ADLINK
LEADING EDGE COMPUTING



Software-Defined EtherCAT Controller Combined with ROS2 AMR Solution

Use Case

LRI Distribuída no Brasil pela LRI | vendas@lri.com.br | 51 2129-3000



The recent lack of manpower in manufacturing is forcing businesses to accelerate the introduction of automation into their processes. Coupled with the growing adoption of Industry 4.0 and smart factories, use of Autonomous Mobile Robots (AMRs) has surged. According to a report by Inkwood Research, the AMR market is expected to continue to expand at a compound growth rate of 23.43% from 2021 to 2028.

In traditional AMR solutions, the control of motors, robotic arms, and sensing elements is handled by dedicated controllers provided by different manufacturers resulting in higher cost and complicated integration. As the integration of artificial intelligence increases with AMRs, motion control sensors must be more responsive and accurate in providing real-time feedback. ADLINK has been deeply involved in the automation market for many years. With a strong background in motion control, we understand the difficulties in integrating software and hardware, which is why we are constantly innovating new technologies to solve automation related challenges.

Three-way control integrated into a single solution, reducing size and improving endurance

When businesses consider introducing robotic solutions, they are faced with having to choose smaller robots due to space restrictions within factories. In view of this, robot manufacturers face a new challenge–integrating control equipment and operating systems into smaller platforms.

ADLINK understands these pain points, developing integrated software and hardware technology for AMR robot controllers, and pioneering an EtherCAT + ROS2 solution that combines the three key controllers of an AMR robot: motor, robotic arm, and sensing element. Integrating these three controllers into a single unit greatly reduces the controller's overall size to meet the miniaturization requirements of modern AMRs, and offers the added benefits of increased battery space, improved endurance, and achieving better motion control.

EtherCAT + ROS solution accelerates the integration of software and hardware

ADLINK's EtherCAT solution has enabled the optical lens manufacturer to achieve a 25% reduction in production costs compared to their previous industrial PC solution and boost production efficiency by 20% with a shorter development time. They used their in-house development team's automation expertise to develop more accurate bonding systems, increase capacity, enhance responsiveness to production line changes, and satisfy precision control requirements without risking exposing their trade secrets to outside suppliers.

As an important element of an AMR's design architecture, the open source Robot Operating System (ROS) is responsible for connecting the various components of the robot for communication and operation. ROS development is normally carried out by IT personnel not usually familiar with operational technology (OT), requiring more time for IT and OT personnel to communicate to make an AMR operate efficiently, resulting in delayed development time and missed business opportunities. ADLINK has streamlined this development bottleneck with the use of ROS nodes, giving IT personnel direct access to OT-level systems, which simplifies overall development and integration, while offering support for additional applications and utilities.

ADLINK's solution integrates ROS and motion control into ROS Topics that can be automatically converted into motor and input/output (I/O) control, solving the problem of OT integration for AMR developers.

Distribuída no Brasil pela LRI | vendas@lri.com.br | 51 2129-3000

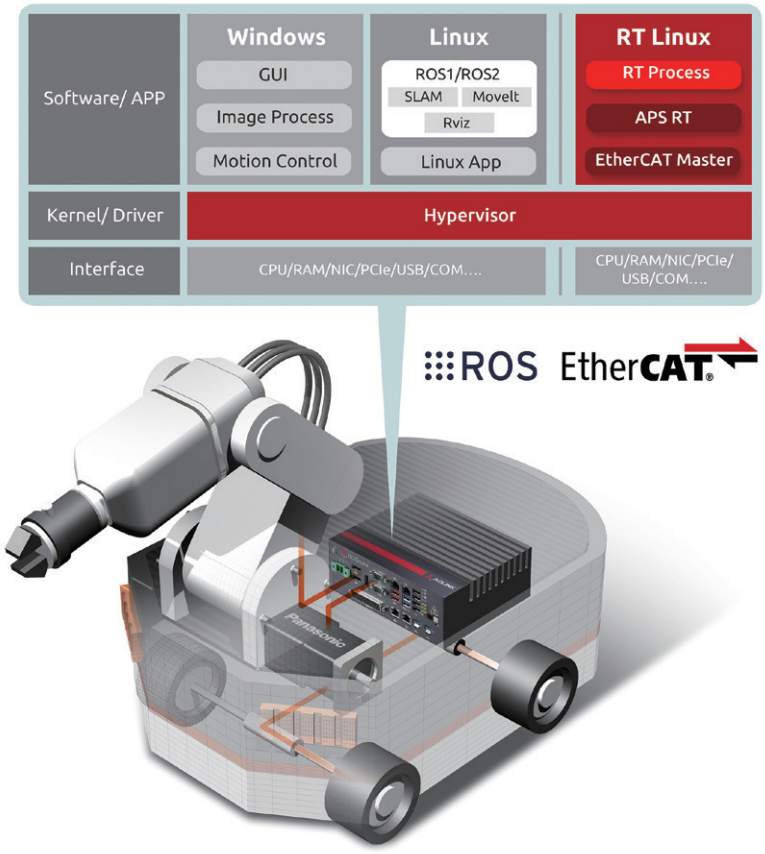
IT personnel need only use a ROS package to properly control AMR wheels and arms, reducing the need to rely on custom system integration solutions.

SoftEtherCAT is a software-defined EtherCAT controller based on an open communication protocol with real-time and high synchronization characteristics. Control of an AMR's arms, wheels and sensors is unified through the use of EtherCAT, resulting in motor and I/O controls that are more accurate and standardized. This helps to avoid production delays and lowers overall controller costs. Since EtherCAT is an open communication protocol, motors from different manufacturers can be freely matched or replaced which reduces dependence on specific suppliers and gives customers greater flexibility in AMR development without using specific motion control combinations.

Because ADLINK's ROS motion controller communicates through the EtherCAT protocol, developers only need to use the ROS kit to control AMR motors and arms. Coupled with the EtherCAT unified serial control element controller, compatible robotic arms or motors can be easily integrated with an AMR, increasing flexibility and facilitating maintenance and future updates.

Using a general industrial computer as a controller and integrating the ROS operating system can result in a product development time of about four to six months. In comparison, Japanese manufacturer Panasonic adopted the EtherCAT + ROS solution provided by ADLINK with its own servo motor, reducing the development time to just two months, which greatly improved the market competitiveness for its customers, offering them a distinct advantage to meet the AMR needs and business opportunities that have continued to grow in recent years ahead of their competitors.

In the era of smart manufacturing, flexible component selection and fast launch-to-market are prerequisites for seizing orders. Improving technology and providing better services to customers and suppliers has become the key to maintaining a competitive advantage. ADLINK's technology optimization case for AMR development and integration has proved the importance of quick and rapid integration in smart manufacturing.



Distribuída no Brasil pela LRI | vendas@lri.com.br | 51 2129-3000

Head Office

ADLINK Technology, In c.
No. 66, Huaya 1st Rd., Guishan Dist.,
Taoyuan City 333411, Taiwan
Tel : +886-3-216-5088
Fax: +886-3-328-5706

www.adlinktech.com

Worldwide Offices

Ampro ADLINK Technology, Inc.
6450 Via Del Oro, San Jose, CA 95119-1208, USA
Tel: +1-408-360-0200
Toll Free: +1-800-966-5200 (USA only)
Fax: +1-408-360-0222
Email: info@adlinktech.com

ADLINK Technology (China) Co., Ltd.
上海市浦东新区张江高科技园区芳春路300号 (201203)
300 Fang Chun Rd., Zhangjiang Hi-Tech Park
Pudong New Area, Shanghai, 201203 China
Tel: +86-21-5132-8988
Fax: +86-21-5192-3588
Email: market@adlinktech.com

ADLINK Technology Beijing
北京市海淀区上地东路1号盈创动力大厦E座801室 (100085)
Rm. 801, Power Creative E, No. 1 Shang Di East Rd.
Beijing, 100085 China
Tel: +86-10-5885-8666
Fax: +86-10-5885-8626
Email: market@adlinktech.com

ADLINK Technology Shenzhen
深圳市南山区科技园南区高新南七道数字技术园A1栋2楼C区(518057)
2F, C Block, Bldg. A1, Cyber-Tech Zone, Gao Xin Ave. Sec. 7 High-Tech Industrial Park S.,
Shenzhen, 518054 China
Tel: +86-755-2643-4858
Fax: +86-755-2664-6353
Email: market@adlinktech.com

ADLINK Technology Singapore Pte. Ltd.
1008 Toa Payoh North, 07-17/18 Singapore 318996
Tel: +65-6844-2261
Fax: +65-6844-2263
Email: singapore@adlinktech.com

ADLINK Technology Singapore Pte Ltd. (Indian Liaison Office)
#50-56, First Floor, Spearhead Towers
Margosa Main Road (between 16th/17th Cross)
Malleswaram, Bangalore - 560 055, India
Tel: +91-80-42246107, +91-80-23464606
Fax: +91-80-23464606
Email: india@adlinktech.com

ADLINK Technology Japan Corporation
〒101-0045 東京都千代田区神田鍛冶町3-7-4
ユニゾ神田鍛冶町三丁目ビル4F
Unizo Kanda Kaji-cho 3 Chome Bldg. 4F,
3-7-4 Kanda Kajicho, Chiyoda-ku,
Tokyo 101-0045, Japan
Tel: +81-3-5209-6001
Fax: +81-3-5209-6013
Email: japan@adlinktech.com

ADLINK Technology Korea Ltd.
경기도 용인시 수지구 신수로 767 A동 1503호 (동천동, 분당수지유타워) (우) 16827
A-1503, U-TOWER, 767 Sinsu-ro, Suji-gu,
Yongin-si, Gyeonggi-do, Republic of Korea, 16827
Toll Free:+82-80-800-0585
Tel: +82-31-786-0585
Fax: +82-31-786-0583
Email: korea@adlinktech.com

ADLINK Technology, Inc. (Israel Liaison Office)
SPACES OXYGEN, 62 Medinat, Ha-yehudim st
4673300, Herzliya, Israel, P.O.Box – 12960
Tel: +972-54-632-5251
Fax: +972-77-208-0230
Email: israel@adlinktech.com

ADLINK Technology GmbH
Hans-Thoma-Straße 11
D-68163 Mannheim, Germany
Tel: +49 621 43214-0
Fax: +49 621 43214-30
Email: germany@adlinktech.com

Ulrichsbergerstraße 17
D-94469 Deggendorf, Germany
Tel: +49 991 290 94–10
Fax: +49 991 290 94–29
Email: germany@adlinktech.com

ADLINK Technology, Inc. (French Liaison Office)
Bâtiment Thalès - Parc des Algorithmes,
Route de l'Orme des Merisiers,
91190 SAINT AUBIN, France
Tel: +33 (0) 1 60 12 35 66
Fax: +33 (0) 1 60 12 35 66
Email: france@adlinktech.com

ADLINK Technology, Inc. (UK Liaison Office)
First Floor West Exeter House,
Chichester fields Business Park Tangmere,
West Sussex, PO20 2FU, United Kingdom
Tel:+44-1243-859677
Email: uk@adlinktech.com

intel partner Titanium

All products and company names listed are trademarks or trade names of their respective companies. ©2022 ADLINK Technology, Inc.
All Rights Reserved. All pricing and specifications are subject to change without further notice.

LRI Distribuída no Brasil pela LRI | vendas@lri.com.br | 51 2129-3000