# Chapter 18

# SELECT

**Edition 2**

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## Overview

This chapter describes a class of Function Blocks that provide a multiplexer-type operation. The output value is one of sixteen selected values according to the value of an index input. Simple recipe systems may be constructed using these Function Blocks. Data types supported are:

Boolean, Real, Integer, Time and String.

## SELECT_REAL FUNCTION BLOCK

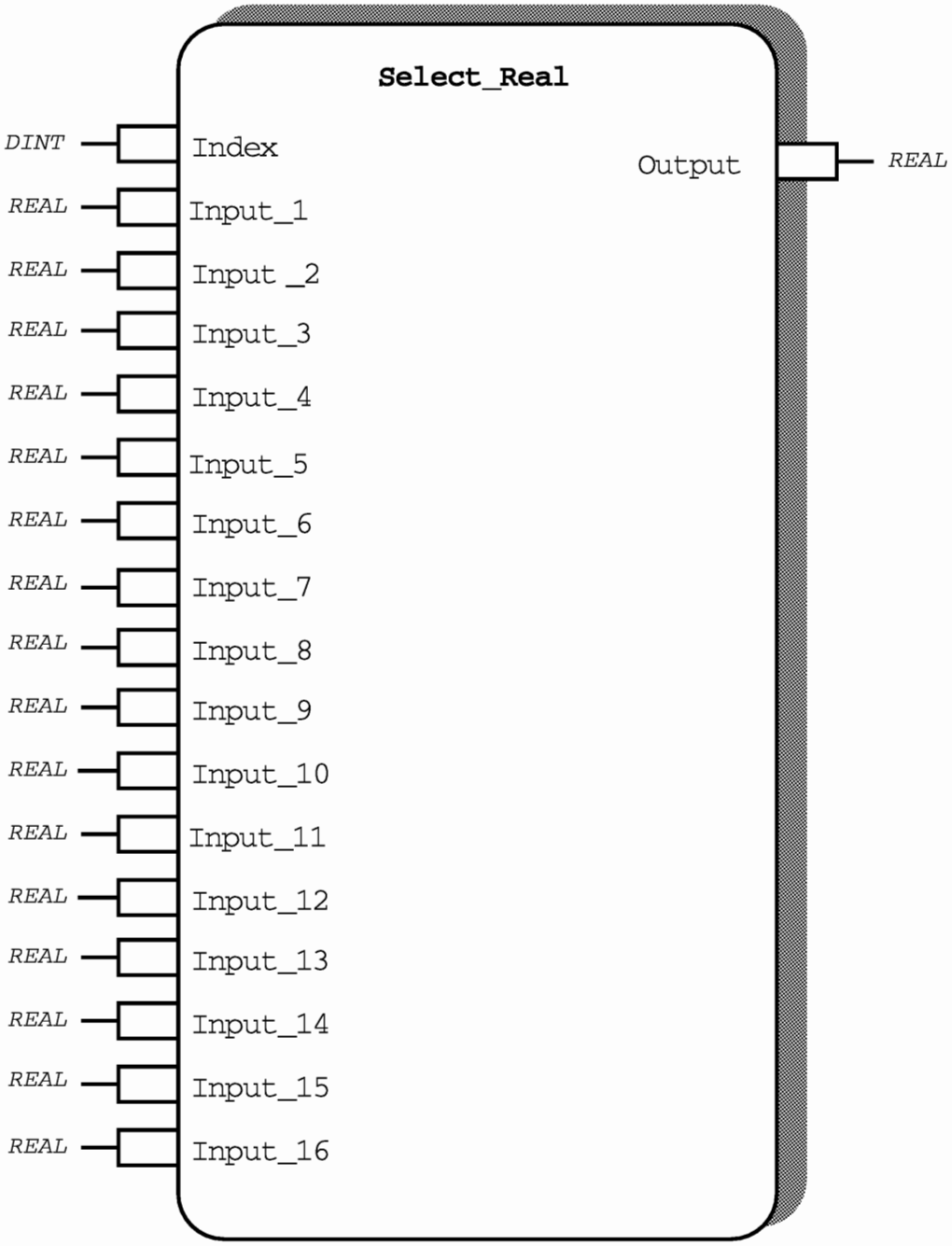



Figure 18-1 Select_Real Function Block

## Functional Description

The Select_Real function block operates as a 16-way multiplexer for REAL variables, which provides a mechanism for selecting a floating point (REAL)output from one of up to sixteen floating point (REAL)inputs. The function block has an integer input (Index), sixteen floating point (REAL) inputs (Input_1 to Input_16) and a floating point (REAL) output (Output). The value of Output will be selected from one of the sixteen real inputs according to the relationship:

Index = n

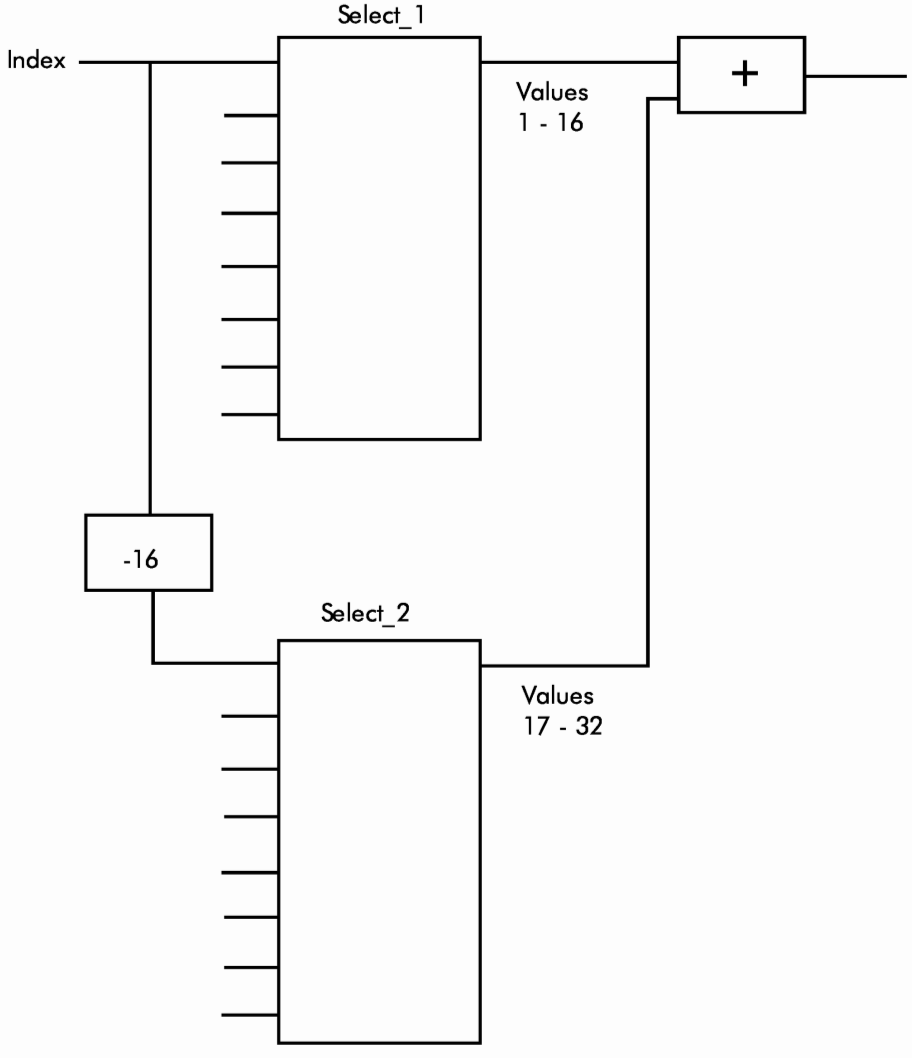
when $1 \leq n < 16$

Output := Input - n

when $n \leq 0$ or $n > 16$

Output := 0

This latter feature enables the construction of simple recipe systems using SELECT blocks eg.:



In the example, Select_1 provides the first 16 values and Select_2 will output 0. When index is greater than 16, Select_2 will output the next 16 values and Select_1 will output 0. The two outputs may be simply added together to provide the value which is used by the control strategy.

## Function Block Attributes

Type: ..... 80 16

Class: ..... SELECT

Default Task: ..... Task_2

Short List: ..... Index, Output

Memory Requirements: ..... 72 Bytes

Execution Time: ..... 19.5 µ Secs

## Parameter Attributes

| Name | Type | Cold Start | Read Access | Write Access | Type Specific Information | |
|---|---|---|---|---|---|---|
| Index | **DINT** | 0 | Oper | Oper | High Limit<br>Low Limit | 16<br>0 |
| Input_1 to Input_16 | **REAL** | 0.0 | Oper | Oper | High Limit<br>Low Limit | 999,999<br>-999,999 |
| Output | **REAL** | 0.0 | Oper | Block | High Limit<br>Low Limit | 999,999<br>-999,999 |

Table 18-1 Select_Real Parameter Attributes

# SELECT_DINT FUNCTION BLOCK

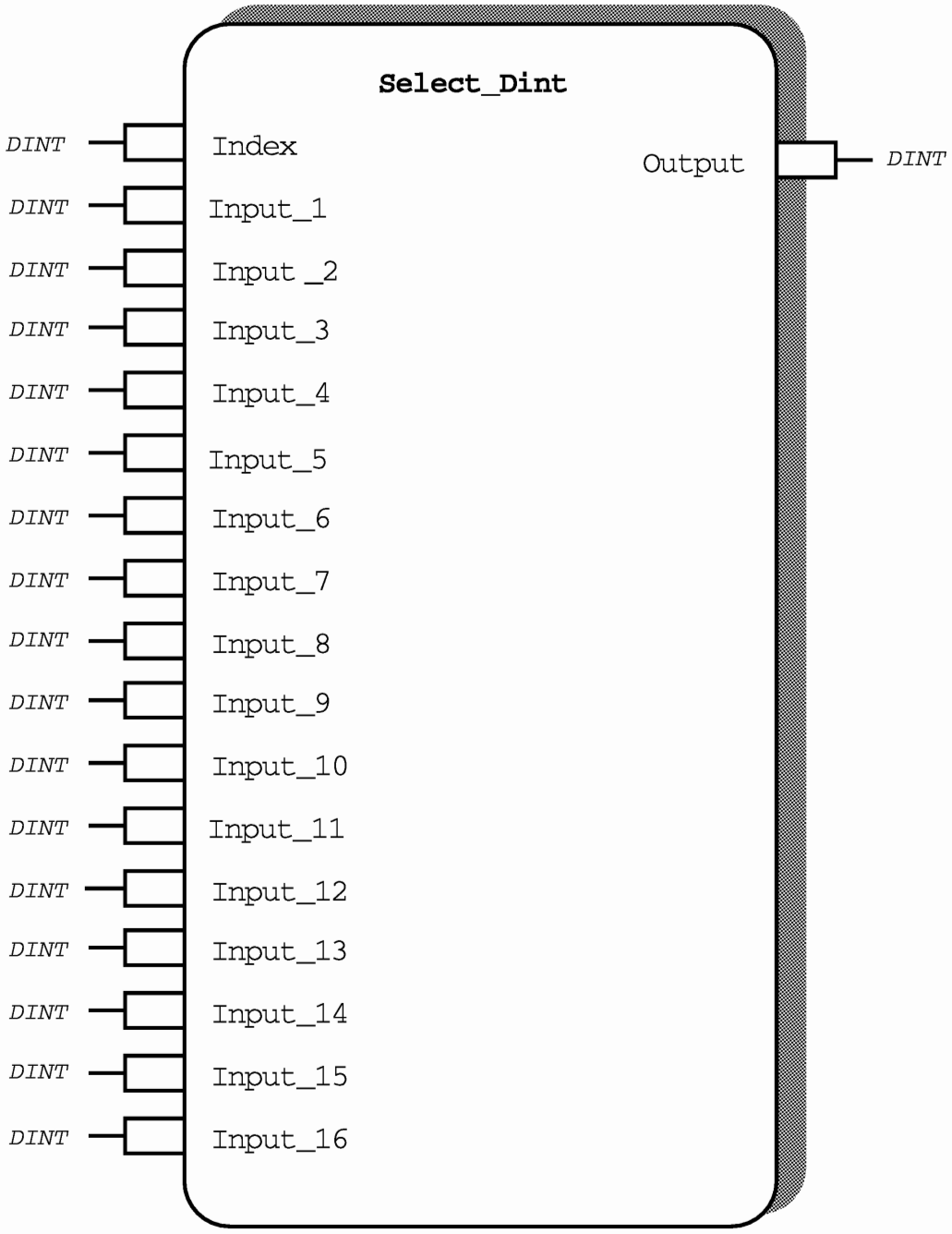



Figure 18-2 Select_Dint Function Block

## Functional Description

The Select_Dint function block operates as a 16-way multiplexer for integer (DINT )variables, which provides a mechanism for selecting an integer output from one of up to sixteen integer inputs. The function block has seventeen integer inputs (Index and Input_1 to Input_16) and an integer output (Output). The value of Output will be selected from one of the sixteen integer inputs, Input_1 to Input_16 according to the relationship:

Index = n

when $1 \leq n < 16$

Output := Input - n

when $n \leq 0$ or $n > 16$

Output := 0

See Select_Real for example of use of this feature.

## Function Block Attributes

Type:..... 50 20

Class: ..... SELECT

Default Task: ..... Task_2

Short List: ..... Index, Output

Memory Requirements: ..... 72 Bytes

Execution Time: ..... 19.5 µ Secs

## Parameter Attributes

| Name | Type | Cold Start | Read Access | Write Access | Type Specific Information | |
|---|---|---|---|---|---|---|
| Index | **DINT** | 0 | Oper | Oper | High Limit<br>Low Limit | 16<br>0 |
| Input_1 to Input_16 | **DINT** | 0 | Oper | Oper | High Limit<br>Low Limit | 999,999<br>-999,999 |
| Output | **DINT** | 0 | Oper | Block | High Limit<br>Low Limit | 999,999<br>-999,999 |

Table 18-2 Select_Dint Parameter Attributes

## SELECT_TIME FUNCTION BLOCK

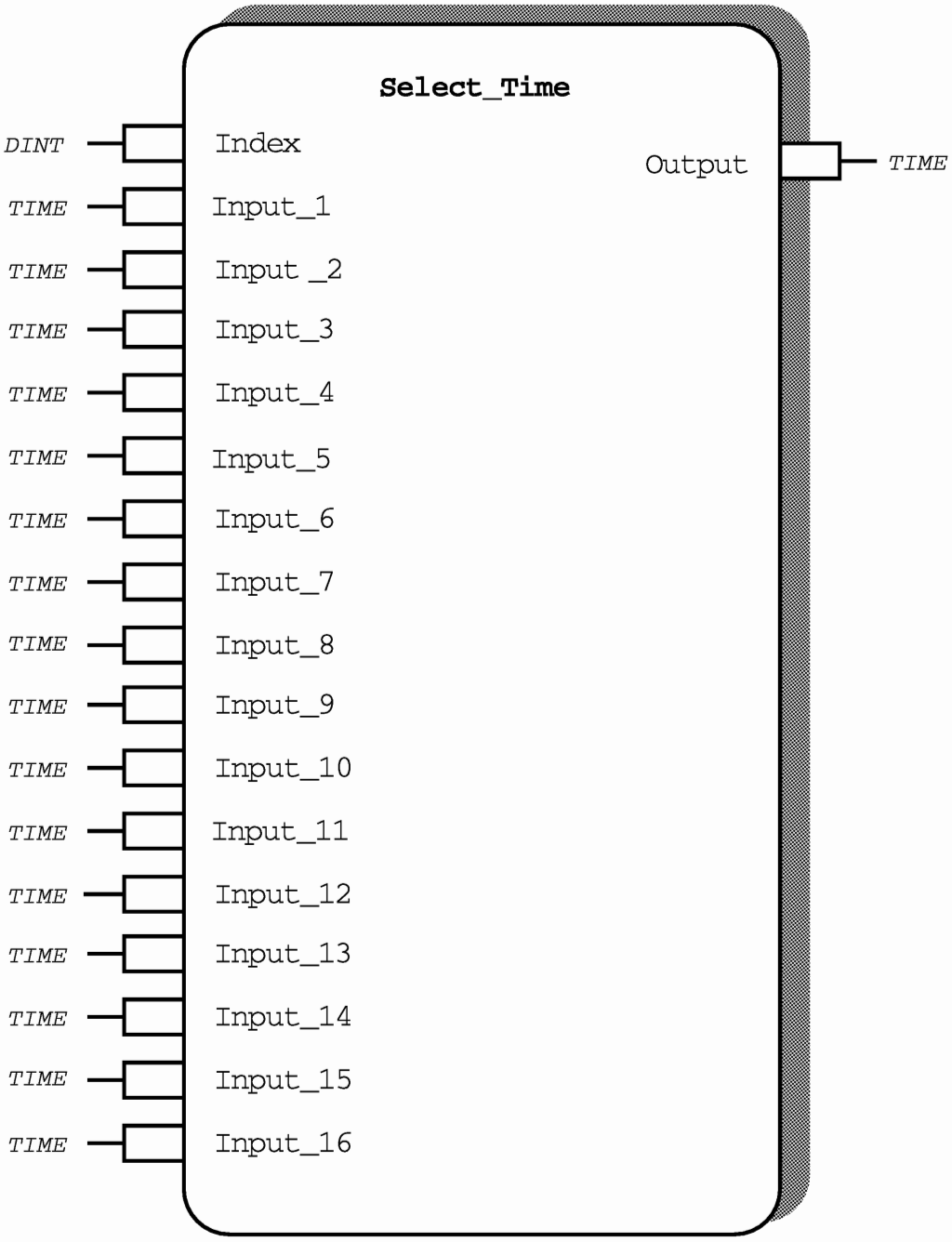



Figure 18-3 Select_Time Function Block

## Functional Description

The Select_Time function block operates as a 16-way multiplexer for duration (TIME) variables, which provides a mechanism for selecting a time output from one of up to sixteen time inputs. The function block has an integer input (Index), sixteen time inputs (Input_1 to Input_16) and a time output (Output). The value of Output will be selected from one of the sixteen time inputs according to the relationship:

Index = n

when $1 \leq n < 16$

Output := Input - n

when $n \leq 0$ or $n > 16$

Output := 0ms

See **Select_Real** for example of use of this feature.

## Function Block Attributes

Type:..... 50 30

Class: ..... SELECT

Category: ..... Normal

Default Task: ..... Task_2

Short List: ..... Index, Output

Memory Requirements ..... 72 bytes

Execution Time ..... 19.5µ Secs

## Parameter Attributes

| Name | Type | Cold Start | Read Access | Write Access | Type Specific Information | |
|---|---|---|---|---|---|---|
| Index | **DINT** | 0 | Oper | Oper | High Limit<br>Low Limit | 16<br>0 |
| Input_1 to Input_16 | **TIME** | 0ms | Oper | Oper | High Limit<br>Low Limit | 23d_23h _59ms<br>0ms |
| Output | **TIME** | 0ms | Oper | Block | High Limit<br>Low Limit | 23d_23h _59m<br>0ms |

Table 18-3 Select_Time Parameter Attributes

# SELECT_BOOL FUNCTION BLOCK

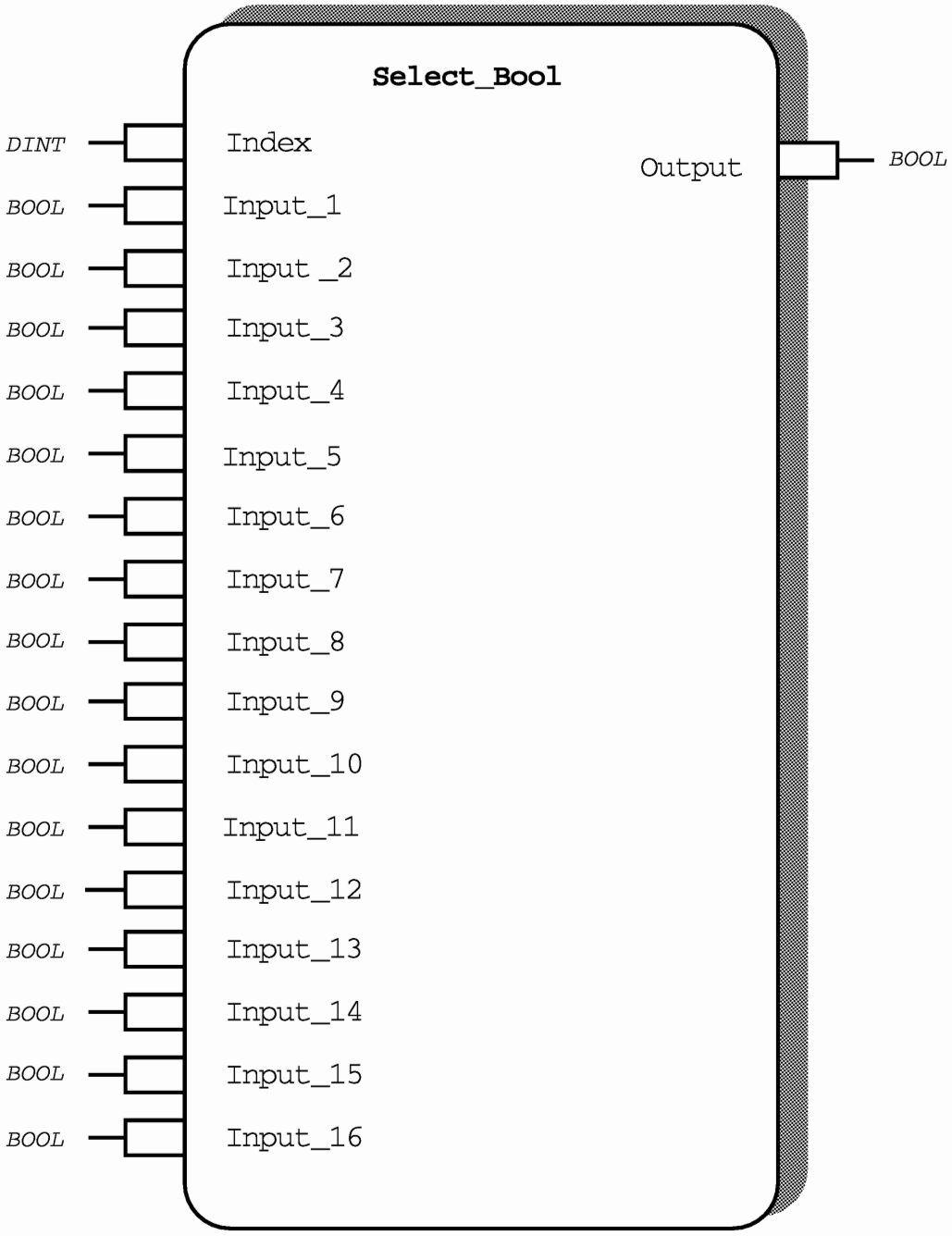



Figure 18-4 Select_Bool Function Block

## Functional Description

The Select_Bool function block operates as a 16-way multiplexer for 'boolean (BOOL) ' variables, which provides a mechanism for selecting a boolean (BOOL) ' output from one of up to sixteen boolean (BOOL) ' inputs. The function block has an integer input (Index), sixteen boolean (BOOL) ' inputs (Input_1 to Input_16) and a boolean (BOOL) ' output (Output). The value of Output will be selected from one of the sixteen boolean (BOOL) ' inputs according to the relationship:

Index = n

when $1 \leq n < 16$

Output := Input - n

when $n \leq 0$ or $n > 16$

Output := OFF (0)

See Select_Real for example of use of this feature.

## Function Block Attributes

Type:..... 50 40

Class: .....SELECT

Default Task: .....Task_1

Short List: .....Index, Output

Memory Requirements; .....22 Bytes

Execution Time .....17.2 µ Secs

## Parameter Attributes

| Name | Type | Cold Start | Read Access | Write Access | Type Specific Information | |
|---|---|---|---|---|---|---|
| Index | **DINT** | 0 | Oper | Oper | High Limit<br>Low Limit | 16<br>0 |
| Input_1 to Input_16 | **BOOL** | OFF (0) | Oper | Oper | Senses | OFF (0)<br>ON (1) |
| Output | **BOOL** | OFF (0) | Oper | Block | Senses | OFF (0)<br>ON (1) |

Table 18-4 Select_Bool Parameter Attributes

# SELECT_STR FUNCTION BLOCK

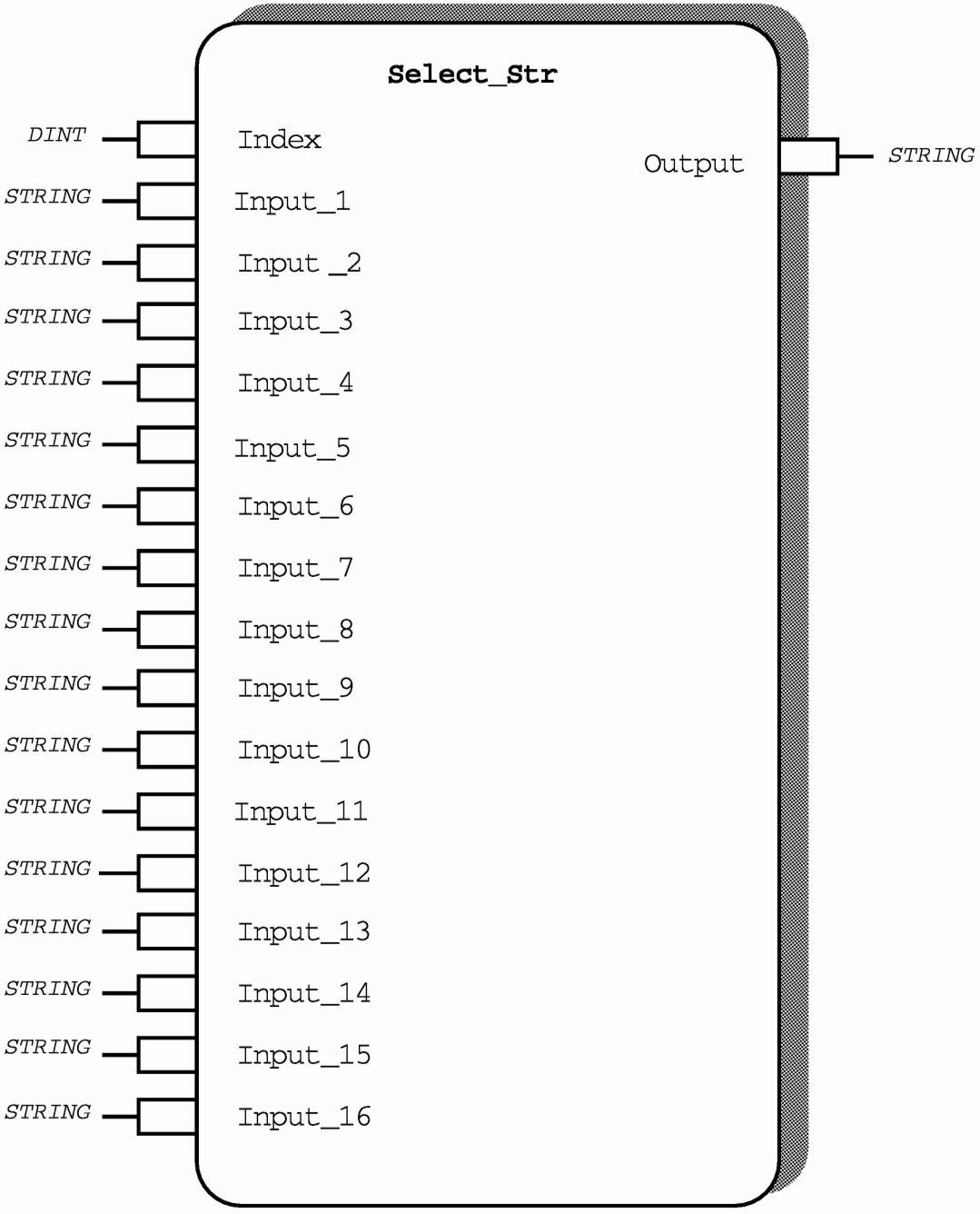



Figure 18-5 Select_Str Function Block

## Functional Description

The Select_Str function block operates as a 16-way multiplexer for STRING variables, which provides a mechanism for selecting a string output from one of up to sixteen string inputs. The function block has an integer input (Index), sixteen string inputs (Input_1 to Input_16) and a string output (Output). The value of Output will be selected from one of the sixteen string inputs according to the relationship:

Index = n

when $1 \leq n < 16$

Output := Input - n

when $n \leq 0$ or $n > 16$

Output := '' (null string)

See Select_Real for example of use of this feature. Strings from multiple select block outputs may be concatenated using the ST function, CONCAT. See PC3000 Functions Handbook for details.

## Function Block Attributes

Type:..... 50 80

Class: .....SELECT

Default Task: .....Task_2

Short List: .....Index, Output

Memory Requirements: .....1398 Bytes

Execution Time: .....68.2 µ Secs

## Parameter Attributes

| Name | Type | Cold Start | Read Access | Write Access | Type Specific Information | |
|---|---|---|---|---|---|---|
| Index | **DINT** | 0 | Oper | Oper | High Limit<br>Low Limit | 16<br>0 |
| Input_1 to Input_16 | **STRING** | ' ' | Oper | Oper | Maximum Length | 80 Characters |
| Output | **STRING** | ' ' | Oper | Block | Maximum Length | 80 Characters |

Table 18-5 Select_Str Parameter Attributes

# SET_REAL FUNCTION BLOCK

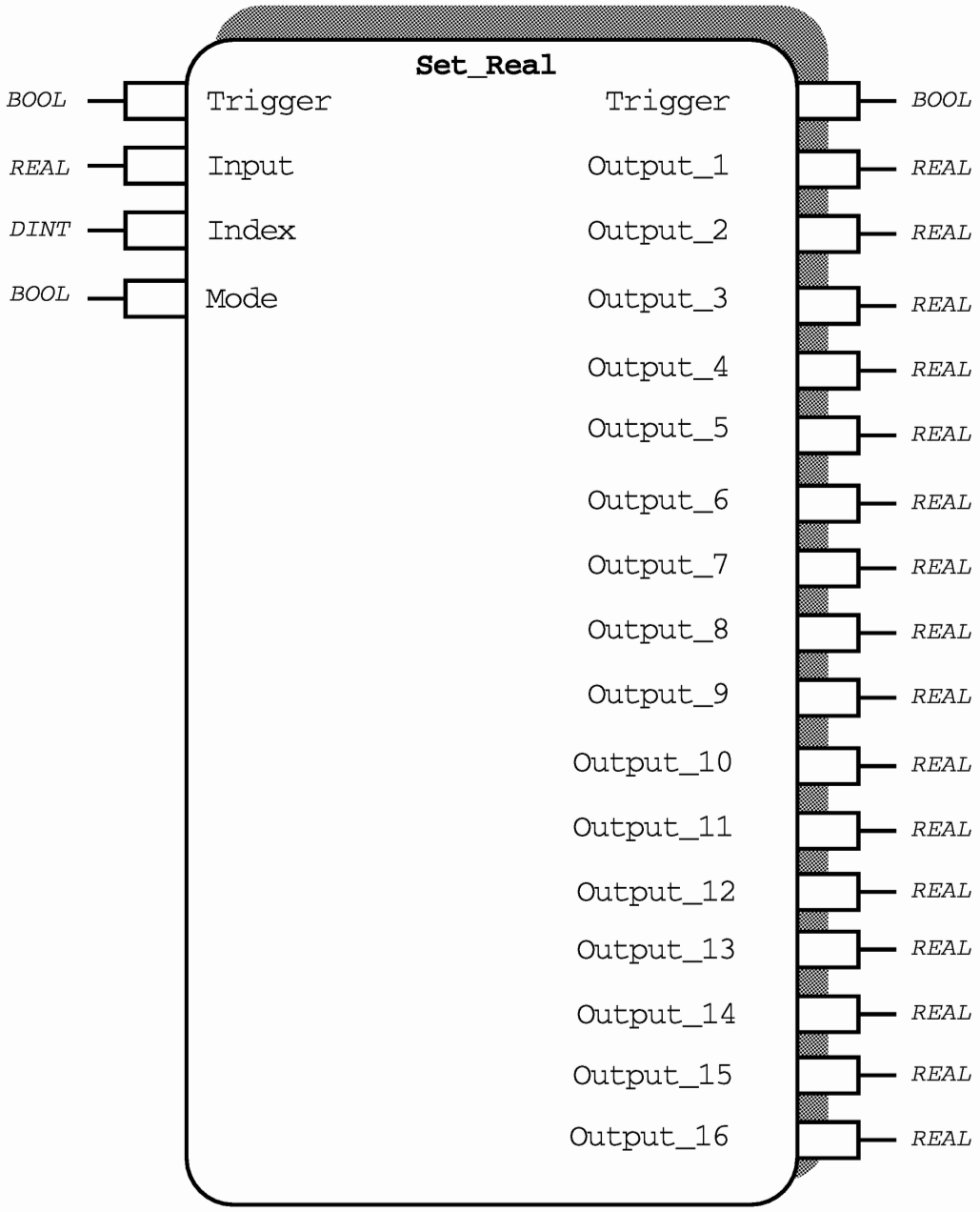



Figure 18-6 Set_Real Function Block Diagram

## Functional Description

A set of sixteen registers of type Real is maintained as sixteen outputs, Output_1 to Output_16. The values contained in these registers are fed in via the single Input, the register into which the Input is directed being determined by the input Index.

The function block can operate in one of two modes. Either the registers may be updated continuously, i.e. every function block execution cycle; or they only update when the input Trigger goes from false to true.

## Function Block Attributes

Type: ..... 50 90

Class: ..... Select

Default Task: ..... Task_2

Short List: ..... Input, Index, Mode, Trigger

Memory Requirements: ..... 78 Bytes

## Parameter Descriptions

### Trigger (TRG)

When **Mode** is set to Trig, setting this input causes the value currently on **Input** to be copied to the register whose number is indicated on **Index.** For example, if **Input** is 10.3, and Index is 5, when Trigger is set to On **Output_5** will also show the value 10.3, provided **Mode** is set to Trig.

**Trigger** is returned to the Off state immediately by the function block. No external action is required by the user program to achieve this.

### Input (IN)

The value which will be copied to the register specified by **Index.**

### Index (I)

The register to which the **Input** should be copied, either immediately if **Mode** is set to Cont, or when **Trigger** is set to On if **Mode** is set to Trig.

### Mode (M)

Determines the way in which the registers are updated. The register indicated by **Index** will be changed to the value of **Input** immediately if **Mode** is set to Cont, but if **Mode** is set to Trig this change will occur when **Trigger** is next set to On.

### Output_1 (O1) to Output_16 (O16)

The values of the sixteen registers into which **Input** can be fed.

Only the register indicated by **Index** is affected by changing values of **Input.** Other registers hold their current values.

## Parameter Attributes

| Name | Type | Cold Start | Read Access | Write Access | Type Specific Information | |
|---|---|---|---|---|---|---|
| Trigger | **BOOL** | Off (0) | Oper | Oper | Senses | Off (0)<br>On (1) |
| Input | **REAL** | 0 | Oper | Oper | High Limit<br>Low Limit | +3·402823E+38<br>-3·402823E+38 |
| Index | **DINT** | 0 | Oper | Oper | High Limit<br>Low Limit | +2147483647<br>-2147483648 |
| Mode | **BOOL** | Trig (0) | Oper | Oper | Senses | Trig (0)<br>Cont (1) |
| Output_1 to Output_16 | **REAL** | 0 | Oper | Oper | High Limit<br>Low Limit | +3·402823E+38<br>-3·402823E+38 |

Table 18-6 Set_Real Parameter Attributes

# SET_DINT FUNCTION BLOCK

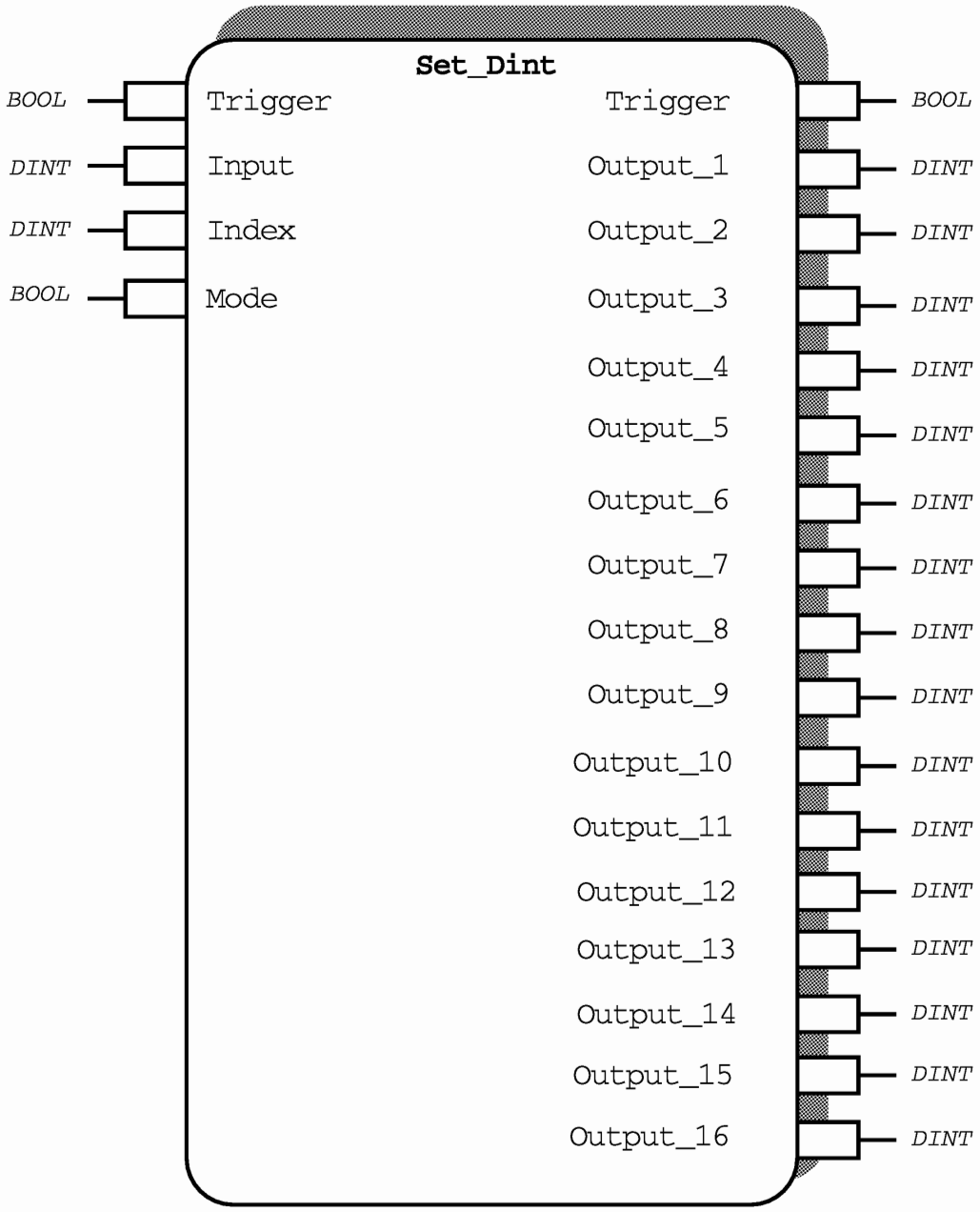



Figure 18-7 Set_Dint Function Block Diagram

## Functional Description

A set of sixteen registers of type Dint is maintained as sixteen outputs, Output_1 to Output_16. The values contained in these registers are fed in via the single Input, the register into which the Input is directed being determined by the input Index.

The function block can operate in one of two modes. Either the registers may be updated continuously, i.e. every function block execution cycle; or they only update when the input Trigger goes from false to true.

## Function Block Attributes

Type: ..... 5092

Class: ..... SELECT

Default Task: ..... Task_2

Short List: ..... Input, Index, Mode, Trigger

Memory Requirements: ..... 78 Bytes

## Parameter Descriptions

### Trigger (TRG)

When **Mode** is set to Trig, setting this input causes the value currently on Input to be copied to the register whose number is indicated on Index. For example, if **Input** is 37, and **Index** is 5, when **Trigger** is set to On **Output_5** will also show the value 37, provided **Mode i**s set to Trig.

**Trigger** is returned to the Off state immediately by the function block. No external action is required by the user program to achieve this.

### Input (IN)

The value which will be copied to the register specified by **Index.**

### Index (I)

The register to which the **Input** should be copied, either immediately if **Mode** is set to Cont, or when **Trigger i**s set to On if **Mode** is set to Trig.

## Mode (M)

Determines the way in which the registers are updated. The register indicated by **Index** will be changed to the value of **Input** immediately if **Mode** is set to Cont, but if **Mode** is set to Trig this change will occur when **Trigger** is next set to On.

## Output_1 (O1) to Output_16 (O16)

The values of the sixteen registers into which **Input** can be fed.

Only the register indicated by **Index** is affected by changing values of **Input.** Other registers hold their current values.

## Parameter Attributes

| Name | Type | Cold Start | Read Access | Write Access | Type Specific Information | |
|---|---|---|---|---|---|---|
| Trigger | **BOOL** | Off (0) | Oper | Oper | Senses | Off (0)<br>On (1) |
| Input | **DINT** | 0 | Oper | Oper | High Limit<br>Low Limit | +2147483647<br>-2147483648 |
| Index | **DINT** | 0 | Oper | Oper | High Limit<br>Low Limit | +2147483647<br>-2147483648 |
| Mode | **BOOL** | Trig (0) | Oper | Oper | Senses | Trig (0)<br>Cont (1) |
| Output_1 to Output_16 | **REAL** | 0 | Oper | Oper | High Limit<br>Low Limit | +2147483647<br>-2147483648 |

Table 18-7 Set_Dint Parameter Attributes

## SET_TIME FUNCTION BLOCK

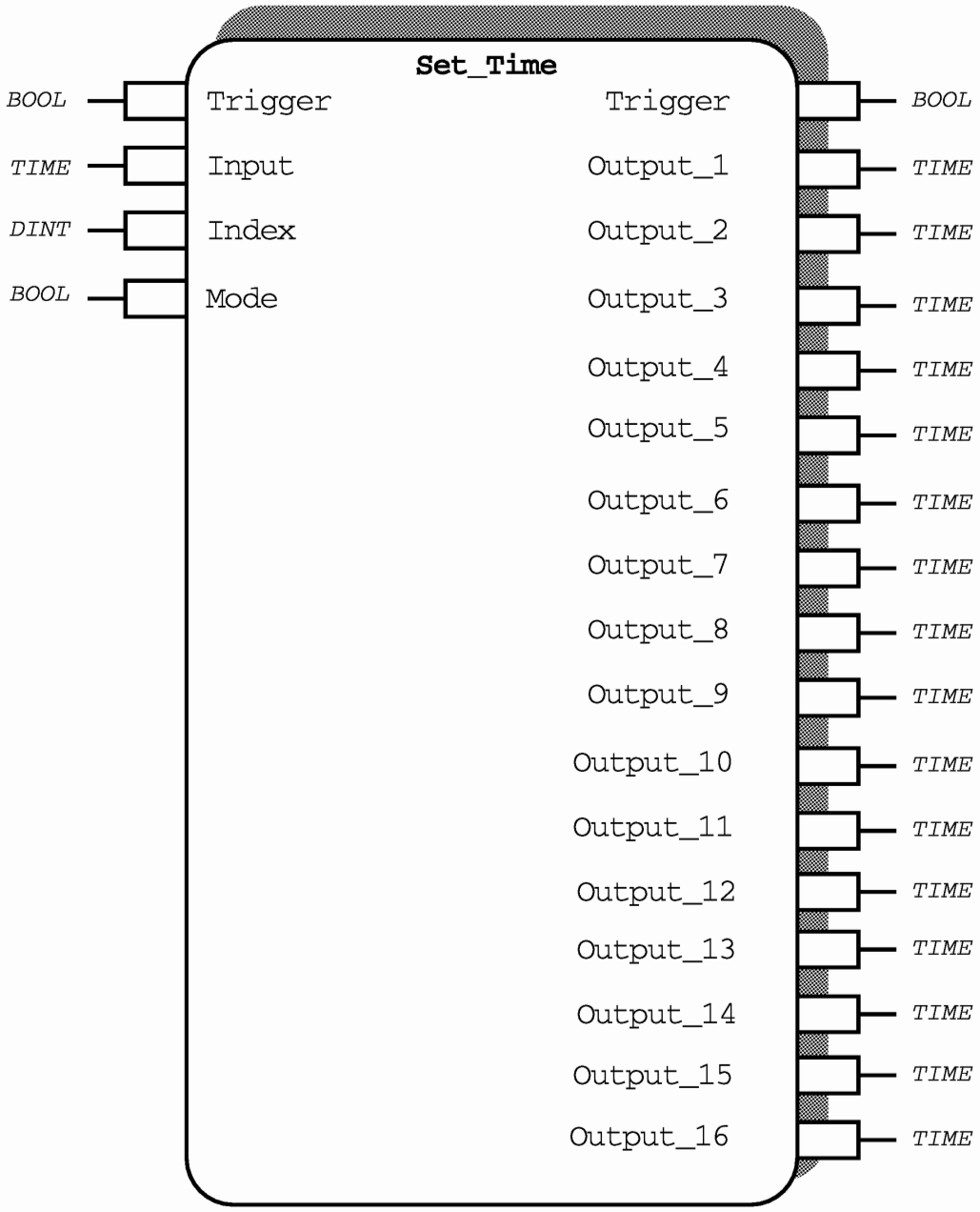



Figure 18-8 Set_Time Function Block Diagram

## Functional Description

A set of sixteen registers of type Time is maintained as sixteen outputs, Output_1 to Output_16. The values contained in these registers are fed in via the single Input, the register into which the Input is directed being determined by the input Index.

The function block can operate in one of two modes. Either the registers may be updated continuously, i.e. every function block execution cycle; or they only update when the input Trigger goes from false to true.

## Function Block Attributes

Type: ..... 5094

Class: ..... SELECT

Default Task: ..... Task_2

Short List: ..... Input, Index, Mode, Trigger

Memory Requirements: ..... 78 Bytes

## Parameter Descriptions

### Trigger (TRG)

When **Mode i**s set to Trig, setting this input causes the value currently on **Input** to be copied to the register whose number is indicated on **Index.** For example, if **Input** is 55s, and **Index** is 5, when **Trigger** is set to On **Output_5** will also show the value 55s, provided **Mode** is set to Trig.

**Trigger** is returned to the Off state immediately by the function block. No external action is required by the user program to achieve this.

### Input (IN)

The value which will be copied to the register specified by **Index.**

## Index (I)

The register to which the **Input** should be copied, either immediately if **Mode** is set to Cont, or when **Trigger** is set to On if **Mode** is set to Trig.

## Mode (M)

Determines the way in which the registers are updated. The register indicated by **Index** will be changed to the value of **Input** immediately if **Mode** is set to Cont, but if **Mode** is set to Trig this change will occur when **Trigger** is next set to On.

## Output_1 (O1) to Output_16 (O16)

The values of the sixteen registers into which **Input** can be fed.

Only the register indicated by **Index** is affected by changing values of **Input.** Other registers hold their current values.

## Parameter Attributes

| Name | Type | Cold Start | Read Access | Write Access | Type Specific Information | |
|---|---|---|---|---|---|---|
| Trigger | **BOOL** | Off (0) | Oper | Oper | Senses | Off (0)<br>On (1) |
| Input | **TIME** | 0ms | Oper | Oper | High Limit<br>Low Limit | 23d23h59m59s999ms<br>0 |
| Index | **DINT** | 0 | Oper | Oper | High Limit<br>Low Limit | +2147483647<br>-2147483648 |
| Mode | **BOOL** | Trig (0) | Oper | Oper | Senses | Trig (0)<br>Cont (1) |
| Output_1 to Output_16 | **TIME** | 0ms | Oper | Oper | High Limit<br>Low Limit | 23d23h59m59s999ms<br>0 |

Table 18-8 Set_Time Parameter Attributes

## SET_BOOL FUNCTION BLOCK

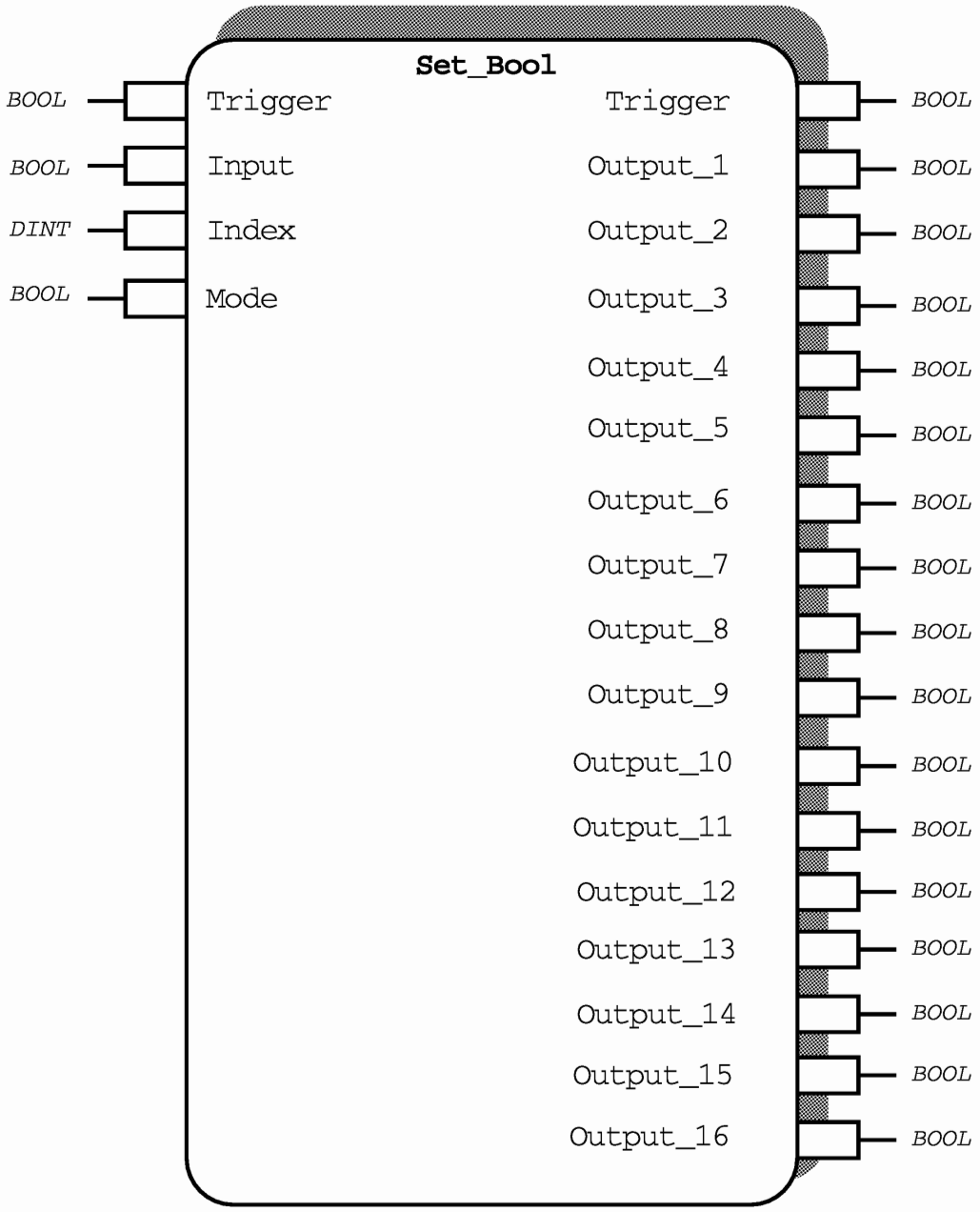



Figure 18-9 Set_Bool Function Block Diagram

## Functional Description

A set of sixteen registers of type Bool is maintained as sixteen outputs, Output_1 to Output_16. The values contained in these registers are fed in via the single Input, the register into which the Input **i**s directed being determined by the input Index.

The function block can operate in one of two modes. Either the registers may be updated continuously, i.e. every function block execution cycle; or they only update when the input Trigger goes from false to true.

## Function Block Attributes

Type: ..... 5096

Class: ..... SELECT

Default Task: ..... Task_1

Short List: ..... Input, Index, Mode, Trigger

Memory Requirements: .... 28 Bytes

## Parameter Descriptions

### Trigger (TRG)

When **Mode** is set to Trig, setting this input causes the value currently on **Input** to be copied to the register whose number is indicated on **Index.** For example, if **Input** is On, and **Index** is 5, when **Trigger** is set to On **Output_5** will also show the value On, provided **Mode** is set to Trig.

**Trigger** is returned to the Off state immediately by the function block. No external action is required by the user program to achieve this.

### Input (IN)

The value which will be copied to the register specified by **Index.**

### Index (I)

The register to which the **Input** should be copied, either immediately if **Mode** is set to Cont, or when **Trigger** is set to On if Mode is set to Trig.

### Mode (M)

Determines the way in which the registers are updated. The register indicated by **Index** will be changed to the value of **Input** immediately if **Mode** is set to Cont, but if **Mode** is set to Trig this change will occur when **Trigger** is next set to On.

### Output_1 (O1) to Output_16 (O16)

The values of the sixteen registers into which **Input** can be fed.

Only the register indicated by **Index** is affected by changing values of **Input.** Other registers hold their current values.

## Parameter Attributes

| Name | Type | Cold Start | Read Access | Write Access | Type Specific Information | |
|---|---|---|---|---|---|---|
| Trigger | **BOOL** | Off (0) | Oper | Oper | Senses | Off (0)<br>On (1) |
| Input | **BOOL** | Off (0) | Oper | Oper | Senses | Off (0)<br>On (1) |
| Index | **DINT** | 0 | Oper | Oper | High Limit<br>Low Limit | +2147483647<br>-2147483648 |
| Mode | **BOOL** | Trig (0) | Oper | Oper | Senses | Trig (0)<br>Cont (1) |
| Output_1 to Output_16 | **BOOL** | Off (0) | Oper | Oper | Senses | Off (0)<br>On (1) |

Table 18-9 Set_Bool Parameter Attributes

## SET_STR FUNCTION BLOCK

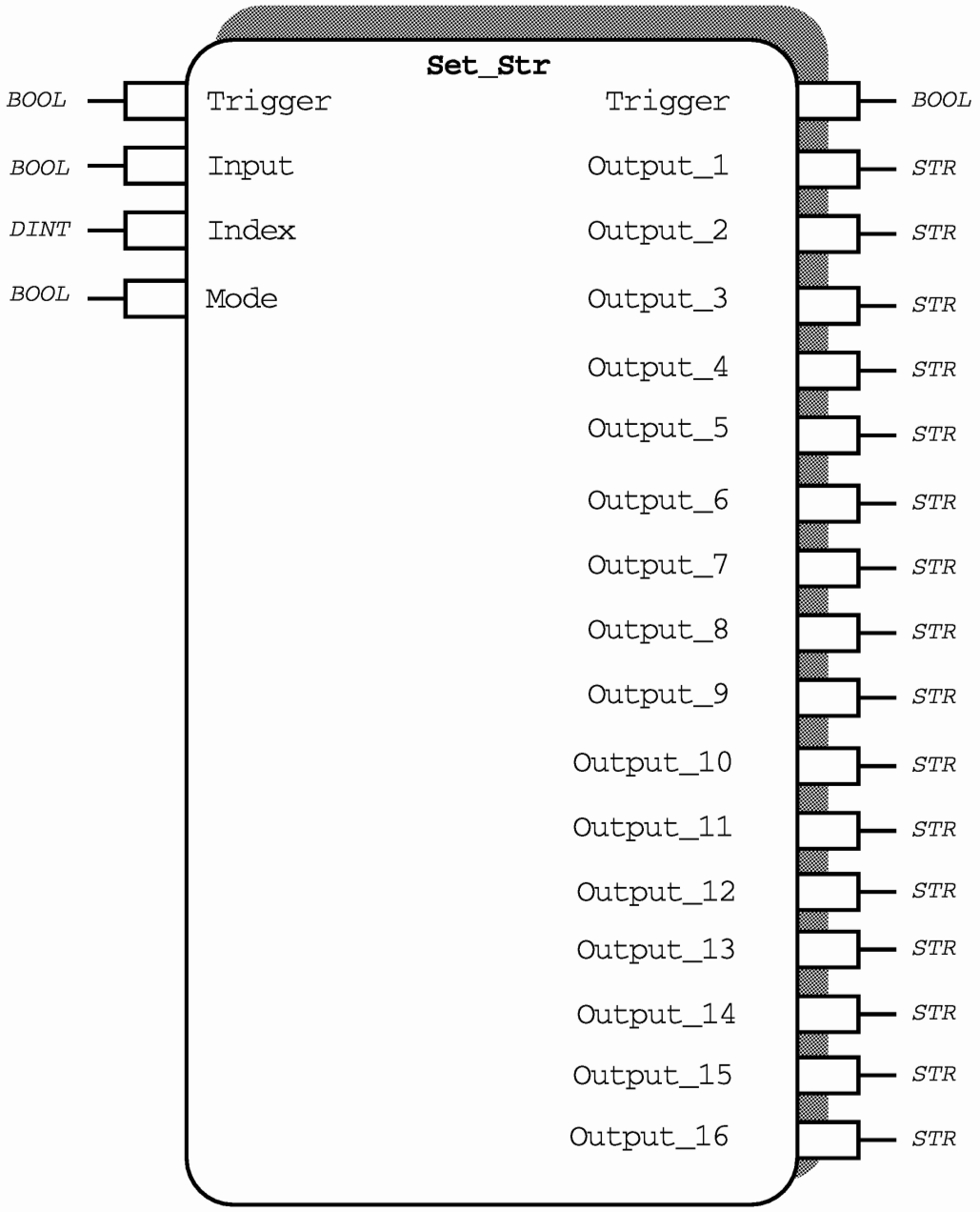



Figure 18-10 Set_Str Function Block Diagram

## Functional Description

A set of sixteen registers of type String is maintained as sixteen outputs, Output_1 to Output_16. The values contained in these registers are fed in via the single Input, the register into which the Input is directed being determined by the input Index.

The function block can operate in one of two modes. Either the registers may be updated continuously, i.e. every function block execution cycle; or they only update when the input Trigger goes from false to true.

## Function Block Attributes

Type: ..... 5098

Class: ..... SELECT

Default Task: ..... Task_2

Short List: ..... Input, Index, Mode, Trigger

Memory Requirements: ..... 1404 Bytes

## Parameter Descriptions

### Trigger (TRG)

When **Mode** is set to Trig, setting this input causes the value currently on **Input** to be copied to the register whose number is indicated on Index. For example, if Input is 'hello', and **Index** is 5, when **Trigger** is set to On **Output_5** will also show the value 'hello', provided **Mode** is set to Trig.**Trigger** is returned to the Off state immediately by the function block. No external action is required by the user program to achieve this.

### Input (IN)

The value which will be copied to the register specified by **Index.**

## Index (I)

The register to which the **Input** should be copied, either immediately if **Mode** is set to Cont, or when **Trigger i**s set to On if **Mode** is set to Trig.

## Mode (M)

Determines the way in which the registers are updated. The register indicated by **Index** will be changed to the value of **Input i**mmediately if **Mode** is set to Cont, but if **Mode** is set to Trig this change will occur when **Trigger** is next set to On.

## Output_1 (O1) to Output_16 (O16)

The values of the sixteen registers into which **Input** can be fed.

Only the register indicated by **Index** is affected by changing values of **Input.** Other registers hold their current values.

## Parameter Attributes

| Name | Type | Cold Start | Read Access | Write Access | Type Specific Information | |
|---|---|---|---|---|---|---|
| Trigger | **BOOL** | 0 | Oper | Oper | Senses | Off (0)<br>On (1) |
| Input | **STR** | " | Oper | Oper | None | |
| Index | **DINT** | 0 | Oper | Oper | High Limit<br>Low Limit | +2147483647<br>-2147483648 |
| Mode | **BOOL** | Trig (0) | Oper | Oper | Senses | Trig (0)<br>Cont (1) |
| Output_1 to Output_16 | **STR** | " | Oper | Oper | None | |

Table 18-10 Set_Str Parameter Attributes

## REGISTER_REAL FUNCTION BLOCK

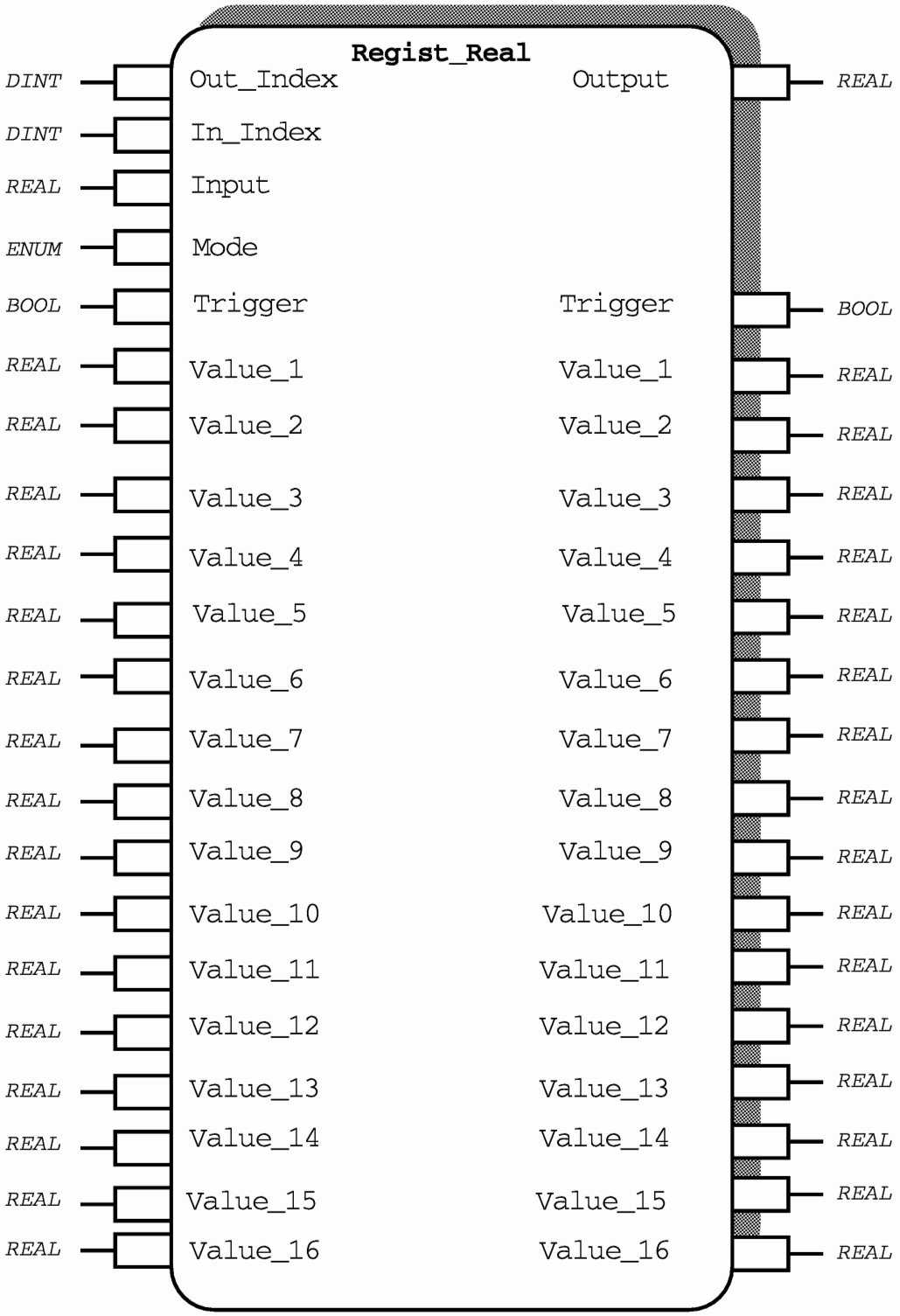



Figure 18-11 Regist_Real Function Block Diagram

## Functional Description

The functionality provided here is essentially that of a 16 by 1 matrix. Numbers can be stored and retrieved according to a numerical index.

A set of sixteen registers of type Real is maintained. The current values within these registers are presented as sixteen input/outputs, Value_1 to Value_16. Therefore the values contained in these registers can be changed directly by writing to one of these input/outputs.

The value in one of the registers can be changed by the parameter Input, the register into which the Input is directed being determined by the input In_Index. This updating of one register can happen in one of two ways. Either the register may be updated continuously, i.e. every function block execution cycle; or it may be updated only when the input Trigger goes from false to true.

An Output is also provided which will indicate the current value of one of the registers. The register whose value is indicated is determined by the input Out_Index.

## Function Block Attributes

Type: ..... 50A0

Class: ..... SELECT

Default Task: ..... Task_2

Short List: ..... In_Index, Out_Index, Input, Output

Memory Requirements: ..... 86 Bytes

## Parameter Descriptions

### Out_Index (OID)

Determines from which register the value of **Output** is obtained. If it is set to zero, Output also shows the value zero.

## In_Index (IID)

The register to which the **Input** should be copied, either immediately if **Mode** is set to Cont, or when **Trigger** is set to On if **Mode** is set to OnTrig. **In_Index** has no effect if **Mode** is set to DoNot.

## Input (IN)

The value which will be copied to the register specified by **In_Index** provided **Mode** is set to either Cont or OnTrig.

## Mode (M)

Determines the effect **Input** and **Trigger** have on the register referenced by **In_Index.**

| | |
|---|---|
| DoNot | **Input** and **Trigger** have no effect whatever the value of **In_Index.** |
| Cont | register indicated by **In_Index i**s updated with the value of **Input** every execution cycle of this function block. |
| OnTrig | register indicated by **In_Index** is updated with the value of **Input** every time **Trigger** is set to true. |

## Trigger (TRG)

When **Mode** is set to OnTrig, setting this input causes the value currently on **Input** to be copied to the register whose number is indicated by **In_Index.** For example, if **Input** is set to 10.3, and **In_Index** is 5, when **Trigger** is set to On **Value_5** will also show the value 10.3, provided **Mode** is set to OnTrig.

**Trigger** is returned to the Off state immediately by the function block when **Mode** is Cont or OnTrig. No external action is required by the user program to achieve this.

## Value_1 (V1)to Value_16 (V16)

The values of the sixteen registers into which **Input** can be fed and from which **Output** may be obtained.

Only the register indicated by **In_Index** is affected by changing values of **Input.** Other registers hold their current values unless written to directly by setting its associated value.

## Parameter Attributes

| Name | Type | Cold Start | Read Access | Write Access | Type Specific Information | |
|---|---|---|---|---|---|---|
| Out_Index | **DINT** | 0 | Oper | Oper | High Limit<br>Low Limit | +2147483647<br>-2147483648 |
| In_Index | **DINT** | 0 | Oper | Oper | High Limit<br>Low Limit | +2147483647<br>-2147483648 |
| Input | **REAL** | 0 | Oper | Oper | High Limit<br>Low Limit | +3·402823E+38<br>-3·402823E+38 |
| Mode | **ENUM** | DoNo (0) | Oper | Oper | See parameter List | |
| Trigger | **BOOL** | Off (0) | Oper | Oper | Senses | Off (0)<br>On (1) |
| Value1 to Value_16 | **REAL** | 0 | Oper | Oper | High Limit<br>Low Limit | +3·402823E+38<br>-3·402823E+38 |
| Output | **REAL** | 0 | Oper | Block | High Limit<br>Low Limit | +3·402823E+38<br>-3·402823E+38 |

Table 18-11 Regist_Real Parameter Attributes

# REGISTER_DINT FUNCTION BLOCK

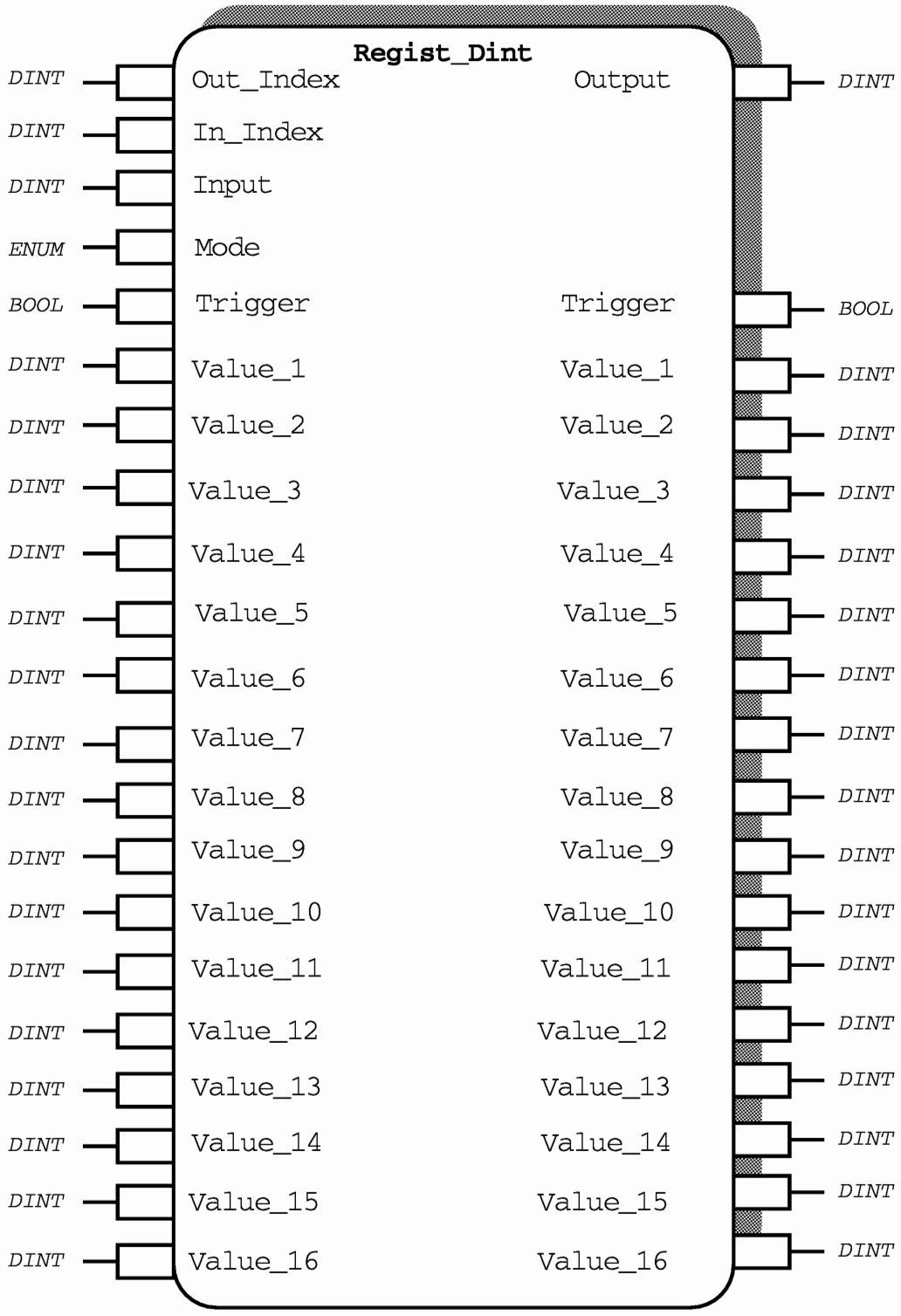



Figure 18-12 Regist_Dint Function Block Diagram

## Functional Description

The functionality provided here is essentially that of a 16 by 1 matrix. Numbers can be stored and retrieved according to a numerical index.

A set of sixteen registers of type Dint is maintained. The current values within these registers are presented as sixteen input/outputs, Value_1 to Value_16. Therefore the values contained in these registers can be changed directly by writing to one of these input/outputs. The value in one of the registers can be changed by the parameter Input, the register into which the Input is directed being determined by the input In_Index. This updating of one register can happen in one of two ways. Either the register may be updated continuously, i.e. every function block execution cycle; or it may be updated only when the input Trigger goes from false to true.

An Output is also provided which will indicate the current value of one of the registers. The register whose value is indicated is determined by the input Out_Index.

## Function Block Attributes

Type: ..... 50A2

Class: ..... SELECT

Default Task: ..... Task_2

Short List: ..... In_Index, Out_Index, Input, Output

Memory Requirements: ..... 86 Bytes

## Parameter Descriptions

### Out_Index (OID)

Determines from which register the value of **Output** is obtained from. If it is set to zero, **Output** also shows the value zero.

## In_Index (IID)

The register to which the **Input** should be copied, either immediately if **Mode** is set to Cont, or when **Trigger** is set to On if **Mode** is set to OnTrig. **In_Index** has no effect if **Mode** is set to DoNot.

## Input (IN)

The value which will be copied to the register specified by **In_Index** provided **Mode** is set to either Cont or OnTrig.

## Mode (M)

Determines the effect **Input** and **Trigger** have on the register referenced by **In_Index.**

| | |
|---|---|
| DoNot | Input and Trigger have no effect whatever the value of **In_Index.** |
| Cont | register indicated by **In_Index is** updated with the value of **Input** every execution cycle of this function block. |
| OnTrig | register indicated by **In_Index** is updated with the value of **Input** every time **Trigger** is set to true. |

## Trigger (TRG)

When **Mode is** set to OnTrig, setting this input causes the value currently on **Input** to be copied to the register whose number is indicated by **In_Index.** For example, if **Input** is set to 37, and **In_Index** is 5, when **Trigger** is set to On **Value_5** will also show the value 37, provided **Mode** is set to OnTrig.

**Trigger** is returned to the Off state immediately by the function block when **Mode** is Cont or OnTrig. No external action is required by the user program to achieve this.

## Value_1 (V1) to Value_16 (V16)

The values of the sixteen registers into which **Input** can be fed and from which **Output** may be obtained.

Only the register indicated by **In_Index** is affected by changing values of **Input.** Other registers hold their current values unless written to directly by setting its associated value.

## Parameter Attributes

| Name | Type | Cold Start | Read Access | Write Access | Type Specific Information | |
|---|---|---|---|---|---|---|
| Out_Index | **DINT** | 0 | Oper | Oper | High Limit<br>Low Limit | +2147483647<br>-2147483648 |
| In_Index | **DINT** | 0 | Oper | Oper | High Limit<br>Low Limit | +2147483647<br>-2147483648 |
| Input | **DINT** | 0 | Oper | Oper | High Limit<br>Low Limit | +2147483647<br>-2147483648 |
| Mode | **ENUM** | DoNo (0) | Oper | Oper | See parameter List | |
| Trigger | **BOOL** | Off (0) | Oper | Oper | Senses | Off (0)<br>On (1) |
| Value_1 to Value_16 | **DINT** | 0 | Oper | Oper | High Limit<br>Low Limit | +2147483647<br>-2147483648 |
| Output | **DINT** | 0 | Oper | Block | High Limit<br>Low Limit | +2147483647<br>-2147483648 |

Table 18-12 Regist_Dint Parameter Attributes

## REGISTER TIME FUNCTION BLOCK

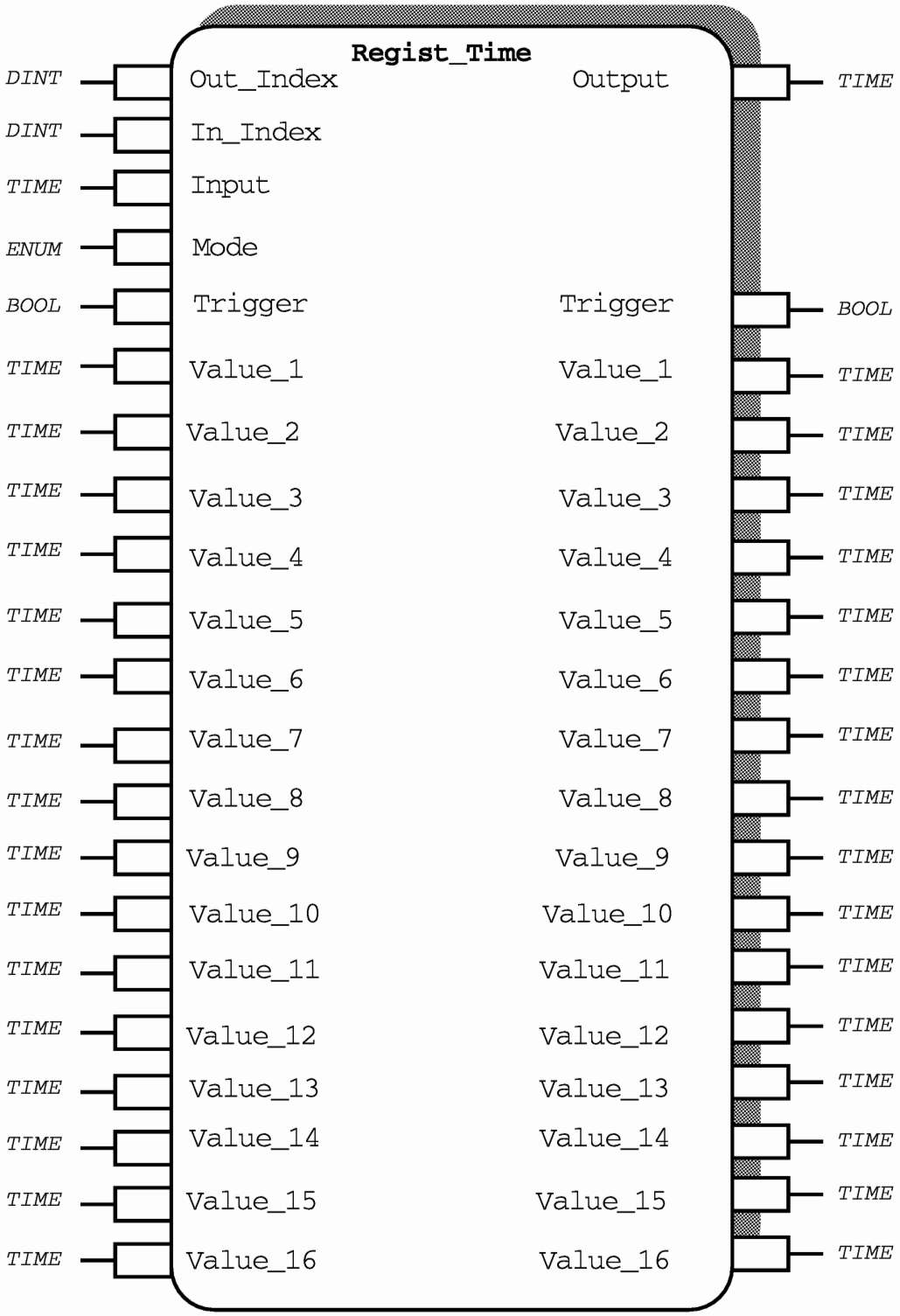



Figure 18-13 Regist_Time Function Block Diagram

## Functional Description

The functionality provided here is essentially that of a 16 by 1 matrix. Numbers can be stored and retrieved according to a numerical index.

A set of sixteen registers of type Time is maintained. The current values within these registers are presented as sixteen input/outputs, Value_1 to Value_16. Therefore the values contained in these registers can be changed directly by writing to one of these input/outputs.

The value in one of the registers can be changed by the parameter Input, the register into which the Input is directed being determined by the input In_Index. This updating of one register can happen in one of two ways. Either the register may be updated continuously, i.e. every function block execution cycle; or it may be updated only when the input Trigger goes from false to true.

An Output is also provided which will indicate the current value of one of the registers. The register whose value is indicated is determined by the input Out_Index.

## Function Block Attributes

Type: ..... 50A4

Class: ..... SELECT

Default Task: ..... Task_2

Short List: ..... In_Index, Out_Index, Input, Output

Memory Requirements: ..... 86 Bytes

## Parameter Descriptions

### Out_Index (OID)

Determines from which register the value of **Output** is obtained from. If it is set to zero, **Output** also shows the value zero.

## In_Index (IID)

The register to which the **Input** should be copied, either immediately if **Mode** is set to Cont, or when **Trigger** is set to On if **Mode** is set to OnTrig. **In_Index** has no effect if **Mode** is set to DoNot.

## Input (IN)

The value which will be copied to the register specified by **In_Index** provided **Mode** is set to either Cont or OnTrig.

## Mode (M)

Determines the effect **Input** and **Trigger** have on the register referenced by In_Index.

DoNot Input and Trigger have no effect whatever the value of **In_Index.**

Cont register indicated by **In_Index i**s updated with the value of **Input** every execution cycle of this function block.

OnTrig register indicated by **In_Index i**s updated with the value of Input every time **Trigger** is set to true.

## Trigger (TRG)

When **Mode** is set to OnTrig, setting this input causes the value currently on **Input** to be copied to the register whose number is indicated by **In_Index.** For example, if **Input** is set to 55s, and **In_Index** is 5, when **Trigger** is set to **On Value_5** will also show the value 55s, provided **Mode** is set to OnTrig.

**Trigger** is returned to the Off state immediately by the function block when **Mode** is Cont or OnTrig. No external action is required by the user program to achieve this.

## Value_1 (V1) to Value_16 (V16)

The values of the sixteen registers into which **Input** can be fed and from which **Output** may be obtained.

Only the register indicated by **In_Index** is affected by changing values of **Input.** Other registers hold their current values unless written to directly by setting its associated value.

## Parameter Attributes

| Name | Type | Cold Start | Read Access | Write Access | Type Specific Information | |
|---|---|---|---|---|---|---|
| Out_Index | **DINT** | 0 | Oper | Oper | High Limit<br>Low Limit | +2147483647<br>-2147483648 |
| In_Index | **DINT** | 0 | Oper | Oper | High Limit<br>Low Limit | +2147483647<br>-2147483648 |
| Input | **TIME** | 0ms | Oper | Oper | High Limit<br>Low Limit | 23d23h59m59s999ms<br>0 |
| Mode | **ENUM** | DoNot(0) | Oper | Oper | See parameter List | |
| Trigger | **BOOL** | Off (0) | Oper | Oper | Senses | Off (0)<br>On (1) |
| Value_1 to Value_16 | **TIME** | 0 | Oper | Oper | High Limit<br>Low Limit | 23d23h59m59s999ms<br>0 |
| Output | **TIME** | 0 | Oper | Block | High Limit<br>Low Limit | 23d23h59m59s999ms<br>0 |

Table 18-13 Regist_Time Parameter Attributes

## REGISTER BOOL FUNCTION BLOCK

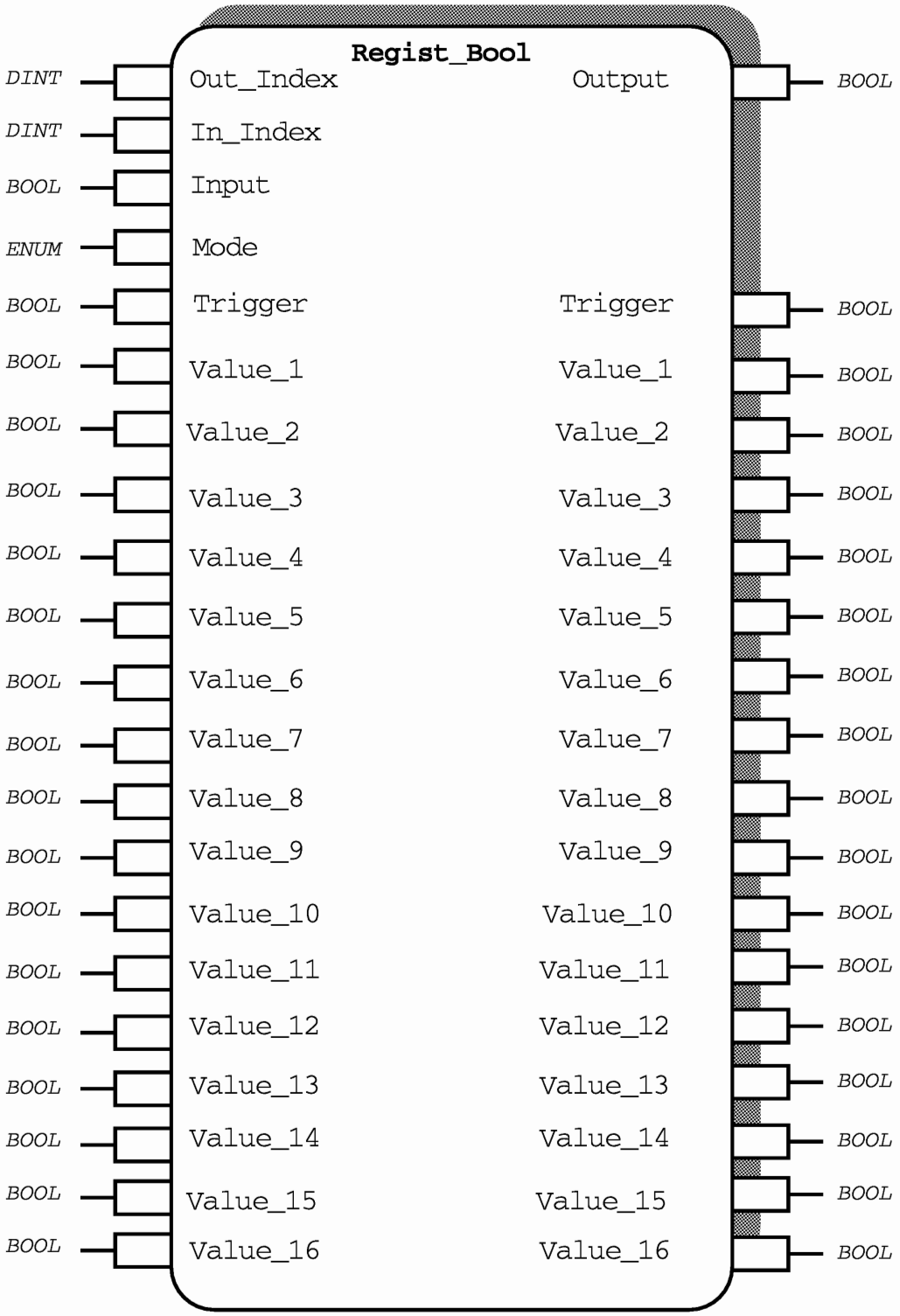



Figure 18-14 Regist_Bool Function Block Diagram

## Functional Description

The functionality provided here is essentially that of a 16 by 1 matrix. Numbers can be stored and retrieved according to a numerical index.

A set of sixteen registers of type Bool is maintained. The current values within these registers are presented as sixteen input/outputs, Value_1 to Value_16. Therefore the values contained in these registers can be changed directly by writing to one of these input/outputs.

The value in one of the registers can be changed by the parameter Input, the register into which the Input is directed being determined by the input In_Index. This updating of one register can happen in one of two ways. Either the register may be updated continuously, i.e. every function block execution cycle; or it may be updated only when the input Trigger goes from false to true.

An Output is also provided which will indicate the current value of one of the registers. The register whose value is indicated is determined by the input Out_Index.

## Function Block Attributes

Type: ..... 50A6

Class: ..... SELECT

Default Task: ..... Task_2

Short List: ..... In_Index, Out_Index, Input, Output

Memory Requirements: ..... 32 Bytes

## Parameter Descriptions

### Out_Index (OID)

Determines from which register the value of **Output i**s obtained from. If it is set to zero, **Output** also shows the value zero.

## In_Index (IID)

The register to which the **Input** should be copied, either immediately if **Mode** is set to Cont, or when **Trigger** is set to On if **Mode** is set to OnTrig. **In_Index** has no effect if **Mode** is set to DoNot.

## Input (IN)

The value which will be copied to the register specified by **In_Index** provided Mode is set to either Cont or OnTrig.

## Mode (M)

Determines the effect **Input** and **Trigger** have on the register referenced by **In_Index.**

DoNot — Input and **Trigger** have no effect whatever the value of I**n_Index.**

Cont — register indicated by **In_Index i**s updated with the value of **Input** every execution cycle of this function block.

OnTrig — register indicated by **In_Index i**s updated with the value of **Input** every time **Trigger** is set to true.

## Trigger (TRG)

When **Mode** is set to OnTrig, setting this input causes the value currently on **Input** to be copied to the register whose number is indicated by **In_Index.** For example, if **Input** is On, and **In_Index** is 5, when Trigger is set to **On Value_5** will also show the value On, provided **Mode** is set to OnTrig.

**Trigger** is returned to the Off state immediately by the function block when **Mode** is Cont or OnTrig. No external action is required by the user program to achieve this.

## Value_1 (V1) to Value_16 (V16)

The values of the sixteen registers into which **Input** can be fed and from which **Output** may be obtained.

Only the register indicated by **In_Index** is affected by changing values of **Input.** Other registers hold their current values unless written to directly by setting its associated value.

## Parameter Attributes

| Name | Type | Cold Start | Read Access | Write Access | Type Specific Information | |
|---|---|---|---|---|---|---|
| Out_Index | **DINT** | 0 | Oper | Oper | High Limit<br>Low Limit | +2147483647<br>-2147483648 |
| In_Index | **DINT** | 0 | Oper | Oper | High Limit<br>Low Limit | +2147483647<br>-2147483648 |
| Input | **BOOL** | Off (0) | Oper | Oper | Senses | Off (0)<br>On (1) |
| Mode | **ENUM** | DoNo (0) | Oper | Oper | See parameter List | |
| Trigger | **BOOL** | Off (0) | Oper | Oper | Senses | Off (0)<br>On (1) |
| Value_1 to Value_16 | **BOOL** | Off (0) | Oper | Oper | Senses | Off (0)<br>On (1) |
| Output | **BOOL** | Off (0) | Oper | Block | Senses | Off (0)<br>On (1) |

Table 18-14 Regist_Bool Parameter Attributes

## REGISTER STR FUNCTION BLOCK

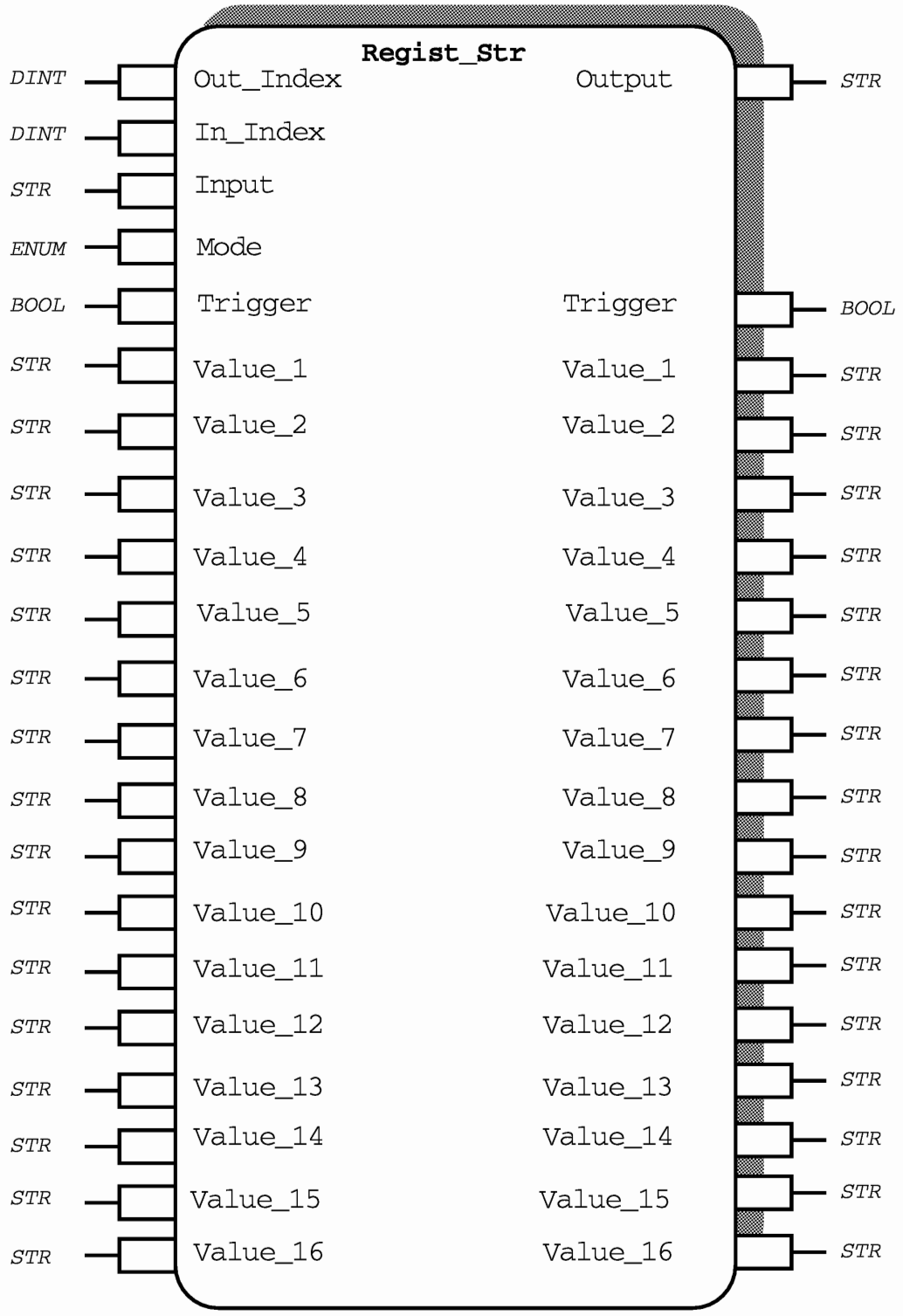



Figure 18-15 Regist_Str Function Block Diagram

## Functional Description

The functionality provided here is essentially that of a 16 by 1 matrix. Numbers can be stored and retrieved according to a numerical index.

A set of sixteen registers of type String is maintained. The current values within these registers are presented as sixteen input/outputs, Value_1 to Value_16. Therefore the values contained in these registers can be changed directly by writing to one of these input/outputs.

The value in one of the registers can be changed by the parameter Input, the register into which the Input is directed being determined by the input In_Index. This updating of one register can happen in one of two ways. Either the register may be updated continuously, i.e. every function block execution cycle; or it may be updated only when the input Trigger goes from false to true.

An Output is also provided which will indicate the current value of one of the registers. The register whose value is indicated is determined by the input Out_Index.

## Function Block Attributes

Type: ..... 50A8

Class: ..... SELECT

Default Task: ..... Task_2

Short List: ..... In_Index, Out_Index, Input, Output

Memory Requirements: ..... 1490 Bytes

## Parameter Descriptions

### Out_Index (OID)

Determines from which register the value of **Output** is obtained from. If it is set to zero, **Output** also shows the value zero.

## In_Index (IID)

The register to which the **Input** should be copied, either immediately if **Mode** is set to Cont, or when **Trigger** is set to On if Mode is set to OnTrig. **In_Index** has no effect if **Mode** is set to DoNot.

## Input (IN)

The value which will be copied to the register specified by **In_Index** provided **Mode** is set to either Cont or OnTrig.

## Mode (M)

Determines the effect **Input** and **Trigger** have on the register referenced by **In_Index.**

| | |
|---|---|
| DoNot | **Input** and **Trigger** have no effect whatever the value of **In_Index.** |
| Cont | register indicated by I**n_Index i**s updated with the value of **Input** every execution cycle of this function block. |
| OnTrig | register indicated by **In_Index** is updated with the value of **Input** every time **Trigger** is set to true. |

## Trigger (TRG)

When **Mode** is set to OnTrig, setting this input causes the value currently on **Input** to be copied to the register whose number is indicated by **In_Index.** For example, if **Input** is set to 'hello', and **In_Index** is 5, when Trigger is set to On **Value_5** will also show the value 'hello', provided **Mode** is set to OnTrig.

Trigger is returned to the Off state immediately by the function block when **Mode** is Cont or OnTrig. No external action is required by the user program to achieve this.

## Value_1 (V1) to Value_16 (V16)

The values of the sixteen registers into which **Input** can be fed and from which **Output** may be obtained.

Only the register indicated by **In_Index** is affected by changing values of **Input.** Other registers hold their current values unless written to directly by setting its associated value.

## Parameter Attributes

| Name | Type | Cold Start | Read Access | Write Access | Type Specific Information | |
|---|---|---|---|---|---|---|
| Out_Index | **DINT** | 0 | Oper | Oper | High Limit<br>Low Limit | +2147483647<br>-2147483648 |
| In_Index | **DINT** | 0 | Oper | Oper | High Limit<br>Low Limit | +2147483647<br>-2147483648 |
| Input | **STR** | " | Oper | Oper | None | |
| Mode | **ENUM** | DoNot(0) | Oper | Oper | See parameter List | |
| Trigger | **BOOL** | Off (0) | Oper | Oper | Senses | Off (0)<br>On (1) |
| Value_1 to Value_16 | **STR** | " | Oper | Oper | None | |
| Output | **STR** | " | Oper | Block | None | |

Table 18-15 Regist_Str Parameter Attributes