

CC-Link News

EUROPEAN EDITION

In this issue:

From initial idea to certified product in just six months

In the current economic climate many companies are looking for markets with potential for sustained growth. The sensor specialist Balluff has now added a new line of distributed I/O modules for the CC-Link fieldbus network technology to its range of networking products for industrial automation applications.

This is in response to rising demand, mainly in Asia, but also in other regions, for mature network solutions for this open fieldbus technology that was originally introduced in the year 2000. Development of the new modules was completed in just six months, from the initial idea to the marketable product.

Based in the German town of Neuhausen near Stuttgart, Balluff GmbH is a leading manufacturer of sensor technology for factory automation applications. Originally established in 1921 as a mechanical repair shop, the company now has over 2,100 employees worldwide and is represented on all continents by 24 subsidiaries and another 30 local offices. Balluff is now particularly well known for its comprehensive range of sensors – hardly surprising when one considers that the company developed its first electro-mechanical sensor over 50 years ago. In recent years, alongside its many innovative products in the sensors field, Balluff has also been developing and expanding its own range of products for networking and system solutions. “To make full use of the power and capabilities of modern sensors users need high-quality, robust and fully-compatible network technology that can ensure fast and reliable data communication with the controller,” explains Rainer Traub, head of product marketing at Balluff.

A certified family of products

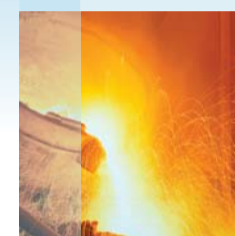
One of the company’s latest developments is a line of encapsulated I/O modules for the CC-Link open fieldbus network, with a variety of different input and output combinations. Designed for use in heavy-duty industrial environments, the CC-Link I/O modules enable fast installation of distributed automation systems without complex wiring and switchgear cabinets. Sensors, actuators and other devices are connected directly to the module with pre-assembled standard cables and communicate with the programmable logic controller via the deterministic fieldbus network. Coloured LEDs for operating status and a display with soft keys for setting the station address and data transfer rate facilitate installation, maintenance and troubleshooting.



The products are certified by the CC-Link Partner Association (CLPA) and combine simple M12 connection technology and vibration-proof electronics including the CC-Link interface, all fully enclosed in a sturdy die-cast zinc housing. The compact modules have an IP67 ingress protection rating (dust-tight and protected against temporary submersion in water), so that they can also be used in locations exposed to dust, water, oil and mechanical stresses. Typical applications include machine tools, machining centres and manufacturing equipment in the automobile industry.

A fast-growing fieldbus system

Why is the sensors specialist Balluff investing in the development of components for this fieldbus technology which is still not very widely known in Europe? Marketing expert Rainer Traub has a simple answer to this question: “Balluff is an international company and we need a broad portfolio of products catering to the diverse needs of the world market,” he explains. “CC-Link is one of the newer fieldbus systems for industrial automation, but it is growing rapidly and it has a very strong proponent in Mitsubishi Electric, one of the world’s biggest controller manufacturers and a driving force for the development and adoption of this network standard.” This has already made CC-Link one of the world’s most popular fieldbus networks, which in turn makes it attractive for leading device manufacturers, mechanical engineering firms and plant operators in Germany and Europe.



CC-Link helps modernise ore processing plant

A Ukrainian ore processor has improved its plant and operations on virtually every front by modernising a 15 year old crushing and grading line using CC-Link open communications.



Floor beams made to measure

Bonna Sabla has automated earthquake-proof concrete beam casting using CC-Link open communications so that each beam can be made to individual specifications.



New Ukraine Representative

To help in this ever changing market a new representative will take over the role as prime contact for CLPA’s local Promotion Partner CSC, who have acted as CLPA’s local partner for the last 3 and a half years.



New CC-Link blog

CC-Link now has a newsletter blog, Facebook, Twitter and LinkedIn pages. See page 4 for details.

Alternative language versions will be available in German, Italian, Polish, Turkish and Russian as a download via the news section of our website.

Continuation of article from front cover

Acceptance of distributed automated systems and open fieldbus systems has been increasing considerably recently, particularly in the Asian market. Rainer Traub sees good market potential for the new CC-Link I/O modules in combination with other Balluff products, both in the USA – where CC-Link is already widely used in the automotive industry – and in other regions. “Asia and Eastern Europe are particularly prominent among the markets with good potential for long-term growth,” he emphasises, “but our customers in Germany are also asking for mature products for this network technology.” For example, a well-known manufacturer of machine tools and long-standing Balluff customer is now equipping its products with CC-Link as the standard network technology. This was another factor that influenced the decision to develop the new line of modules.

A complete package for fast development

Balluff’s popular splitter boxes are a product under ongoing development, and implementation of CC-Link technology in them turned out to be quite straightforward. “Even with the new integrated display, which is a first for these devices, the new CC-Link I/O modules were ready and certified just six months after we commenced development,” reports Traub, who praises the easy handling of the network technology, the excellent collaboration with the CLPA and their great support and service throughout the development process. “This includes the comprehensive specifications documents and check lists, which leave virtually no questions unanswered,” he adds.

CC-Link technology is based on an application-specific integrated circuit, or ASIC, which handles the entire management of the security and transport layer and ensures trouble-free communication between the automation components in the network. The CLPA provides wide-ranging support for device and machine manufacturers who want to equip their products with a CC-Link interface. This includes comprehensive information and advice services for the CC-Link network family, special development packages, chipsets that facilitate fast integration of the interface in the vendors’ own products, and facilities for preliminary engineering tests and conformity checks. Companies can also access a worldwide CLPA network of branches and regional offices that can help them to get their products to market.

Putting the new modules through their paces

When it comes to quality and performance Balluff doesn’t make any compromises. The developers thus decided to design the bus interface for CC-Link themselves and to put it in the splitter box housing together with the other electronic components. Ready-to-use communications modules are also available from a variety of manufacturers as an alternative to own development of internal fieldbus circuits. For their own development work Balluff had access to a comprehensive technology support package that the CLPA makes available to all regular members. The small number of open questions remaining were cleared up at a personal meeting with the CC-Link experts at the European CLPA headquarters in Ratingen. All other communication was by phone and email, also during the certification process, which was carried out in Japan.

Before the new modules were submitted for certification they were tested thoroughly at Balluff’s own laboratories, according to the CLPA specifications. “The only test we didn’t have the equipment for ourselves was the special electromagnetic noise test, which is unknown in this form in Europe,” notes Rainer Traub. However, here too a solution was quickly found: The preliminary electromagnetic compatibility (EMC) tests were carried out at the CLPA’s European test centre in Düsseldorf. Unlike most other fieldbus systems, the conformity tests for CC-Link compatible devices includes a comprehensive EMC test in addition to the standard tests for things like proper functioning, ageing and moisture-resistance. Because of this the CLPA specifies certain electronic components and component classifications as binding requirements for product developers.

After the successful preliminary tests it was a foregone conclusion that Balluff’s new CC-Link I/O modules would pass the final conformity test with flying colours, and the company was able to start mass production soon after this. “We are now already able to service the demand for distributed I/O modules for CC-Link,” summarises marketing expert Traub. Balluff now also offers its RFID (Radio Frequency Identification) based identification systems with a CC-Link interface.

CC-Link helps modernise ore processing plant

A Ukrainian ore processor has improved its plant and operations on virtually every front by modernising a 16 year old crushing and grading line using CC-Link open communications.

Poltavskiy GOK, based in Komsomolsk in the Ukraine, was aware that its main iron ore crushing plant was a legacy from a different era of industrial history, and they realised that it was not as efficient as modern competitor plants elsewhere in Europe.

The control system was the original one. While it was working as well as the day it was installed in 1994 and could be expected to keep plodding on for many years to come, its performance level was way below the current state of the art for control technology.

Consultant engineers from CSC-Automation in nearby Kiev were asked to review the plant and suggest strategies for technical improvements. Much of the mechanical equipment was found to be in good order, with a long working life ahead of it.

The decision was made to replace the control system. Critically CSC wanted to use CC-Link open communications, so that in future it would be possible to easily make upgrades. This would mean the new control system could be steadily renewed in stages so that it never again fell way behind competitive standards.

OA O Poltavskiy GOK’s plant grinds iron ore to a consistent grain size so that it is easier to smelt. It does this in a series of stages on a continuous throughput basis. In total there are 56 major items of capital plant, ranging from rod and ball mills to conveyors, from sieves and screens to quality control mechanisms and emergency shut-offs. These are arranged into three sections, with the ore passing through each in turn. Safety systems abound, with fail-safes, shut-offs and diverters ready to cut in either automatically or by human intervention.

The control system is based on a distributed architecture using Mitsubishi Electric PLCs. Each section has its own controller, and each controller is able to take over the other sections if required. Communications within and between each section, and to the master controller is via CC-Link.



Much of the software is based on Citect SCADA packages, with data, information, reports and backups available on local HMIs, in the main control room and in the commercial offices. Drives throughout the plant are Mitsubishi. Sensors and other equipment on the network are from various manufacturers. In total there are approaching 1000 different control loops in the plant.

The benefits of the control system upgrade include a doubling of throughput to 400 tonnes per hour and a step change in plant availability. Power consumption was reduced because spoil is removed earlier in the process; final iron concentration has improved from 33-37% to a consistent 65.22%. The plant runs smoother, reducing wear and breakdowns. New diagnostics have contributed to this and helped to improve safety. Working conditions and plant performance have improved, enabling staff to undertake broader duties.

CC-Link cements success in Europe

When Bonna Sabla decided to introduce a new range of concrete floor beams, it wanted a universal design that covered every building situation and it knew that production had to be as efficient and accurate as possible.

Located in Niort in Western France, it brought in Dutch specialist system house THISO Industrial Automation B.V. - www.thiso.nl and capital equipment manufacturer Erba B.V. right from the start to develop the production systems alongside the product design.

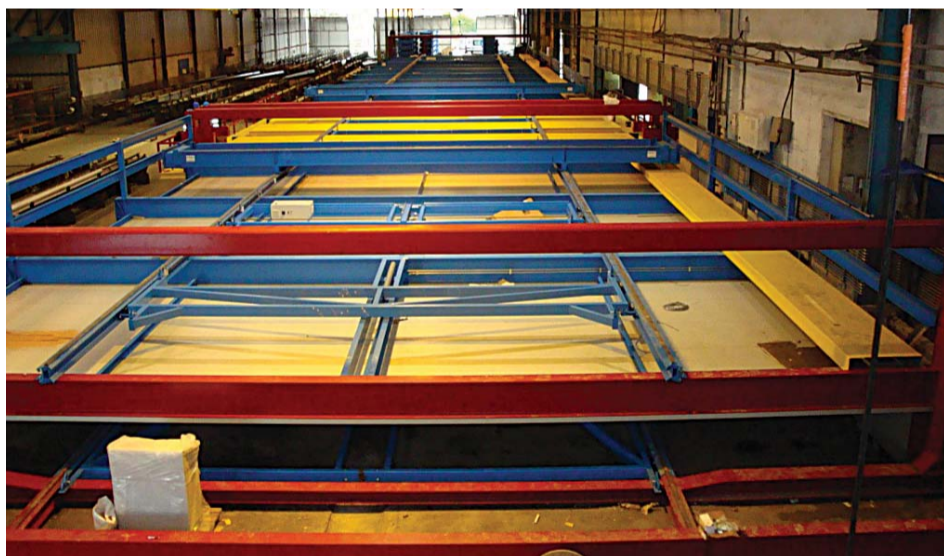
Because every building is unique the beam has to be available in different sizes, from 6m to 7m in length and 100 to 160mm high. The specially designed "T" profile creates maximum strength while optimising the amount of concrete needed, saving cost and reducing the dead weight of the building.

The profile of the beams is very important as they are designed with a lip to hold the insulating materials needed to meet the new energy saving standards being developed to combat carbon emissions.

The automation side of the process consists of a master PLC (Programmable Logic Controller) which manages the entire operation through seven remote I/O stations with various digital and analogue connections, and three HMIs all networked together using CC-Link.

The new 80m long plant consists of four main stages, these being: casting; heating; mould release, and cleaning. Each beam is controlled under tension to make them stronger. On the steel bar tensioning system there are four hydraulic rams. These are controllable so that the tension can be varied and each beam made to an individual specification. The maximum pull per ram is 700 bar, meaning beams can be made for the most demanding of applications. Each ram is driven by a 37kW hydraulic pump, the settings of which are managed by a local HMI (Human Machine Interface).

Each full mould weighs 4000kg with the concrete inside the mould weighing 3000kg. Each mould sits on a carrying wagon which is on rails with its own on-board controls that control the wagon's speed etc. The wagons are controlled by a small second PLC which connects to the main PLC via a wireless LAN.



When the moulds have been filled and the steel's tension set, the mould transport wagon proceeds into the drying sections. The heating and drying process for a mould takes a whole day, with 48 moulds distributed on six wagons being able to be made consecutively. Concrete contains lime which naturally cures, but to help the process quicken the drying sections are heated between 30 to 40 degrees depending on the product with this temperature held accurate to within 2% along the whole heating sections. Again this is controlled by the central PLC.

After the mould has completed the drying process the ends of the tensioning steels are cut off by an automatic saw. The set concrete beams are then mechanically pulled out by a hydraulic system and stacked leaving the moulded concrete ready to go into storage

When the mould has been emptied the wagon is flipped onto its back and then continues on its path to the last process which is the cleaning section. Here the mould is manually cleaned and coated with concrete oil to ease the set concrete removal process.

The HMIs connected via CC-Link are used to display all alarms, temperature settings, hydraulic controls, pressure readings etc. All data is also recorded, providing useful maintenance and diagnostic information for long term management.

CC-Link was selected for a number of reasons: due to the long distances required to connect small groups of distributed I/O points that link parts of the plant together; the high speed communication speeds needed over such long distances to the remote HMIs and its proven reliability in harsh conditions.

Cees Van Veldhuisen of THISO quotes "This was the first time I had used CC-Link and was surprised how simple it was to use. When we turned on the network it worked straight away. We simply installed it and it worked. We were extremely pleased that CC-Link worked so successfully in such harsh site conditions". So happy are THISO that they will be offering CC-Link as a standard communications network on their systems.

CC-Link IE Field Specifications and Conformance specifications released

In the Winter 2009 issue of the CC-Link newsletter we announced the new CC-Link IE Field Industrial Ethernet for intelligent applications. The network specifications and conformance test specifications have now been released as

PDF documents and are available to members of the CC-Link Partner Association on request. Please contact partners@clpa-europe.com with your request

CC-Link IE Field Network Specification	
Overview	BAP-C1605-001
Physical Layer and Data Link Layer Application Layer Service Application Layer Protocol Communication profile	BAP-C1605-002
Implementation Rules	BAP-C1605-003
Device profile	BAP-C1605-004

CC-Link IE Field Conformance Test Specification	
CC-Link IE Field Network Master/Local station Conformance test specification	BAP-C0401-036
CC-Link IE Field Network Intelligent device station Conformance test specification	BAP-C0401-037
CC-Link IE Field Network Recommended Network Wiring Parts test specification	BAP-C0401-038

New CC-Link compatible products

Meiden Thyfrec VT240S



Powerful variable speed drive with 6 control modes in one, enabling users to control asynchronous or synchronous motors (such as induction motors or permanent magnet motors), speed sensor-less vector control or vector control with closed loop, V/F variable torque control or V/F constant torque control. Open to all applications, the Meiden Thyfrec VT240S may be equipped with a CC-Link option card and additional options dedicated to client needs.

- Range of 0.75 to 475 kW, PLC built into inverter for PID control and specific functions, optional built-in EMI filter, selectable soft-sounds, RoHS directive compliant, UL, cUL and CE compliant, high efficiency operations and dioxin-free plastic cases.

HMS Industrial Networks Anybus-CompactCom CC-Link Plug-in module



These modules are designed for integration into devices such as HMI's, robot controllers, drives, PLC's, valve blocks, instruments, weigh scales and more.

The new plug-in, low cost CC-Link slave incorporates parallel and serial interfaces with an innovative CompactFlash mounting mechanism. A short development then provides CC-Link connectivity.

- Interchangeable plug-in solution providing instant CC-Link connectivity
- Powered by Anybus NP30 ASIC technology
- Large bright LEDs for easy viewing of status and mode

Leoni L45467-Y19-C15 CC-Link Cable



CC-Link certified 3 core cable. Copper conductors covered with foam high density Polyethylene insulation, with aluminium foil-Polyester tape (Beldfoil) and copper braid shields.

- Operating temperature -40 to 70 degrees centigrade
- Shield 100% foil, 80% Braid
- Up to 10 Mbps speeds
- Fully certified by CLPA
- Nominal Attenuation at 1 MHz 0.49 DB/100 Ft

ND Meters Cube 400 Energy Management Meter



These low cost, easy to use electronic multifunction panel mounting meters feature self diagnostic installation, backlit 3 line display and are suitable for both 3 & 4 wire systems

- Display options kWh, kVARh, kVAh, kW, kVAR, kVA, V, A, PF, Hz, peak & demand values
- DIN 96x96 standard format

- True RMS measurement to the 30th harmonic
- Individual harmonics to the 15th
- Accuracy better than Class 1
- IP54 Protection Category
- Five year warranty

New Ukraine Representative



Due to the unprecedented success of CC-Link in the region, the CLPA is increasing its support and promotional activities in the Ukraine. With increasing demand from the market for information about CC-Link, stronger communications; new ideas and creative marketing concepts are needed. To help in this strengthening market a new representative will take over the role within CLPA's local Promotion Partner CSC, who has acted as local partner for the last three and a half years.

CSC is a very active supporter and promoter of the CC-Link technologies in the Ukraine. In addition to industrial applications, it has achieved notable successes in encouraging and supporting technical universities in the country to use CC-Link. This includes the Dneprodzerzhinsk State Technical University and the National University of Food Technologies.

Svetlana Suzdaltseva will now take over the main co-ordination role from Tatyana Kurilenko. Tatyana, who has been the main contact for the last two years, will continue to support CLPA in another capacity.

Svetlana who speaks English, German, Russian and of course Ukrainian will be able to improve CC-Link communications within Ukraine with her extensive language skills and customer knowledge.

For further information about CC-Link activities in Ukraine please contact Svetlana directly on tel/fax: +38044 494-33-77 or write to CLPA-Ukraine, 4B Marina Raskova St, Kiev 02660, Ukraine.

So where is it?

However good a website is, you can be assured that at least some customers have problems getting the information they need. Most people have received information or found a link pointing them to something interesting, but on clicking it are sent to a generic home page with no idea of how to find what they are looking for.

CLPA is developing a new website to minimise these problems, and the first stage is a new blog from the CC-Link Partners Association that went online in April. The service will provide fast and easy access news and relevant information to users and makers of CC-Link compatible devices. The news section on the CLPA-EU website will be maintained, but the blog will be updated more frequently.

Reflecting the growing importance of social media in business, there are also Facebook and LinkedIn pages. Prefer a tweet for even faster and shorter information? Then sign-up to the optional service from Twitter where you will receive a brief summary sent directly to your mobile phone.



All these services are located at www.cc-link-news.eu so go there and subscribe today. You won't be disappointed.

If you want to become one of the growing group of Machine Builders integrating CC-Link compatibility into their machines visit www.clpa-europe.com for full details

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3M Deutschland
ABB AS Robotics
ABB OY
ABB Oy
Advanced Electrical Ltd
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Akhmaton Ltd
APS Ltd
APV Products
ASKON
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AutoCont Control Systems
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Automation Research Centre, University of Limerick
Balluff GmbH
Barwit Control Systems (MH) Ltd
Beckhoff Automation GmbH
Beijer Electronics AB
Belcom

Belden
Betech 100pt Ltd
Bjhl-Wriedemann GmbH
BPX Electro Mechanical Ltd
CBI Electric
CNC CBKO SP. zo.0
Cognex
Contrinex AG
Control Techniques Drives Ltd
Cougar Automation Ltd
CSC Automation Ltd
Datalogic S.p.A.
Datsensor SPA
DDC Ltd
Deuschmann Automation GmbH & Co KG.
Eaton Electric Ltd
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Festo AG & Co. KG
Fuji Electric FA Europe GmbH
Gateweb GmbH
Geotek Elektrik Elektronik Otomasyon Ltd Sti
GEVA Elektronik Handelsgesellschaft mbH
Global Associates
GTS Asansör San. ve Tic. Ltd. ti. Mr
GTS Genel Teknik Sistemler Ltd. Sti.
Hengstler GmbH
Hilscher GmbH
HMS Industrial Networks AB
Hottinger Baldwin Messtechnik GmbH
Idec Electronics
Iigus GmbH
Industrial Solutions Ltd
INEA d.o.o.
Institute of Automatic Control & Robotics,
Warsaw University
K A Schmersal GmbH
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Kisco Deutschland GmbH
Kitron AS
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Krakow University of Technology
KUNBUS GmbH
L C Automation Ltd
Lemvigh Muller Industriel & Aytomation
Leoni Special Cables Friesoythe GmbH & Co.KG
Leuze Electronic GmbH + Co KG
Lütze Ltd
Manuel Jehkul
Medicion Y Control, S.A.
Meltrade Automatika Kit
MESCO Engineering GmbH
Mikrol
Mitsubishi Electric Europe
MPL Technma Sp. Z.o.o.
MPL Technology Sp z o. o.
National University of Food Technology

Newton Tesla (Electronic Drives) Ltd
Northern Design (Electronics) Ltd
Ogrody Podlaskie Kowalewsey sp.j.
Oliver IGD Ltd
OptionExist Limited
Oriental Motor (Europe) GmbH
Paktron Engineering Co Ltd
Panasonic Electric Works Europe AG
Parker SSD Drives
Patelite Corporation
Pepperl & Fuchs GmbH
Pilz GmbH & Co.
Politechnika Czestochowska ITMIAP
Pro-face Europe BV
Pronar Sp. Z o. o.
Prosoft Technology
Rudolf Kleinscher Schaltungsbau
Safronics Limited
Schneider Electric SA

S C Johnson
Seacane Ltd
Severn Controls Ltd
SICK AG
Sirius Trading & Services SRL
Slavutich PPA
SMC European Technical Centre
Softing AG
Sotrinic Ps. Z.o.o.
SVS-Nevelin GmbH
Tambands-Ukraine Ltd
Taurusprobit Ltd
TC Ltd
Technical University of Liberec
Technikon Ltd
The Silesian University of Technology
Faculty of Mechanical Engineering
Triglia Ltd
U J Lapp GmbH

UKRBIOTAL Ltd
Ukr-PAK Ltd
VAT Vakuuum ventile AG
Veda-servis
Volev Firma
WAGO Kontakttechnik GmbH
Warsaw University of Technology Institute of Radioelectronics
Weidmueller Interface GmbH & Co KG
Westermo Data Communications Ltd
Westermo Research & Development AB
Western Automation
Wildgoose & Davies
Woodhead Software & Electronics sasu (Molex)
Zaklad Elektroniki i Informatyki Chip
ZAO "Automatika-Sever"

