messages are forwarded to Operate IT B; process messages are only passed on if a gateway access has been configured for the tag that has generated this message. All other process messages are discarded in the OPC server.

The messages are passed directly to Operate IT B and are entered in the message database there. If the connection to the client is broken, all messages are discarded. When a new connection has been established, all currently pending messages are re-read from the process stations and the complete message information is sent to Operate IT B.

1.4 Licensing

A 'Operate IT B Integration Licence' is required for the Freelance 2000 system for a number of RTDSs. Only with this licence is it possible to configure Operate IT B and the RTDS connections as a control station for Freelance.

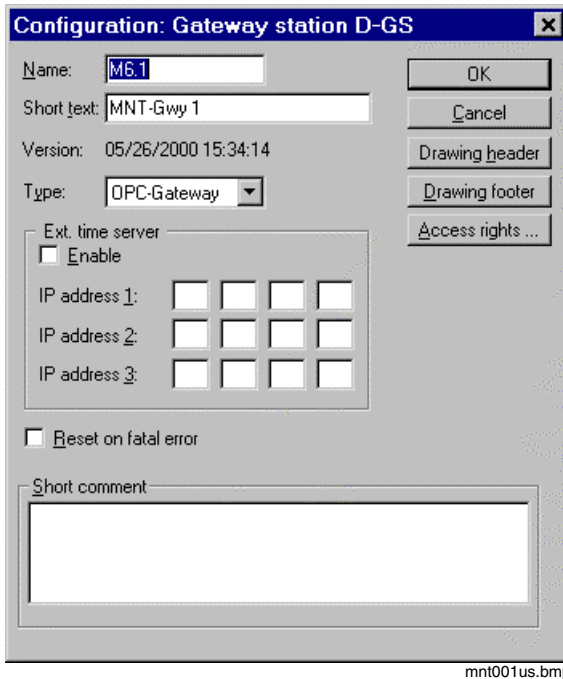
The AddOn package for Freelance 2000 must be installed in the Operate IT B System. This package contains the Freelance TagImporter for storing the DigiTool data, and the descriptions of the Freelance 2000 function blocks for Operate IT B and the associated faceplates.

1.5 Configuration

1.5.1 Set-up and configuration of the gateway station in the project tree

A gateway station must be configured under the CONF configuration project element.

The configuration of the gateway station consists of allocating a name with a maximum of 4 characters and specifying the gateway type. When coupling a Freelance 2000 system with Operate IT B the type OPC gateway must be entered



This dialog is presented directly when setting up a new gateway resource, or via the menu selection *Project / Header ...* for a gateway.

<i>Name</i>	Arbitrary name of the gateway, max. 4 characters,
<i>Short text</i>	Arbitrary text, max. 12 characters. (This text is not checked for plausibility within the Freelance 2000 system. In particular, in the case of large systems with a number of sub-systems within Operate IT B, this text can be used to better identify the individual stations.)
<i>Version</i>	Date and time of creating the object,
<i>Type</i>	OPC gateway.

Ext. time server On loading the gateway station the functionality is activated to dispatch targeted time synchronization messages to other stations in the network.

Enable

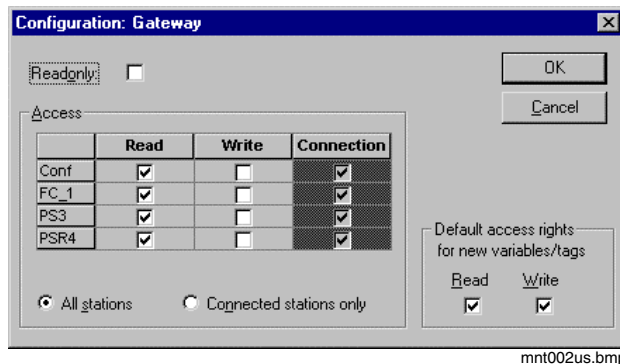
Ext. time server Time synchronization of external stations is switched on or off.

IP-Address 1..3 Up to 3 stations can be time-synchronized by an OPC gateway. The addresses of Freelance process stations can be entered.

DRAWING HEADER
AND FOOTER

See **Engineering Manual, System configuration, Documentation**

After the selection of ACCESS RIGHTS... the following dialog is displayed:



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The gateway access methods are established in this dialog. The settings in this dialog are given preference over the settings for the subordinate objects (tags and variables).

ALL the process stations in the project are listed in the left column, irrespective of whether a connection between the process station and the gateway station has been configured in the connection editor or not. Inconsistencies are indicated via the plausibility check.

Read only Fundamentally, no write commands from the Operate IT B System are passed to the process stations.

Access The system is configured in respect of each process station that is available in the project to determine whether it is to be accessed via the gateway on a read-only or read and write basis.

If read-only rights are configured for a process station, all write access to a variable or tag at this process station is rejected in the gateway. The entry 'read-only' for the complete gateway overwrites a write access that has been configured there.

For each process station that is subsequently set-up in the project tree, a read access right is assigned as standard via the gateway.



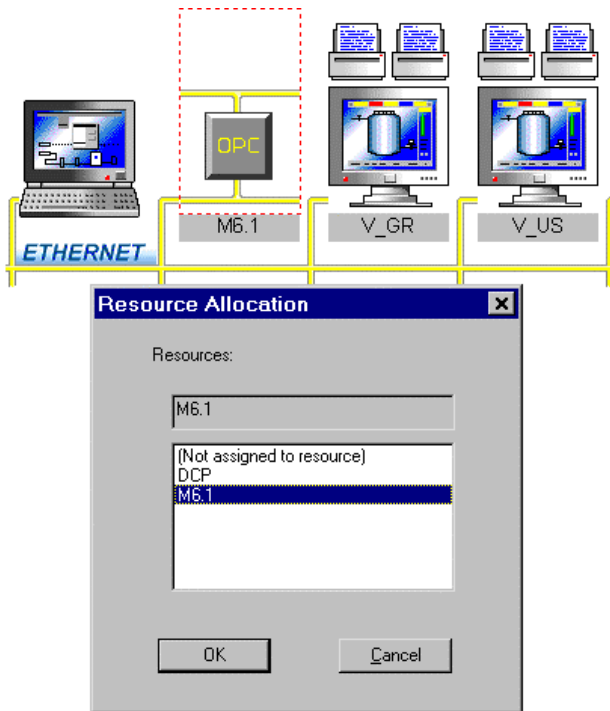
A write access right that is configured here is only effective if the 'read-only' check box is not ticked.

Default access rights for new variables/tags

All newly applied variables and tags retain the access rights that are configured here as a pre-setting for this gateway.

1.5.2 Gateway station in the hardware structure

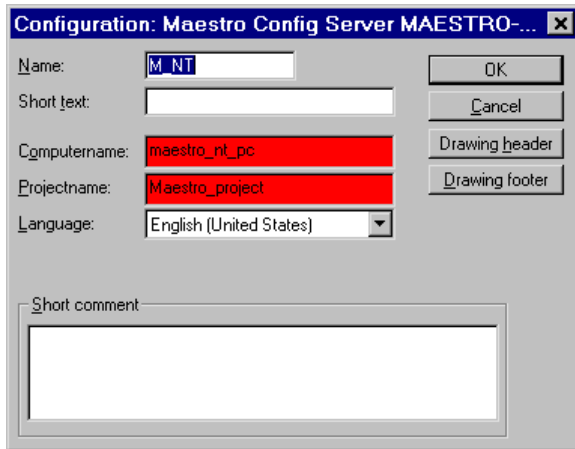
In the hardware structure, a free space must be selected within the operator control level and a gateway resource that has already been set-up in the project tree must be allocated.



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1.5.3 Configuration of the Operate IT B station

A MAESTRO CS ConfigServer resource is inserted in the project tree, below the CONF node.



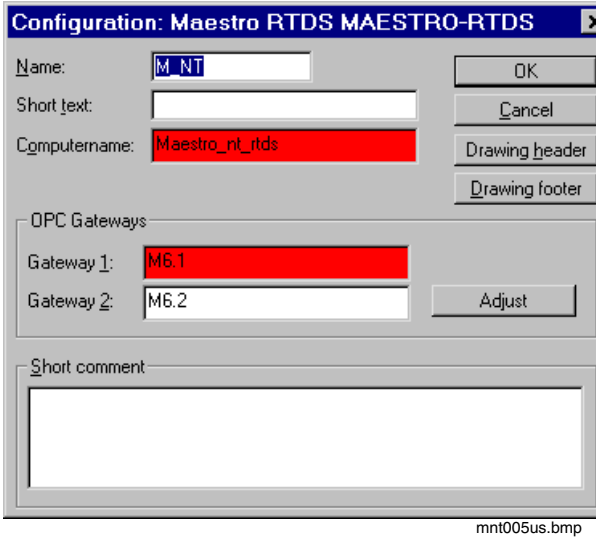
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<i>Name</i>	Arbitrary name of the Operate IT B resource, max. 4 characters
<i>Short text</i>	Arbitrary text, max. 12 characters. (This text is not checked for plausibility within the Freelance 2000 system. In particular, in the case of large systems with a number of sub-systems within Operate IT B, this text can be used to better identify the individual stations.)
<i>Computer name</i>	Name or IP address of the PC in the network that contains the Operate IT B database.
<i>Project name</i>	Name of the Operate IT B project in which this Freelance 2000 system is to be integrated. (After installation of Operate IT B software a default project 'ConfigServer' exists in Operate IT B system.)
<i>Language</i>	Selection of the project language to be used for Operate IT B.

1.5.4 Configuration of a RTDS

A RTDS (RealTimeDataServer) is configured under the Operate IT B resource. A RTDS contains the software that renders the data available from a subordinate system for a Operate IT B system.

In order to distribute the communication load, it is possible to connect a Freelance project to a Operate IT B system via several RTDS links. However, in this case, each tag and variable must be explicitly assigned to one RTDS.



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<i>Name</i>	Arbitrary name of the RTDS object, max. 12 characters.
<i>Short text</i>	Arbitrary text, max. 12 characters.
<i>Computer name</i>	Name or IP address of the PC in the network that contains the communication software for Operate IT B.
<i>OPC Gateways</i>	Name of the OPC gateway station that makes the Freelance data available for Operate IT B. Enter the name or select via the F2 key.
<i>Gateway 1</i>	Name of the OPC gateway station
<i>Gateway 2</i>	Name of the redundant OPC gateway station
<i>ADJUST</i>	The configuration for the two gateway stations is adjusted, i.e. the access rights to the tags and variables configured for gateway 1 are accepted for gateway 2. All previously configured access rights for gateway 2 are deleted.

1.5.5 Configuration of the process stations

With two exceptions, the configuration of the process stations is independent of an integration in Operate IT B. To couple a Freelance 2000 system to Operate IT B, the DigiTool project data is transferred to the Operate IT B system, adapted to the data structure of this system using the TagImporter program and loaded into the Operate IT B database.

Several points should be noted in respect of the integration into Operate IT B when preparing the project in DigiTool. See the next chapters.

1.5.6 Tags and variables

For each coupled tag and variable, an object with the appropriate name is created in the database in the Operate IT B system. In the gateway station, the names of the tags and variables are converted into process station addresses. The procedure of allocating names must satisfy the conventions of all the systems.

In the Operate IT B system, various characters are reserved for the different functions. These characters must not be used in the names of the objects to be coupled.

The following characters can be used for names without restriction:

0 ... 9	(ASCII "048" - "057")
A ... Z	(ASCII "065" - "090")
a ... z	(ASCII "97" - "122")

The following characters are not permitted:

:	(Colon, ASCII "058")
;	(Semicolon, ASCII "059")
.	(Period, ASCII "046")
,	(Comma, ASCII "044")
/, \	(Diagonal strokes, ASCII "047", "092")
"	(Inverted commas, ASCII "034")
'	(Apostrophe, ASCII "039")
[,], (,), {, }	(Brackets, ASCII "091", "093", "040", "041", "123", "125")
?	(Question mark ASCII "063")
%	(Percentage sign, ASCII "037")
&	(And sign, ASCII "038")
*	(Asterisk, ASCII "042"),
#	(Number sign, ASCII "035")
	(ASCII "127")
	(ASCII "00" .. "31")

The following characters must not be used as 1 character in the names:

Space	(ASCII "032")
_	(Underline, ASCII "095")
!	(Exclamation mark, ASCII "033")
+, -	(Plus, Minus, ASCII "043", "045")

A space must not be used as the last character.

In contrast to the Freelance 2000 system, in the Operate IT B system, no distinction is made between upper and lower case text. When coupling the systems, therefore, no names are permitted that are only distinguishable by upper case and lower case text.

Within a Freelance 2000 system the names are always unambiguous. Therefore, if projects from a number of Freelance 2000 systems are loaded in the same Operate IT B system, collisions can occur. The TagImporter provides a warning if a collision of names is detected and the object concerned is not loaded into the database.

1.5.7 Stipulation of the data that is available via the gateway

The project configuration must define which data from the process stations is to be available to the Operate IT B system via the gateway. The configuration stipulates, for each tag and variable in the project, whether the data from the process station can be read and/or written via the gateway.

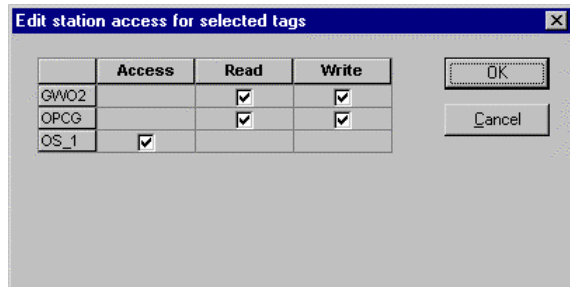
In the station view (*Tag/Variable list* → *station view*), the permissible methods of access via a gateway can be stipulated for each entry on the list. The configured station access conditions are visualised in the variables and tags list through individual letters:

Variable list Search Edit System Cross references!						
Name	DCP	DCPr	OPC	DDE	M6_1	M6_2
AS_HEIZ	RW	RW	RW	RW	RW	RW
AnaOut01	RW	RW	RW	RW	RW	RW
AnaVal01	RW	RW	RW	RW	RW	RW
Ausg_saege	RW	RW	RW	RW	RW	RW
Ausg_sinus	RW	RW	RW	RW	RW	RW
BEH1_BLAU	R	R	R	R	R	R
BEH1_GRUEN	RW		RW	RW	R	RW
BEH1_PINK	RW	RW	RW	RW	RW	RW
BEH2_BLAU	RW	RW	RW	RW	RW	RW
BEH2_GRUEN	R	R	RW	RW	RW	RW
BEH2_PINK	RW	RW	RW	RW	RW	RW
BinOut05	RW	RW	RW	RW	RW	RW
BinOut06	RW	RW	RW	RW	RW	RW
BinOut07	RW	RW	RW	RW	RW	RW
BinOut08	RW	RW	RW	RW	RW	RW
BinOut09	RW	RW	RW	RW	RW	RW
BinOut10	RW	RW	RW	RW	RW	RW
CycRes	RW	RW	RW	RW	RW	RW
DCP_CMajorVerNo	R	R	R	R	R	R
DCP_CMinorVerNo	R	R	R	R	R	R
DCP_CPU_Load	R	R	R	R	R	R
DCP_CPatchVerNo	R	R	R	R	R	R


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R Read
W Write

After double-clicking the left mouse button in a gateway column or positioning the cursor in a row and selecting *Edit / Station Access...* the dialog for configuring the access options appears. The station access can be collectively changed for a number of list entries, in that a number of entries can be marked using Shift + arrow keys before going to the menu (*Station Access...*).



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Left column	Listing of all configured operator and gateway stations; only the gateway stations are listed in the variables list ;
ACCESS	Only for DigiVis stations, no significance for gateway coupling;
READ	The data for the previously selected variable/s and tag/s can be read from the process stations via the gateway;
WRITE	The data for the previously selected variable/s and tag/s can be modified at the process station via the gateway (only user-defined variables can be written, pre-defined process station variables can only be read).
	No access should be configured via the process display for variables that have been written both by a task and via a gateway. The write command can be lost on implementation of the process image. If these variables are used in a redundant task, then they should be represented by other variables.

1.5.8 Commissioning the gateway station

As with the process stations, a gateway station must also be commissioned. The configured station access rights can be visualised via the dialog (Select project tree element → *Project* → *Header...*).

When all the process stations have been loaded, the project data must also be loaded to the gateway station. On the first commissioning of a gateway *Load* → *Whole station* is required, configuration changes are transferred to the gateway station *through Load* → *changed objects*.

All variables and tags to which access through this gateway has been configured are made known to the gateway station using the DigiTool loading procedure. The data for these variables and tags can be displayed later on a Operate IT B system and modified if necessary.

1.5.9 Loading project data into a Operate IT B system

In preparation:

In a similar way to loading a DigiVis station, all the necessary data here are transferred to Operate IT B using a download. Also when loading a Operate IT B station, on first commissioning it is necessary to proceed *Load → Whole station*. Configuration changes are transferred by *Load → changed objects*. (In the first implementation step this procedure must be executed 'manually').

Loading the data into the Operate IT B database is a longer procedure in terms of time than loading a DigiVis station. For this reason, the data are transferred and then the TagImporter is started. Import is executed directly on the Operate IT B computer, containing the ConfigServer. The DigiTool PC is no longer required.

An object is created in the Operate IT B database for each tag and variable that is transferred from Freelance to Operate IT B. After the object generation, the data can be displayed and operated with the associated faceplates.

1st step of realization: It is not possible to load the Freelance 2000 data directly from the project tree into the Operate IT B system. The data must be exported from the highest menu level of DigiTool into a PLC file, *Project / Export / PLCOpen-File (*.plc)*. This file must be transferred into the PC which has the installation of the ConfigServer of Operate IT B (e.g. per FTP). At this computer the Freelance 2000 TagImporter must be started, the PLC file must be loaded. After importing the OPC server all tags and variables can be imported by selection or completely with one step

1.5.9.1 DigiVis station project data

The project configuration of the DigiVis stations are not transferred to Operate IT B, only the configuration of the process stations. Thus there is no transfer from Freelance 2000 to Operate IT B of

- Graphics displays,
- Group displays,
- Trend displays,
- Archives,
- Display assignments.

All these settings must be re-configured on Operate IT B.

1.5.10 Display of Freelance 2000 data on Operate IT B


As soon as the objects for the Freelance 2000 tags and variables have been generated and stored in the database, all the data necessary for the Freelance 2000 project is contained in the Operate IT system. Faceplates for the tags and variables can be called up, values from tags and variables can be used in graphics displays and protocols. The operation of parameters and variables is also directly possible.

Likewise, the signals from the Freelance 2000 process stations can be immediately received in the Operate IT B system.

1.5.11 Re-configuration of Operate IT B-relevant data

In achieving the display of the Freelance 2000 project on Operate IT B, a Operate IT B object is created for every function block and every variable. To this end, a display specification exists for every Freelance 2000 function block and variable type that is available on Operate IT B via a gateway. The values configured in Freelance 2000 are accepted in the Operate IT B objects. All parameters that are not available in Freelance 2000 obtain suitable default values on the first configuration.

Special Operate IT B functions, such as archiving, display assignment, etc., must be established with the online configuration. All data can be modified again in the Operate IT B configuration dialog. It must be remembered, however, that on re-loading the project, for example following a project change in DigiTool, all the values configured in DigiTool are overwritten again.

 The source of the Freelance 2000 function blocks on Operate IT B is DigiTool. All configurations made possible by DigiTool should be carried out on DigiTool. Only those configurations that are specific to Operate IT B should be carried out on Operate IT B.

Example: The user access right for operating a value is a part of the function block information. It has its origin in Freelance 2000 and is therefore always overwritten again on every loading sequence with the values configured in DigiTool. The presentation format of a value is purely Operate IT B information and is not configured on Freelance 2000. On the first creation of the object a default format is entered; any format change that is undertaken in this instance is retained on 'over-loading' the object.

There is no identification in the configuration dialogs as to which data is overwritten by a re-loading on Operate IT B. If a number of objects of a type are changed in the same way, therefore, an individual instance should be tested to see if the modifications have been retained on re-loading the project.

1.6 Time synchronization

All CPU sub-assemblies within a Freelance 2000 system (DCP process stations and field controllers) are harmonized in respect of the time synchronization. In general the sub-assembly with the lowest station number accepts the timemaster function for the CPU sub-assemblies. On connecting a radio clock to a CPU sub-assembly, this CPU becomes the time master in the Freelance 2000 system.

All PCs within a Freelance 2000 satellite (DigiTool, DigiVis, OPC) can be synchronized by this process station (Adjustment on set-up). If a Freelance 2000 PC is not time-synchronized the representation of the curves and trends will not operate correctly.


A radio clock with a connection to each sub-system should be used to time-synchronize a number of systems under a Operate IT B system.

The functions on the Windows operating system are available to achieve time synchronization between the sub-systems and Operate IT B. (See Operate IT B documentation)

Without radio clock the following settings are necessary to time-synchronize Operate IT B and Freelance: Disable the automatic time-synchronization during the installation of DigiTool. In the Freelance project configuration: Activate the external time server for the OPC gateway which is used for data transfer to Operate IT B and specify the IP address of one Freelance process station.

1.7 Retrospective project changes

After a configuration change in DigiTool and the loading of modified objects on the process station, it is not initially possible for Operate IT B to operate via the OPC server. The Freelance 2000 function blocks can only be operated again after loading modified objects on the gateway.

 If no gateway-related changes have been made, only the version number of the project has to be adapted on the gateway. DigiTool executes this change automatically.

In the first implementation step no version monitoring exists between Freelance 2000 and Operate IT B. This means, that the adjustment of the project data must be ascertained by the user. Following a project change in DigiTool, re-loading in respect of Operate IT B is only necessary if data and parameters have been modified which are relevant to the representation on Operate IT B. If, for example, a function block is inserted in the project, adaptation of the workstation configuration is only necessary if this function block is also to be available via the gateway.

2 Representation of the Freelance 2000 data on Operate IT B

2.1 Display of the Freelance 2000 blocks and variables on Operate IT B

A faceplate exists on Operate IT B for the function block classes that are available on DigiVis (see Appendix for assignment of the class identifiers). Not all selectors for the Freelance 2000 blocks are available on Operate IT B. In general, the selectors that are available are those that are required for representation in the faceplate.

In coupling a communication block (Modbus, send and receive, telecontrol protocol), the messages for this block are transferred to Operate IT B.

The data configured in Freelance are displayed by the TagImporter on the structures of the Operate IT B objects. Data that are available only on Operate IT B but not in Freelance 2000, are allocated default values. The instance data of the objects can be changed in the online configuration of Operate IT B. On an update of the Freelance 2000 project – new import of project data using the TagImporter – the data that were configured in DigiTool are overwritten with the current project data. Data that cannot be imported from the Freelance project are retained on the update.

2.2 Short text and long text

A short and a long text can be configured for each tag in the Freelance 2000 system. Both these texts are imported into the description of the Operate IT B objects (Description = <short text> / <long text>).

2.3 Areas

The areas configured in Freelance are accepted in Operate IT B on the generation of an object. Tags and variables from two different Freelance projects that have been configured for identical areas are applied in Operate IT B under the same area.

The area of a Operate IT B object can be changed with the Operate IT B online configuration; on an update of the Freelance project using the TagImporter, **the change is retained**.

A tag was first configured without an area definition. In this case a new configured area is accepted into the Operate IT B system by updating this tag by using the TagImporter.

2.4 Display formats

The display format of a value is defined separately in Freelance 2000 every time the value is used. In other words, the same value can be displayed differently in different places, e.g. in graphics displays and protocols, and the same real value can be displayed with a different number of decimal places.

The display format in Operate IT B has a fixed connection with the value. If the same value is displayed in different places, the format configured for this value is always used for display.

When a Operate IT B object is generated the TagImporter ascertains a suitable format. If the display formats are changed in online configuration, **these values are retained on update.**

2.5 Faceplates on Operate IT B and DigiVis

Several differences result from the different systematics of the two systems. See the description in the next chapters.


2.5.1 Basic differences

2.5.1.1 Size of the faceplates

On Operate IT B, all faceplates have the same size (1/8 of the representation range or 1/8 of the group display).

2.5.1.2 Texts

All the texts configured in DigiTool are displayed on Operate IT B in text lists. Identical texts are only inserted once. Before a text is inserted in the database, a check is made to see if the text already exists. No distinction is made here between upper and lower case, e.g. if a text 'ON' already exists, then a text 'on' will not be inserted.

 No distinction between upper and lower case text is made on Operate IT B. The text 'ON' and 'on' do not exist next to each other. The text is used in the Operate IT B system in the notation in which it was first required.

2.5.1.3 Presentation of messages in the faceplate

All data for the tag messages are supplied with the message via the OPC interface. As in the Freelance 2000 system, upcoming alarms are displayed in the header of the faceplate.

Within a Freelance 2000 system the configured alarm types are filed for all block classes in the Gt<Nr> parameters. The value of this parameter is defined class-specifically. In order to enable uniform alarm display within a Operate IT B system, an **EvType<Nr>** parameter of data type UINT (unsigned Integer) has been defined in addition for each alarm point in the Operate IT B objects.

The TagImporter describes this parameter using unambiguous system-wide identification of the configured alarm type. See appendix for meaning of values.

2.5.1.4 Sub-division of the faceplates

On Operate IT B, there is in addition a status field between the value display and the operator panel.

2.5.1.5 Operation

DigiVis has language-specific names for the operated selectors. On Operate IT B the selector names are displayed in the operating window.

2.5.2 Class-specific differences

2.5.2.1 Ratio controller C_CR and C_SR

Switching the faceplate visualization between ratio and absolute values in DigiVis is controlled by the process station. Visualization of one ratio controller at several operator stations will be identically at all screens.

Within a Operate IT B system the switching between ratio and absolute values will be done locally in the faceplate. Each faceplate at one or more operator station will have its own visualization of this function block.

2.5.2.2 Structured data types


No display exists on Operate IT B for variables of user-defined structured data types; even the individual components of such variables are not available on Operate IT B.

2.5.2.3 BYTE, WORD, DWORD data types

The Bitstring data types are displayed in Operate IT B on unsigned integer data types.

2.5.2.4 Global variables

Faceplates are available on Operate IT B for global variables. Freelance 2000 variables are not operator-accessible after input by the TagImporter. The conductivity can be changed in the Operate IT B online configuration. It is not changed on a new upload by the TagImporter.

 An operation of variables is only possible if the control access on Operate IT B is re-configured.

In preparation:

Variables will be imported with the access rights configured in DigiTool. The finally access right is computed by combining of the access rights configured in the variable list with the gateway access right.

Variables on Operate IT B have a scaling and a dimension (Unit). On input by the TagImporter the scaling is set to the range available for the data type, and the dimension is assigned an empty string.

The scaling and dimension can be changed in the Operate IT B online configuration; they are not changed on a new upload by the TagImporter. Global values with a comment (33 characters) can be provided in Freelance 2000. This comment is displayed on the description of the variable object on Operate IT B.

The names of **system variables** in a Freelance system contain a full stop. These names are not permissible within Operate IT B. If these system variables are available on Operate IT B, the names are changed :

The full stop in the name is replaced by the character '@'.

2.5.2.5 Signals of I/O sub-assemblies

Within a Freelance 2000 system, signals from I/O sub-assemblies can be processed directly in the editors. Imaging on the basis of global variables is not required.

However, these signals are not available via the gateway. As in the earlier versions, to couple these values via the gateway, the imaging must be undertaken on the basis of a global variable.

2.5.2.6 Communication blocks

No faceplate exists for the communication blocks (Modbus, send and receive, telecontrol). On coupling of these blocks via the gateway, the messages from Freelance 2000 are transferred to Operate IT B.

2.6 Sequential Function Chart (SFC)

2.6.1 Steps in an SFC

In DigiTool a comment can be assigned to each step of an SFC. This comment (max. 20 characters) is mapped on the Operate IT B step texts 1 and 2. The text breaks are preferably executed with spaces, behind special characters ',', '!', '!', '!', '!' or by a change from small to large text. The step texts 1 and 2 are displayed on Operate IT B in the standard representation.

The step delays of an SFC are not operator-accessible from Operate IT B. The same applies to permanent On/Off.

2.6.2 Action window

Only variables of the BOOL data type can be written from the action windows on Operate IT B. The write access of the variables must be re-configured on Operate IT B; it is retained if an upload is repeated. The action window corresponds to the criteria window of a step on DigiVis.

2.6.3 Transitions

In a Freelance 2000 system it is possible to configure an SFC program with $8 * 16 = 128$ simultaneously 'active' transitions. On a Operate IT B workstation a maximum of 16 transitions can be represented.

2.7 Graphics displays

Only variables for the animation of graphics displays can be used in DigiVis. On Operate IT B it is possible to access all coupled sectors.

2.8 Group displays

The configuration of the group displays on Freelance 2000 is not transferred to Operate IT B. An essential basis for this are the different sizes of the faceplates.

2.9 Messages

All system messages from the Freelance 2000 system are transferred to Operate IT B.

Of the messages that are occasioned by function blocks, only those for which the function block write or read access has been configured via the gateway are passed to Operate IT B.

2.9.1 Display of priorities

The message/alarm priorities 0 to 5 exist in Freelance 2000. Message types are coupled to these priorities. The system messages (Priority 0) are additionally sub-divided into "System message groups" S1, S2, and S3. These groups are visible on the operator interface (Message page, SFPI) and can be used for filtering (e.g. on the message/alarm page) and operation triggering (Audible alarm, entry behavior in SFPI).

Sub-division into the 3 system alarm groups (with examples):

S1: System internal fault / Tag and GWY-CPU internal:

System messages relating to MSR-CPU hardware and software (Cold/warm start of the Freelance 2000 process station), GWY-CPU hardware and software (No DigiNet S or O-Net connection, loss of message from process station xxxx), CPU and GWY redundancy (Prim/Sec toggle), sequence system (Task unrunnable, resource Start/Stop), power supply failure.

S2: Peripheral internal fault, conditions:

I/O internal system messages, self test of the I/O sub-assemblies, lateral communication, task conditions.

S3: Peripheral external fault, ("Other"):

Auxiliary power failure, lead breakage or short-circuit on I/O terminals.

The Freelance 2000 messages are indicated on Operate IT B as follows:

Freelance 2000		Operate IT B
Prio	Type	Prio
0	System S1	2
0	System S2	8
0	System S3	10
1	Fault	1
2	Fault	3
3	Fault	7
4	Switch	13
5	Note	15

There is a peculiarity in the case of the EVENT function block. In Freelance 2000 this function block is used, for example, for starting protocols and archives. On Operate IT B this function cannot be used. An event triggered by this function block is not indicated in Operate IT B.

2.9.2 Filtering of messages without configuration information

All messages from the Freelance 2000 system are sent to the gateway. In the gateway, only those objects are known for which a read or write access has been configured via the gateway.

System messages are always communicated to Operate IT B.

2.9.3 Default names for messages

Messages for a Freelance 2000 object resource are displayed as messages for the RTDS object.

For example, the message “battery empty” from a process station is not displayed with the name of the process station resource, but with the default name on Operate IT B.

The default name is created as follows :

DIGI_RSC_Sn_Om/Ai

where n=Freelance-2000-PS-station number, m = object number, i = alarm index

2.9.4 Hints

The note texts configured in Freelance 2000 are not available on Operate IT B.

2.10 User-defined function blocks

Embedded function blocks entities can be operated and observed if they have dedicated tag names.

3 Time synchronization

3.1 System time, local time, summer time

The system time (Greenwich Mean Time GMT) is used for all time marking in the process stations.

Local time is calculated from the system time and the time zone. The time zone is unified project-wide and is transferred to all stations on bootstrapping and initialization. The system time is used within the process station; local time is available to the user (e.g. for routine, daily events).

All time-related data is transferred to DigiVis with the system time. For display on DigiVis, the system time is converted to current time using the time zone and the Windows NT Summertime table of the DigiVis PC.

If time stamps are expected from the Operate IT B workstation that are not available within the Freelance 2000 system, the appropriate data within the OPC server are expanded to cover this time basis.

Likewise, in the Operate IT B world, the system time is used for all data time marking. Each value of the data type Date & Time is converted in the workstation using the current time zone and summertime.

Time synchronization is carried out using system time.

4 System messages from Operate IT B gateway

At present no messages are generated by the OPC server.

Appendix: Mapping of Freelance 2000 function block classes

Operate IT B Class	Assigned Freelance 2000 Class	Remarks
<F2K_CSTBY>	CSTBY	Constants function block for BYTE
<F2K_CSTWO>	CSTWO	Constants function block for WORD
<F2K_CSTDW>	CSTDW	Constants function block for DOUBLE WORD
<F2K_CSTDT>	CSTDT	Constants function block for DATE&TIME (Time stamp)
<F2K_CSTTI>	CSTTI	Constants function block for TIME (Duration)
<F2K_CSTBO>	CSTBO	Constants function block for BOOL
<F2K_CSTRE>	CSTRE	Constants function block for REAL
<F2K_CSTIN>	CSTIN	Constants function block for INTEGER
<F2K_CSTUI>	CSTUI	Constants function block for UNSIGNED INTEGER
<F2K_CSTDI>	CSTDI	Constants function block for DOUBLE INTEGER
<F2K_CSTUD>	CSTUD	Constants function block for UNSIGNED DOUBLE INTEGER
<F2K_TOUCH>	TOUCH	Touch button
<F2K_FAC>	FAC_D	Frequency-Analog converter
<F2K_MBOUOL>	M_BOUT	Binary Digital output
<F2K_CTP>	CT_P	Pulse counter
<F2K_CTUD>	CTUD	Up / down counter
<F2K_CTT>	CTT	Time counter
<F2K_CTLT>	CT_LT	Operating time counter
<F2K_MONOF>	MONO_F	Monoflop
<F2K_TON>	TON	Timer, switch-on delay
<F2K_TOF>	TOF	Timer, switch-off delay
<F2K_TONOF>	TONOF	Timer, switch-on/off delay
<F2K_TIMER>	TIMER	Timer with external time input

Operate IT B Class	Assigned Freelance 2000 Class	Remarks
<F2K_CCR>	C_CR	Continuous controller, ratio
<F2K_CSR>	C_SR	Step controller, ration
<F2K_CCS>	C_CS	Continuous controller, standard
<F2K_CCU>	C_CU	Continuous controller, universal
<F2K_CSS>	C_SS	Step controller, standard
<F2K_CSU>	C_SU	Step controller, universal
<F2K_COS>	C_OS	Two-position controller, standard
<F2K_COU>	C_OU	Two-position controller, universal
<F2K_CPS>	C_PS	Three-position controller, standard
<F2K_CPU>	C_PU	Three-position controller, universal
<F2K_TUNE>	TUNE	Self tune function block
<F2K_CTANA>	CT_ANA	Counter with analog input
<F2K_CANA>	C_ANA	Set point controller
<F2K_AITR>	AI_TR	Analog input transformation
<F2K_AITRT>	AI_TRT	Analog input transformation with transient monitoring
<F2K_AOTR>	AO_TR	Analog output transformation
<F2K_TS>	TS	Time scheduler
<F2K_MANA>	M_ANA	Analog monitoring
<F2K_MBINOOL>	M_BIN	Binary monitoring
<F2K_MBAV>	M_BAV	Binary monitoring of antivalence
<F2K_DOS>	DOS	Dosing circuit
<F2K_DOSA>	DOS_A	Dosing circuit with analog input
<F2K_DOSE>	DOS_E	Dosing circuit, extended
<F2K_IDF1>	IDF_1	Individual drive function for unidirectional units
<F2K_IDF2>	IDF_2	Individual drive function for bi-directional devices
<F2K_IDFA>	IDF_A	Individual drive function for actuators
<F2K_FPX>	FPX	Block for coupling SymBatch

Operate IT B Class	Assigned Freelance 2000 Class	Remarks
<F2K_VARBOOL>		Freelance variable of the BOOL data type
<F2K_VARINT>		Freelance variable of the INTEGER data type
<F2K_VARUINT>		Freelance variable of the UNSIGNED INTEGER data type
<F2K_VARDINT>		Freelance variable of the DOUBLE INTEGER data type
<F2K_VARUDINT>		Freelance variable of the UNSIGNED DOUBLE INTEGER data type
<F2K_VARREAL>		Freelance variable of the REAL data type
<F2K_VARTIME>		Freelance variable of the TIME data type
<F2K_VARDT>		Freelance variable of the DT data type
<F2K_VARBYTE>		Freelance variable of the BYTE data type
<F2K_VARWORD>		Freelance variable of the WORD data type
<F2K_VARDWORD >		Freelance variable of the DOUBLE WORD data type
<F2K_VARSTR>		Freelance variable of the STR8, STR16, STR32, STR64, STR128, STR256 data types

Appendix: Meaning of values of EvType<Nr> parameters

Value	Alarm Type	Meaning
0	<empty>	No alarm type configured
1	H	High, upper limit value
2	L	Low, lower limit value
3	HH	HighHigh, upper limit value
4	LL	LowLow, lower limit value
5- 16	DHx, DLx, DHHx, DLLx	Change speed D in analog monitoring, H, HH : max. change L, LL : min. change with x = s : per second m : per minute h : per hour
5	DHs	
6	DHm	
7	DHh	
8	DLs	
9	DLm	
10	DLh	
11	DHHs	
12	DHHm	
13	DHHh	
14	DLLs	
15	DLLm	
16	DLLh	
17-20	H_XD, L_XD, HH_XD, LL_XD	Control difference XD for controller, H, HH : max. change L, LL : min. change
17	H_XD	
18	L_XD	
19	HH_XD	
20	LL_XD	
21	LH_XD	Amount of control difference XD for controller
22-25	H_V, L_V, HH_V, LL_V	Ratio limit values for ratio controller, H, HH : max. change L, LL : min. change
22	H_V	
23	L_V	
24	HH_V	
25	LL_V	
26	RUNTIME	Runtime monitoring on IDF
27	ENDPOSITION	End position monitoring on IDF
28	FAULT	Fault monitoring on IDF

Value	Alarm Type	Meaning
29	PROTECTION	Protection monitoring on IDF
30	IN-PLACE	Monitoring of in-place access operations on IDF
31	MAN_AUTO	
32	BLOCKING	Monitoring of blocking on IDF
33	TIME	Time monitoring on timer blocks
34	BINARY	Monitoring of binary signals
35	LH	
36	USER	User-defined alarm for message-generating block
37	TIME_OV	Runtime exceeded on controller self-adjustment
38	NOISE	Noise on controller self-adjustment
39	STAT	
40	MOVE	
41	Y_LIMIT	

Appendix: Examples of project changes

Insertion or deletion of a tag or variable

Configuration in DigiTool

Insert a new function block or a new variable in the project configuration, via the gateway station and define the access rights for this function block or variable in the tag or variables list.

or

delete a function block or variable in the project configuration

or

change the access rights in the tag or variables list for a function block or a variable, via the gateway station

or

shift a program into the project tree in which a function block or a variable is contained that is coupled via a gateway station.

Check the plausibility of the project.

Commissioning in DigiTool

→ Load changed objects on the process station.

Effect on Operate IT B:

A version conflict exists between the process station and the gateway station. All data are further updated on Operate IT B; each operator access from Operate IT B is rejected in the gateway station:

→ Load changed objects on the gateway station.

Effect on Operate IT B:

During the re-configuration, no data is transferred from the gateway station to Operate IT B. As soon as the loading procedure has finished, the data communication is continued. The version conflict between the process and gateway stations is no longer present, all operator interventions are again permitted.

The duration of the break in the connection depends on the number of tags and variables in the gateway.

Operate IT B:

The new object must be loaded in the database using the TagImporter.

Re-configuration of a tag

Configuration in DigiTool

Change a parameter of an existing function block that is available via the gateway station. Check project plausibility.

Commissioning in DigiTool

→ Load changed objects on the process station.

Effect on Operate IT B:

A version conflict exists between the process station and the gateway station. All data are further updated on Operate IT B; every operator access from Operate IT B is rejected in the gateway station:

→ Load changed objects on the gateway station.

Effect on Operate IT B:

There is no longer a version conflict between the process and gateway stations; all operator interventions are again permitted.

Operate IT B:

The further actions depend on the changed parameter:

Parameter exists only in the process station, e.g. the control parameter Kp:

→ no further action required.

Parameter exists in the workstation, e.g. controllability of a limit value

→ the object concerned must be updated in the database.

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