

X-gateway Interface Addendum CC-Link IE Field

Doc: HMSI-27-245, Rev: 1.00



HALMSTAD • CHICAGO • KARLSRUHE • TOKYO • BEIJING • MILANO • MULHOUSE • COVENTRY • PUNE • COPENHAGEN

HMS Industrial Networks
Mailing address: Box 4126, 300 04 Halmstad, Sweden
Visiting address: Stationsgatan 37, Halmstad, Sweden

E-mail: info@hms-networks.com
www.hms-networks.com

Important User Information

This document is intended to provide a good understanding of the functionality offered by the Interface described here.

The reader is expected to be familiar with high level software design, and communication systems in general. The use of advanced interface-specific functionality may require in-depth knowledge of networking internals and/or information from the network specifications. In such cases, the persons responsible for the implementation of this product should either obtain the necessary specifications to gain sufficient knowledge, or alternatively limit the implementation in such a way that this is not necessary.

Liability

Every care has been taken in the preparation of this manual. Please inform HMS Industrial Networks AB of any inaccuracies or omissions. The data and illustrations found in this document are not binding. We, HMS Industrial Networks AB, reserve the right to modify our products in line with our policy of continuous product development. The information in this document is subject to change without notice and should not be considered as a commitment by HMS Industrial Networks AB. HMS Industrial Networks AB assumes no responsibility for any errors that may appear in this document.

There are many applications of this product. Those responsible for the use of this device must ensure that all the necessary steps have been taken to verify that the applications meet all performance and safety requirements including any applicable laws, regulations, codes, and standards.

HMS Industrial Networks AB will under no circumstances assume liability or responsibility for any problems that may arise as a result from the use of undocumented features, timing, or functional side effects found outside the documented scope of this product. The effects caused by any direct or indirect use of such aspects of the product are undefined, and may include e.g. compatibility issues and stability issues.

The examples and illustrations in this document are included solely for illustrative purposes. Because of the many variables and requirements associated with any particular implementation, HMS Industrial Networks AB cannot assume responsibility for actual use based on these examples and illustrations.

Intellectual Property Rights

HMS Industrial Networks AB has intellectual property rights relating to technology embodied in the product described in this document. These intellectual property rights may include patents and pending patent applications in the US and other countries.

Trademark Acknowledgements

Anybus ® is a registered trademark of HMS Industrial Networks AB. All other trademarks are the property of their respective holders.

!

WARNING: This is a class A product. in a domestic environment this product may cause radio interference in which case the user may be required to take adequate measures.

ESD Note: This product contains ESD (Electrostatic Discharge) sensitive parts that may be damaged if ESD control procedures are not followed. Static control precautions are required when handling the product. Failure to observe this may cause damage to the product.

Table of Contents

Preface	About This Document	
	Important User Information.....	3
	Related Documents.....	3
	Document History.....	4
	Conventions & Terminology.....	4
	Support.....	4
Chapter 1	About the CC-Link IE Field Interface	
	General Description.....	5
	Features.....	5
	External View.....	6
	CC-Link IE Field Interface Status LEDs.....	7
	Configuration Switches.....	7
Chapter 2	Installation & Configuration	
	Gateway Config Interface.....	8
Chapter 3	Data exchange	
	General.....	9
	Data representation.....	9
Appendix A	Technical Specification	
	CC-Link IE Field Connector Pinout.....	12

P. About This Document

This document describes network specific features and procedures needed when operating the CC-Link IE Field Slave Interface for the Anybus X-gateway. For general information and operating instructions for the Anybus X-gateway, consult the Anybus X-gateway User Manual.

P.1. Related Documents

Document	Author
Anybus X-gateway User Manual	HMS
CC-Link Cable Wiring Manual, publication CC0208-06	Mitsubishi
CC-Link Specification (Profile), publication BTP-05028-B	Mitsubishi

P.2. Document History

Revision List

Revision	Date	Author(s)	Chapter(s)	Description
1.00	May 2014	SDa	-	First official release

P.3. Conventions & Terminology

The following conventions are used throughout this document:

- Numbered lists provide sequential steps
- Bulleted lists provide information, not procedural steps
- The term 'X-gateway' refers to the Anybus X-gateway
- The term 'Slave Interface' refers to the CC-Link IE Field Slave interface for the Anybus X-gateway.
- The term 'user manual' refers to the Anybus X-gateway User Manual.
- Hexadecimal values are written in the format NNNNh, where NNNN is the hexadecimal value.
- 16/32 bit values are generally stored in Motorola (big endian) format unless otherwise stated.

P.4. Support

For general contact information and support, please refer to the contact and support pages at www.anybus.com.

1. About the CC-Link IE Field Interface

1.1. General Description

The CC-Link IE Field Slave Interface for the X-gateway implements a galvanically isolated CC-Link IE Field interface. The interface acts as a slave device, which means it can be accessed by a CC-Link IE Field master, but it will not initiate communication by itself.

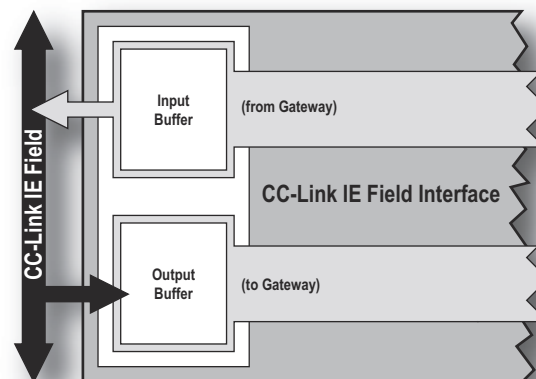
Data is exchanged via the input and output buffers, or via CC-Link IE Field protocols.

- **Input Buffer**

This buffer holds data forwarded *from* the other network, i.e. data which can be read by the CC-Link IE Field master.

- **Output Buffer**

This buffer is forwarded *to* the other network, i.e. data which can be written by the CC-Link IE Field master.



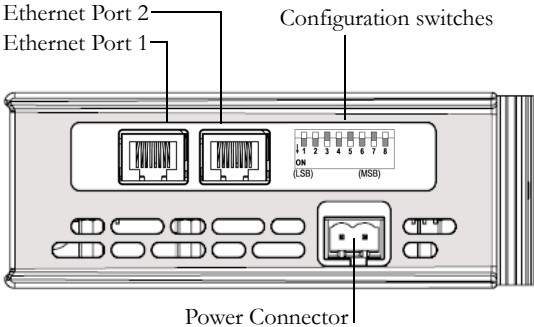
1.2. Features

- CC-Link IE Field Network intelligent device station
- Up to 512 bytes of I/O data, distributed between bit and word data, according to a predefined scheme. See section 3.2..
- Baud rate 1 Gbps fixed
- Station Number configuration via switches

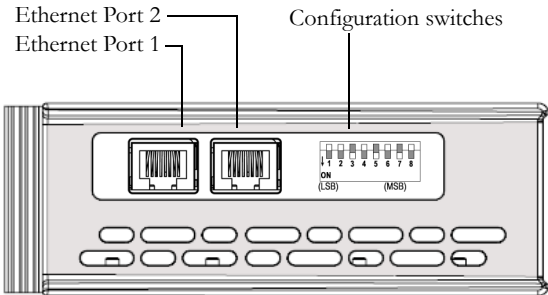
1.3. External View

The CC-Link IE Field Slave interface can be top or bottom-mounted. Both options are illustrated below.

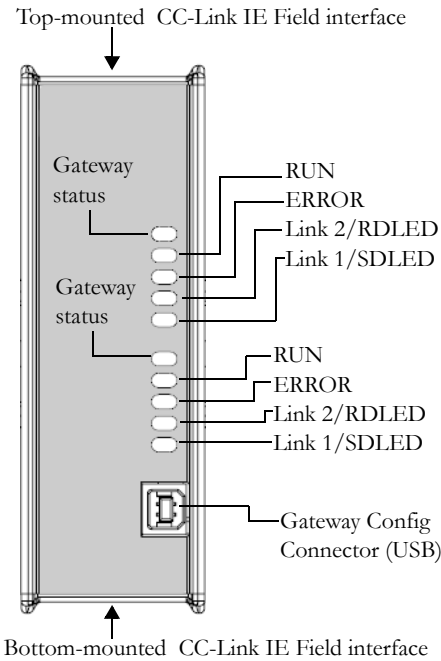
Top-mounted Interface View



Bottom-mounted Interface View



Front View



Gateway Config connector

Consult the X-Gateway User Manual for further details.

Gateway Power connector

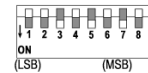
Consult the X-Gateway User Manual for further details.

1.4. CC-Link IE Field Interface Status LEDs

LED	State	Indication
Gateway Status	Consult the Gateway user manual for further details.	
RUN	Green	Normal operation
	Off	No network detected, network timeout
ERROR	Red	- Station not operating normally - Duplicate station number - Master parameter error - Illegal station address during initialization
	Red blink	Link error
	Off	Normal operation or no power
LINK 2 (see switch 8)	Off	- No data link - No power
	Green	Link established to Ethernet network
	Green flash	Activity
RDLED	OFF	- No data received - No power
	Green	Data received
LINK 1 (see switch 8)	OFF	- No data link - No power
	Green	Link established to Ethernet network
	Green flash	Activity
SDLED	OFF	- No data transmission - No power
	Green	Data transmission

1.5. Configuration Switches

Switches 1-7 are for setting the node number before startup. Changes will take effect after a restart.



Switch setting (1-7)	Description
0	Reserved. The ERROR LED shows solid red.
1-120	Node number setting. Switch 1 is LSB and switch 7 is MSB.
(121-126)	Invalid Node numbers.No network communication, and the ERROR LED shows solid red.
127	Node number is assigned from mailbox message if available, otherwise ERROR LED shows solid red.

Switch 8 determines the usage of LED's 3 and 4. The options are to indicate transmission information (RD/SD), or Link (1/2) information. Changes are applied immediately.

Switch setting (8)	Description
ON	LINK status indication on LED 3 and LED 4
OFF	RD/SD status information on LED 3 and LED 4 (Default)

2. Installation & Configuration

2.1. Gateway Config Interface

The X-gateway and the CC-Link IE Field slave interface may be configured by using the software tool **Anybus Configuration Manager** (ACM), which is available from www.anybus.com/support

When ACM is connected to the gateway via the USB configuration connector, the following settings are available:

Network Type	
Name	CC-Link IE Field Network
General	
Input I/O data Size (bytes)	20
Output I/O data Size (bytes)	20
Offline option	Clear ▼
Control word/Status word	Disable ▼

See also:

- The Anybus X-gateway User Manual, for full details on using ACM.
- The online help in ACM, for further help on the available settings.

3. Data exchange

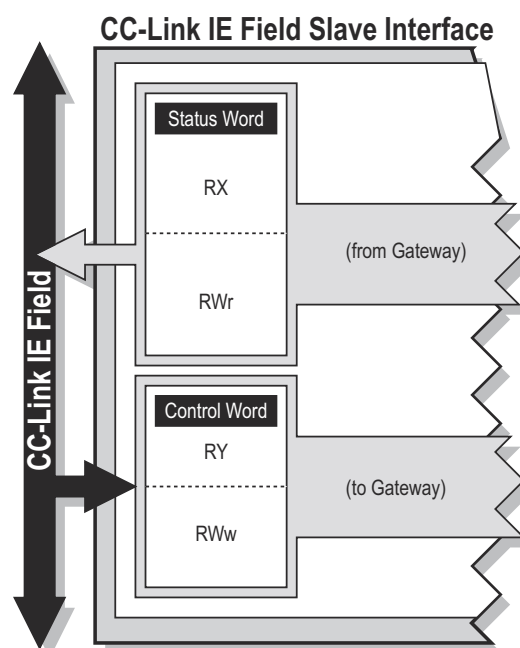
3.1. General

The CC-Link IE Field Slave interface implements a communication solution for the Anybus X-gateway platform, thus providing support for industrial protocols.

The interface exchanges data via two data buffers, a.k.a. the Input and Output Buffers. These buffers can be accessed via the industrial protocol CC-Link IE Field.

The I/O data is transferred as cyclic data (RWx, RY and RX points).

Note: The Control/Status Words and the Live List are not covered in this manual. For more information, see the Anybus-X Gateway Generic User Manual.



3.2. Data representation

The cyclic data I/O data on the CC-Link IE Field network is divided between bit and word information. To be able to predict the distribution of data, the I/O size is divided into one part containing 16-bit blocks of bit information, and a second part with 64-bit blocks of word information. This gives the following distributions:

I/O Size (bytes)	Bit data (bytes)	Word data (bytes)	CC-Link points, Bit/Word	Total Size (bytes)
0<Size<= 2	Size	0	16/4	10
2<Size<= 10	2	Size-2	16/4	10
10<Size<= 12	4	Size-4	32/4	12
12<Size<= 20	4	Size-4	32/8	20
20<Size<= 22	6	Size-6	48/8	22
22<Size<= 30	6	Size-6	48/12	30
30<Size<= 32	8	Size-8	64/12	32
32<Size<= 40	8	Size-8	64/16	40
40<Size<= 42	10	Size-10	80/16	42
42<Size<= 50	10	Size-10	80/20	50
50<Size<= 52	12	Size-12	96/20	52
52<Size<= 60	12	Size-12	96/24	60
60<Size<= 62	14	Size-14	112/24	62
62<Size<= 70	14	Size-14	112/28	70
70<Size<= 72	16	Size-16	128/28	72
72<Size<= 80	16	Size-16	128/32	80

80<Size<= 82	18	Size-18	144/32	82
82<Size<= 90	18	Size-18	144/36	90
90<Size<= 92	20	Size-20	160/36	92
92<Size<= 100	20	Size-20	160/40	100
100<Size<= 102	22	Size-22	176/40	102
102<Size<= 110	22	Size-22	176/44	110
110<Size<= 112	24	Size-24	192/44	112
112<Size<= 120	24	Size-24	192/48	120
120<Size<= 122	26	Size-26	208/48	122
122<Size<= 130	26	Size-26	208/52	130
130<Size<= 132	28	Size-28	224/52	132
132<Size<= 140	28	Size-28	224/56	140
140<Size<= 142	30	Size-30	240/56	142
142<Size<= 150	30	Size-30	240/60	150
150<Size<= 152	32	Size-32	256/60	152
152<Size<= 160	32	Size-32	256/64	160
160<Size<= 162	34	Size-34	272/64	162
162<Size<= 170	34	Size-34	272/68	170
170<Size<= 172	36	Size-36	288/68	172
172<Size<= 180	36	Size-36	288/72	180
180<Size<= 182	38	Size-38	304/72	182
182<Size<= 190	38	Size-38	304/76	190
190<Size<= 192	40	Size-40	320/76	192
192<Size<= 200	40	Size-40	320/80	200
200<Size<= 202	42	Size-42	336/80	202
202<Size<= 210	42	Size-42	336/84	210
210<Size<= 212	44	Size-44	352/84	212
212<Size<= 220	44	Size-44	352/88	220
220<Size<= 222	46	Size-46	368/88	222
222<Size<= 230	46	Size-46	368/92	230
230<Size<= 232	48	Size-48	384/92	232
232<Size<= 240	48	Size-48	384/96	240
240<Size<= 242	50	Size-50	400/96	242
242<Size<= 250	50	Size-50	400/100	250
250<Size<= 252	52	Size-52	416/100	252
252<Size<= 260	52	Size-52	416/104	260
260<Size<= 262	54	Size-54	432/104	262
262<Size<= 270	54	Size-54	432/108	270
270<Size<= 272	56	Size-56	448/108	272
272<Size<= 280	56	Size-56	448/112	280
280<Size<= 282	58	Size-58	464/112	282
282<Size<= 290	58	Size-58	464/116	290
290<Size<= 292	60	Size-60	480/116	292
292<Size<= 300	60	Size-60	480/120	300
300<Size<= 302	62	Size-62	496/120	302
302<Size<= 310	62	Size-62	496/124	310

310<Size<= 312	64	Size-64	512/124	312
312<Size<= 320	64	Size-64	512/128	320
320<Size<= 322	66	Size-66	528/128	322
322<Size<= 330	66	Size-66	528/132	330
330<Size<= 332	68	Size-68	544/132	332
332<Size<= 340	68	Size-68	544/136	340
340<Size<= 342	70	Size-70	560/136	342
342<Size<= 350	70	Size-70	560/140	350
350<Size<= 352	72	Size-72	576/140	352
352<Size<= 360	72	Size-72	576/144	360
360<Size<= 362	74	Size-74	592/144	362
362<Size<= 370	74	Size-74	592/148	370
370<Size<= 372	76	Size-76	608/148	372
372<Size<= 380	76	Size-76	608/152	380
380<Size<= 382	78	Size-78	624/152	382
382<Size<= 390	78	Size-78	624/156	390
390<Size<= 392	80	Size-80	640/156	392
392<Size<= 400	80	Size-80	640/160	400
400<Size<= 402	82	Size-82	656/160	402
402<Size<= 410	82	Size-82	656/164	410
410<Size<= 412	84	Size-84	672/164	412
412<Size<= 420	84	Size-84	672/168	420
420<Size<= 422	86	Size-86	688/168	422
422<Size<= 430	86	Size-86	688/172	430
430<Size<= 432	88	Size-88	704/172	432
432<Size<= 440	88	Size-88	704/176	440
440<Size<= 442	90	Size-90	720/176	442
442<Size<= 450	90	Size-90	720/180	450
450<Size<= 452	92	Size-92	736/180	452
452<Size<= 460	92	Size-92	736/184	460
460<Size<= 462	94	Size-94	752/184	462
462<Size<= 470	94	Size-94	752/188	470
470<Size<= 472	96	Size-96	768/188	472
472<Size<= 480	96	Size-96	768/192	480
480<Size<= 482	98	Size-98	784/192	482
482<Size<= 490	98	Size-98	784/196	490
490<Size<= 492	100	Size-100	800/196	492
492<Size<= 500	100	Size-100	800/200	500
500<Size<= 502	102	Size-102	816/200	502
502<Size<= 510	102	Size-102	816/204	510
510<Size<= 512	104	Size-104	832/204	512

A. Technical Specification

A.1. CC-Link IE Field Connector Pinout

Pin	Signal
1	TD+
2	TD-
3	RD+
4	Termination
5	Termination
6	RD-
7	Termination
8	Termination

