ēKo ESB Integration

FOR ENVIRONMENTAL MONITORING

eKo is an innovative platform that allows users and developers to customize their system by providing the flexibility to add a wide range of sensors to the node. Its plug-and-play Environmental Sensor Bus (ESB) architecture provides the versatility to interface both smart and custom sensors with direct plug-in for any 2,3 wire analog or digital sensors. The ESB solutions offered by MEMSIC allow users to quickly and easily interface their own simple and smart sensors to the eKo system.

Each node has 4 sensor ports to allow users to monitor various parameters at any one location. Low power sensors that can be powered from battery voltage (typically 3.6V) and output signals of 0-3 volts can interface directly to the node. Other sensors that require more signal conditioning, power conditioning, or use digital communications require an external interface module or circuit.

Sensors integrated with the eKo system can be categorized into three types and be interfaced with the eKo node using the ESB option specified:

Type 1: Analog sensors that can be connected directly to the eKo node without any additional signal or power conditioning.

Type 2: Analog sensors that require additional signal conditioning (amplification, level shifting, etc.) and/or power conditioning (9V, 12VDC etc.)

Type 3: Digital sensors requiring serial or other communication protocols.

Applications

- Environmental Research
- Precision Agriculture
- Urban Monitoring
- Pollution Detection
- Irrigation Management
- Weather Science
- Wildfire Warning
- Landfill Monitoring

Sensor Type	Need EEPROM?	Need Analog Signal Conditioning Circuit?	Need Digital Interface?	eKo Interface Option
Type 1	✓			ES9000
Type 2	✓	✓		ES9100
Type 3			✓	ES9200

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ES9000

The ES9000 includes a Switchcraft EN3C6F connector with a programmed Dallas EEPROM for self-identification and a five foot cable necessary to integrate Type 1 sensors with the eKo node. The node can interface directly to two-wire resistive sensors that need 10K ohm completion resistors such as thermistors or watermark soil moisture sensors, and three-wire sensors (power, ground, and signal out) that are excited from 3 to 4 volts and output signals up to 3 volts. The eKo node can supply power from a regulated GPIO line (8 mA max) or directly from batteries (3.6V to 4.2V).

ES9100

The ES9100 analog board interfaces between the eKo node and the sensor with the Dallas self-identification EEPROM embedded into its Switchcraft EN3C6F eKo port connector. The ES9100 is a reference design board that contains flexible signal and power conditioning circuits to interface to many different types of Type 2 sensors. The ES9100 provides support for two analog sensors on one eKo port, selectable jumpers for sensor power, two 6-pin screw terminals (one for external sensors and one for the eKo cable) and a five foot cable.

ES9200

The ES9200 is designed for sensors that use a digital interface and require serial communication to transfer data to the eKo node. The ES9200 can be powered continually from the eKo node and can support multiple sensors at the same time. Type 3 sensors may need to be continually updating versus other sensors that only power-on when a data sample is taken. The ES9200 runs in a very low power sleep mode, servicing sensor interrupts when required and sending a data packet every eKo transmit period. The ES9200 includes a programmable Atmega128L µP for eKo communication and sensor interface, a JTAG connector for code development and debugging, RS485 transceiver for half-duplex communication with the node, RS232 transceiver for communication with intelligent sensors, two 6-pin screw terminals and a five feet cable with Switchcraft EN3C6F connector for the eKo port. Users do not require the Dallas EEPROM embedded in the cable as the self-identification information is contained in the microprocessor on the ES9200.

Ordering Information

Model	Description
ES9000	eKo ESB Interface Cable (for Type 1 sensors)
ES9100	eKo ESB Analog Interface Board (for Type 2 sensors)
ES9200	eKo ESB Digital Interface Board (for Type 3 sensors)