



HAYES
CONTROL SYSTEMS

Beckhoff TwinCAT
Writing to the CX1000 Display

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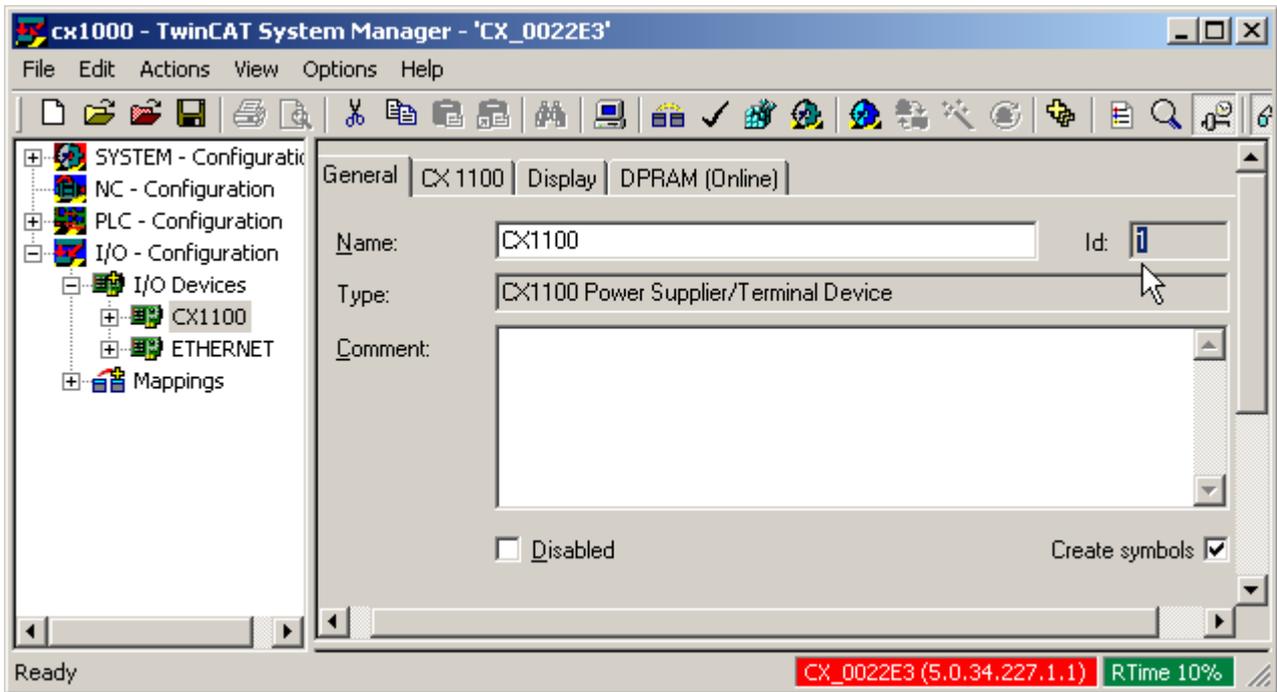
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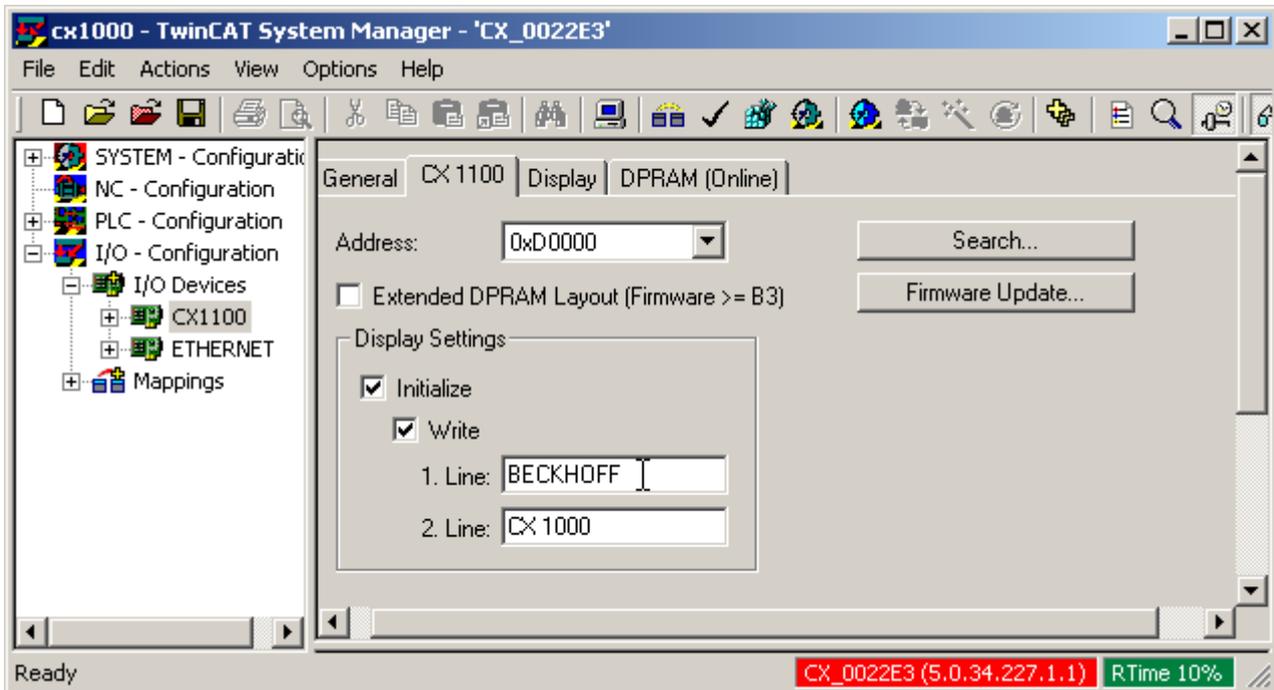
1. CX1000 Default Display Settings

The CX1000 default display text can be configured in TwinCAT System Manager and written to the CX1000 during initialisation. To configure the default text strings:

1. Select the CX1100 Power Supply/Terminal Device under "I/O Devices"



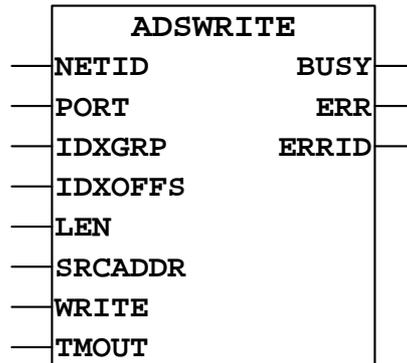
2. Select the "CX1100" tab.
3. Select "Initialize", ticked in enabled.
4. Select "Write", ticked in enabled.
5. Enter the required display text for each line.



Once the updated system configuration has been downloaded, the CX1000 will initialise the display with the specified text.

2. Writing to the CX1000 Display Panel

The CX1000 display panel is part of the “CX1100 Power Supplier/Terminal Device” ADS device, and data is written to it using the **ADSWRITE** function block



Inputs	Function	Type	Description
NETID	AMS Net ID	STRING	The AMS Net ID of the CX1000
PORT	Error! Reference source not found.	UINT	The ADS port number for the CX1000 display is fixed at 300 decimal
IDXGRP	Index Group	UDINT	The index group number of the requested ADS service
IDXOFFS	Index Offset	UDINT	The index offset number of the requested ADS service
LEN	String Length	UDINT	The number of data bytes to be written
SRCADDR	Source Address	DWORD	The address of the first byte of the buffer containing the data to be written
WRITE	Error! Reference source not found.	BOOL	A rising edge triggers the ADSWRITE command
TMOUT	Error! Reference source not found.	TIME	The time period to wait for a response before ADSWRITE is aborted

Outputs	Function	Type	Description
BUSY	Error! Reference source not found.	BOOL	Set to TRUE while the ADSWRITE is in progress. Reset to FALSE when the ADSWRITE function completes or aborts due to timeout
ERR	Error! Reference source not found.	BOOL	Set to TRUE when BUSY goes FALSE if an error occurred with ADSWRITE . Reset to FALSE when a rising edge is detected on the WRITE input
ERRID	Error! Reference source not found.	UDINT	Returns an error code if ERR is set to TRUE. Reset to 0 when a rising edge is detected on the WRITE input

2.1. AMS Net ID

The AMS Net ID is the network address of the CX1000. This is shown in the red box at the bottom of the TwinCAT System Manager screen when the CX1000 has been selected

Writing to the CX1000 Display

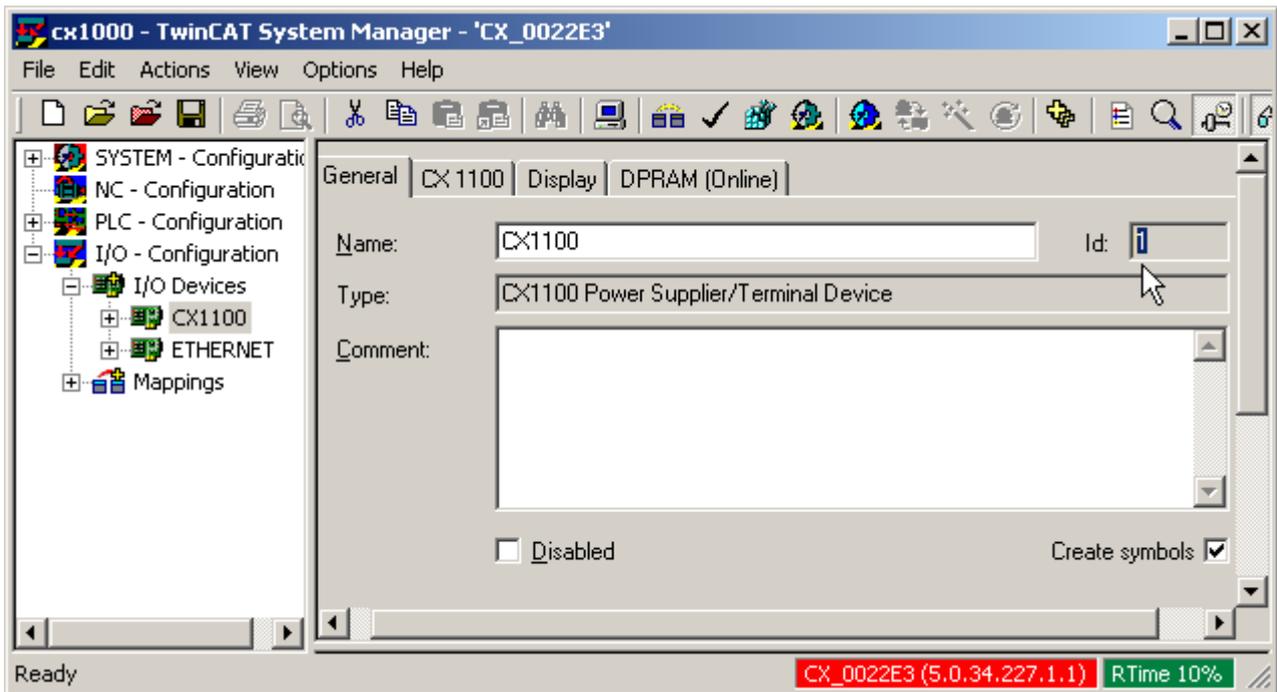
as the target system. The AMS Net ID (**NETID**) input uses a string for the AMS Net ID, e.g. '5.0.34.227.1.1'.



2.2. Index Group

IndexGroup: 0x5000 + DeviceID

The display panel is part of the "CX1100 Power Supplier/Terminal Device", and the DeviceID can be found on the CX1100 tab for this device. In the example below, the DeviceID is 1.



2.3. Index Offset

The Index Offset specifies the feature of the CX1000 display that is to be controlled by the ADSWRITE function. The CX1000 display functions are shown in the table below, along with the index offset value for each function, and any additional info that is required with .

Function	Index Offset	Additional Info
Write Text to Line 1	0xFFFF00FF	Write text string at Source Address (SRCADDR) input to line 1 of the CX1000 display
Write Text to Line 2	0xFFFF40FF	Write text string at Source Address (SRCADDR) input to line 2 of the CX1000 display
Switch Display On	0xFFFF95FF	No additional info required
Switch Display Off	0xFFFF94FF	
Clear Display	0xFFFFA0FF	
Switch Backlight On	0xFFFF96FF	
Switch Backlight Off	0xFFFF97FF	

2.4. String Length

String Length (**LEN**) input specifies how many characters of the string variable will be written to the CX1000 display when the "Write Text To Line 1" or "Write Text To Line 1" functions are called. This input has no effect with the other display control functions. The CX1000 can display up to 16 characters on each line, but if less than 16 characters are written to a line of the display, the remaining characters on the display will remain unchanged. There are several ways to ensure that all characters in the display line are always updated:

- Use string constants with a fixed message length of 16 characters.
- Concatenate a string of 16 blank characters to the text string using the **CONCAT** command, and use **LEFT** to trim the string to 16 characters in length.
- Concatenate a string of 16 blank characters to the text string using the **CONCAT** command, and fix the **LEN** input at 16 so that only the first 16 characters of the string are written to the display.

2.5. Source Address

The Source Address (**SRCADDR**) input is the memory address of the first byte of the text string to be written to the CX1000 display, and this can be passed into **ADSWRITE** by using the **ADR** command. **ADR** simply returns the first memory byte address used by the variable, string, or array name passed into it. This ensures that if the string variable used to generate the text string is moved to another memory location, the program will still write the correct data to the display.

3. Example Program

The program below shows a simple implementation of ADSWRITE to update both lines on the CX1000 display. The following libraries must be included in the PLC project:

- STANDARD.LIB
- TcSystem.LIB (TcBase.lib added automatically)

Set **bDisplayWrite** to **TRUE** to update the display when required.

The screenshot shows the TwinCAT PLC Control interface for a CX1000 project. The main window displays a ladder logic program for 'PROGRAM DISPLAY_FBD'. The program is structured as follows:

```

0001 PROGRAM DISPLAY_FBD
0002 VAR
0003     DisplayLine1 : ADSWRITE;
0004     DisplayLine2 : ADSWRITE;
0005     bDisplayWrite : BOOL;
0006     strLine1     : STRING(16);
0007     strLine2     : STRING(16);

```

The program consists of three rungs:

- Rung 0001:** A function block call for `DisplayLine1`. The parameters are: `NETID` (empty), `BUSY` (output), `PORT` (300), `ERR` (output), `IDXGRP` (16#5001), `ERRID` (output), `IDXOFFS` (16#FFFF00FF), `LEN` (`LEN(strLine1)`), `SRCADDR` (`ADR(strLine1)`), `WRITE` (`bDisplayWrite`), and `TMOUT` (`T#1s`).
- Rung 0002:** A function block call for `DisplayLine2`. The parameters are: `NETID` (empty), `BUSY` (output), `PORT` (300), `ERR` (output), `IDXGRP` (16#5001), `ERRID` (output), `IDXOFFS` (16#FFFF40FF), `LEN` (`LEN(strLine2)`), `SRCADDR` (`ADR(strLine2)`), `WRITE` (`bDisplayWrite`), and `TMOUT` (`T#1s`).
- Rung 0003:** A logic block where the `BUSY` outputs from `DisplayLine1` and `DisplayLine2` are connected to an `AND` block. The output of the `AND` block is connected to the `R` (Reset) input of the `bDisplayWrite` coil.

The status bar at the bottom indicates: Target: CX_00273C (5.0.39.60.1.1), Run Time: 1. The bottom right corner shows the TwinCAT logo.