AS/RS Life-Cycle Upgrades

Replacing Obsolete/Unsupported Power-line Modems

Problem: The communication system for AS/RS Storage Retrieval Machines is experiencing unexplained errors and original components are obsolete and/or unsupported.

The following are typical life-cycle related problems experienced with SRM conductor bar communication systems.

- Power and communication to an in-motion Storage/Retrieval Machine (SRM) has typically been implemented using a top or floor mounted copper conductor bar system with rails that run the length of the storage aisle and a collector shoe assembly on the SRM. One or two of the conductor bar rails are dedicated to communication with the on-board SRM controller. A serialized data stream is typically transmitted by modulating the DC or AC power on the rail(s) by using communication converters or power-line modems. The conductor bar system is subject to environmental debris, wear and dead spots which inhibit error-free communications.

Obsolete AC Power-Line Modem

- The two sides of the converter/modem pair are provided at an end-of-aisle communication panel and in the main control enclosure on the SRM. These devices transmit SRM commands and receive responses. Many of the makes and models of the past are obsolete and unsupported.
- Host communications to the SRM are typically transmitted over the company's Local Area Network. Older SRM controllers did not support Ethernet communication inputs to the processor; therefore, the facility network required extra Ethernet-to-RS232 switches on the network (typically called terminal servers) to create a serialized data stream to the SRM. These switching devices have been notoriously vulnerable to power outages and surges and are difficult to troubleshoot for plant maintenance technicians.

Solution: Replace the powerline modems with new wireless solutions.

The following describes HK wireless solution options for upgrading SRM communication hardware.

- New infrared and RF modems for industrial automated equipment applications are available for ground-to-SRM retrofit applications. HK recommends the MDS iNet-II 900 RF modems. The MDS units provide the connection of both Ethernet and serial devices to an IP network. The iNet900 II is designed for frequency-hopping, spread-spectrum operation in the license free 900 MHz band. The RF modems are mounted at the end of each aisle and "on board" each SRM.

MDS iNet-II RF Modem

- The MDS modems provide an flexible solution to support both

current and future SRM interface requirements. The current RS232 Host interface lines can continue to transmit communications over the serial communication channel with no change to the Host or SRM interface. In the future, when the SRM controllers are upgraded to the Ethernet compatible PLC units, the Ethernet channel will be enabled and all communication is transmitted directly across the Ethernet channel. This is an excellent solution for testing and transitioning when faced with computer and SRM control retrofits.

- The wireless Ethernet communications system is very reliable with no maintenance. Ethernet accessibility to the PLC provides the maintenance staff the abilitity to do RSLogix PLC program monitoring and run HK SRM diagnostics functions from on-ground or network accessible PC's.
- Some SRMs also use conductor bar communications to the SRM carriage and shuttle assembly. An optical solution is recommended for communication between the main control enclosure and the carriage devices using Visolux IR modems. The dedicated pair of transmit and receive modems will be mounted on the base and on the lift carriage of the SRM. The serial data transferred will be identical to the current data that is transmitted over the power line modems.

Visolux IR Modem

Links: More Supporting Information

- HK SRM Communication Upgrade
- HK SRM Control Upgrades
- HK Modernization Services