


APL通信技术在流程控制领域应用

Ethernet-APL (Advanced Physical Layer) 基于IEEE Std 802.3cg-2019中定义的10BASE-T1L,是一种双绞线通信与供电统一、支持本征安全的以太网物理层技术；可实现以太网连接到流程工业现场层仪表的最后一米。APL支持基于以太网通信数据从企业管理层延伸到生产现场，企业管理者可以从以太网获取工厂所有区域数据。APL支持任何基于以太网的自动化协议，因此将促进工业自动化领域的IIoT发展，将数字化世界扩展到过程自动化和仪器仪表。APL将发展成为适用于整个过程自动化领域的单一长期稳定的技术。**鼎实科技**跟踪国际主流工业网络技术趋势，技术产品一贯位于技术前沿。鼎实对APL技术市场前景抱有极大的期待，始终关注APL技术的发展；结合自主技术优势，适时开发了基于APL底层和PROFINET通信协议+PA行规的PROFINET Over APL系统。其中APL交换机(PS和FS)、APL圆卡(APL+PROFINET+PA行规)完全由**鼎实**自主开发。

APL技术优势：

- 1、线缆：双绞线、长距离（1000M）；一条电缆上实现电源和通信传输；可重复使用现有的A型现场总线电缆，降低工程成本。
- 2、支持所有防爆技术、本质安全技术。
- 3、安装技术简单；抗电磁干扰，支持电涌保护。
- 4、支持国际主流工业以太网协议标准。



Application of APL communication technology in process control field

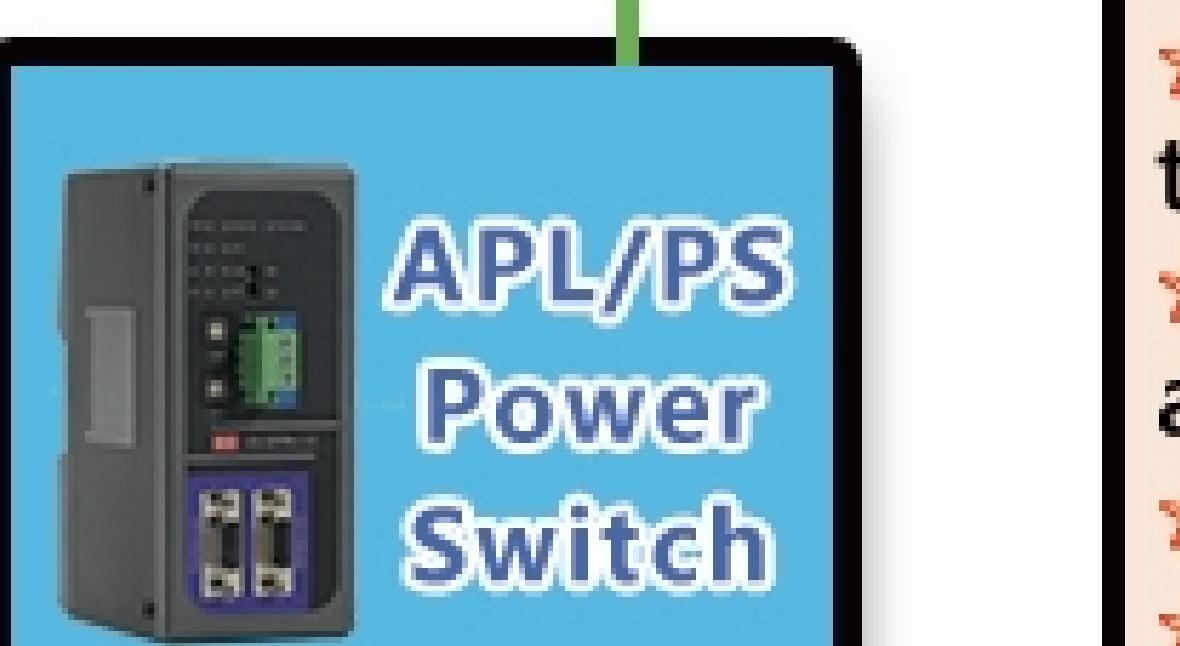
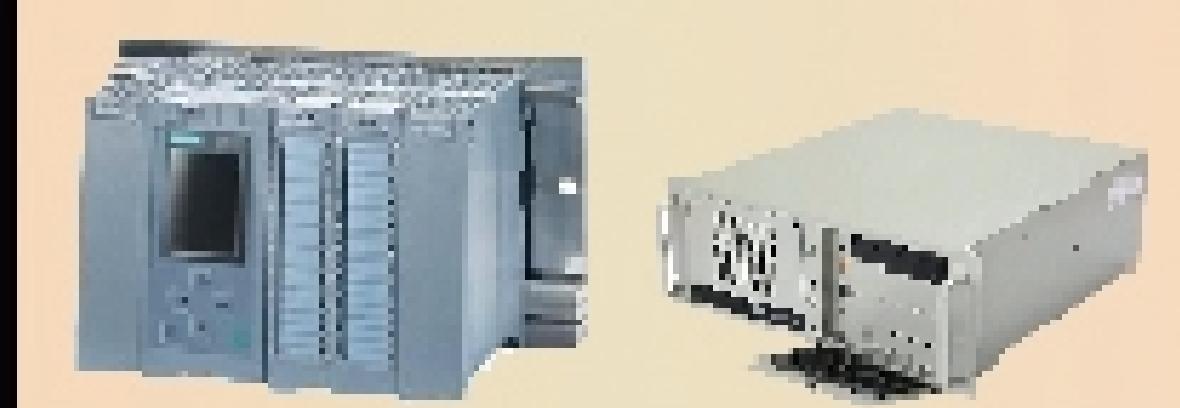
Ethernet-APL (Advanced Physical Layer) is based on the 10BASE-T1L defined in IEEE Std 802.3cg-2019. It is an Ethernet physical layer technology that unifies twisted pair communication and power supply, and supports intrinsic security; It is possible to connect Ethernet to the last meter of process industrial field layer instruments. APL supports extending Ethernet communication data from enterprise management to production sites, allowing enterprise managers to obtain data from all areas of the factory through Ethernet. APL supports any Ethernet based automation protocol, thus promoting the development of IIoT in the field of industrial automation and expanding the digital world to process automation and instrumentation. APL will develop into a single long-term stable technology applicable to the entire process automation field.

DS Technology tracks the international mainstream industrial network technology trends, and its technology products have always been at the forefront of technology. DS has great expectations for the market prospects of APL technology and always pays attention to the development of APL technology; Based on the advantages of independent technology, a PROFINET Over APL system was timely developed based on the APL underlying layer and PROFINET communication protocol+PA protocol. Among them, APL switches (PS and FS) and APL round cards (APL+PROFINET+PA) are completely independently developed by DS.

APL technology advantages:

1. Cable: twisted pair, long-distance (1000M); Implement power and communication transmission on one cable; Reusable existing A-type fieldbus cables to reduce engineering costs.
2. Support all explosion-proof and intrinsic safety technologies.
3. Easy installation technology; Anti electromagnetic interference, supporting surge protection.
4. Support international mainstream industrial Ethernet protocol standards.

Controller, Master
PROFINET
HART-IE, HSE



Parameterized management of APL instruments based on FDT/DTM/EDD technology



① APL Power Switch (PS)

- ★ Equipment power supply: DC 24V (+-20%), two redundant channels
- ★ Ethernet: 2 switched Ethernet ports, 10/100M adaptive, supporting ring network redundancy
- ★ APLTrun port: 2
- ★ Power supply: Power supply voltage 50V, power 57.5W
- ★ Communication: Speed of 10Mbps, signal peak to peak value of 2.4V
- ★ Communication distance: 1km

Key technologies:

- ① DS PROFINET protocol stack (independent technology)
- ② APL physical layer chip ADIN1100 (AD)
- ③ Network power coupling/decoupling technology (independent technology)
- ④ APL power output protection and fault diagnosis technology (independent technology) (independent technology)



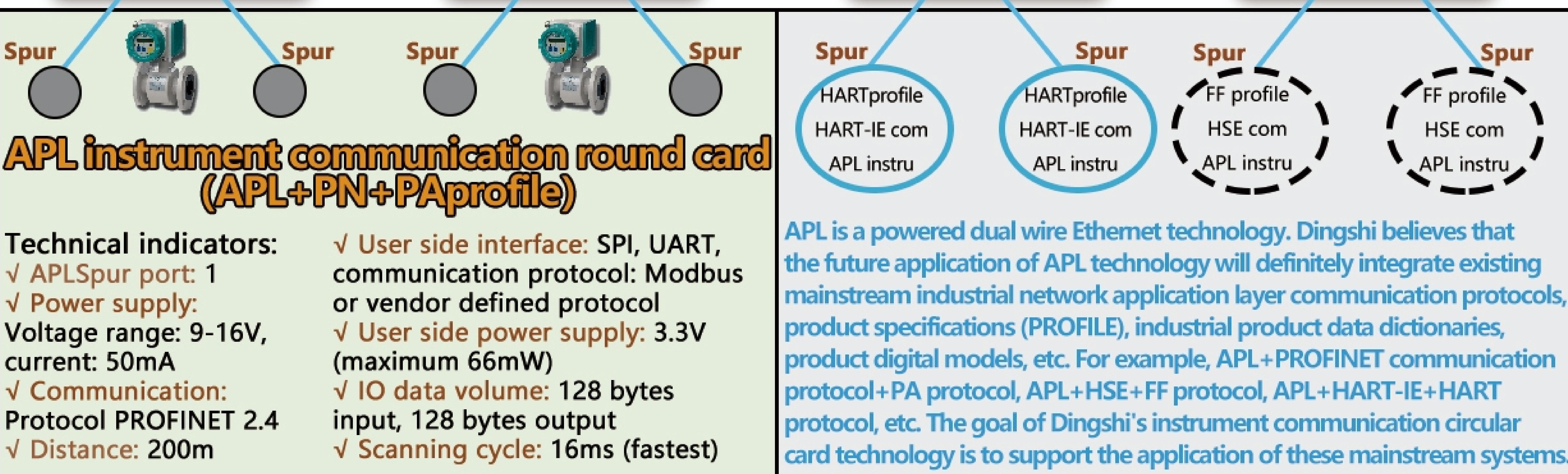
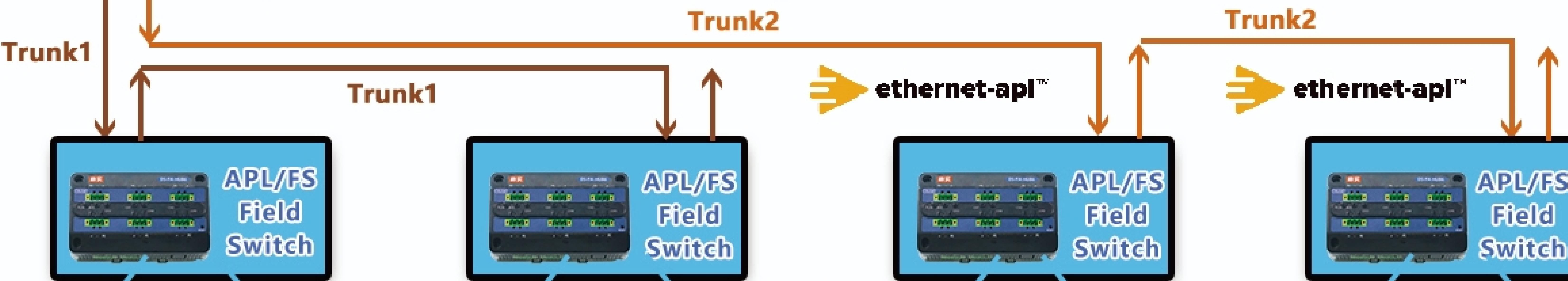
- ⑤ Security barrier technology for APL FS switches (independent technology)
- ⑥ APL round card intrinsic safety technology (independent technology)
- ⑦ APL round card PROFINET+PA industry regulations+APL technology (independent technology)

② APL Field Switch (FS)

- ★ APLTrun port: 2
- ★ Power supply: Power is taken from the power switch, supports overcurrent protection, supports cascading, and supports step-by-step power distribution
- ★ Communication: Speed of 10Mbps, signal peak to peak value of 2.4V
- ★ Distance: 1km
- ★ APLSpur port: 4
- ★ Spur port power supply: supports overcurrent protection, rated voltage 15V, power 1.11W
- ★ Communication: Speed 10Mbps, signal peak to peak 1V
- ★ Communication distance: 200m

③ APL defines two types of network segments: Trunk and Spur

- ★ **Trunk:** Provide high power and communication signals for transmission up to 1000 meters.
- ★ **Spur:** It has lower power and optional intrinsic safety, with a maximum length of up to 200 meters.



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