LOCOMOTIVE CONTROL COMPUTER [LCC]

System Datasheet

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INTEGRAL
CONTROL SYSTEMS LTD.

Locomotive Control Computer – LCC

Whether you're modernizing an ageing conventional locomotive or creating an entirely new generation design, the Integral LCC has your needs covered:

Key Benefits

- Improve all-weather adhesion by up to 30%*
- Traction motor thermal management protection software
- Powerful and flexible microprocessor technology eliminates old and bulky modules
- Reduce extra control relays and wiring by up to 75%* improving reliability
- Available remote monitoring via cellular or satellite connectivity
- Integration with intuitive driver and maintenance display units
- Integration with key systems such as EAB (Electronic Air Brake), HOTD (Head of Train Device), LDU (Locomotive Display Unit), ECP (Electronically Controlled Pneumatic Brake), LDARS (Locomotive Data Acquisition and Recording System) and DP (Distributed Power.)
- Integration with Integral AC or DC propulsion power electronic systems
- Designed to EN50155 and MIL-STD compliance.

* Compared with EMD ® dash 2 or pre dash 2 configurations

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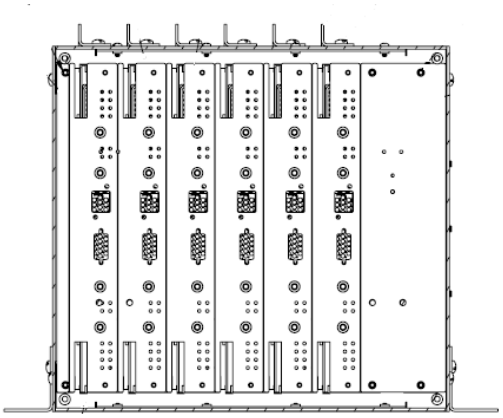

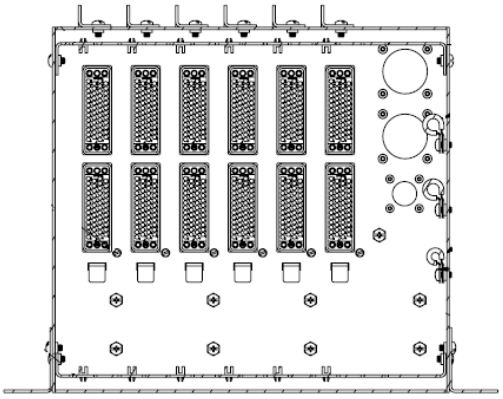

Specifications

Power Management

- Nominal supply input 72Vdc with ultra-wide transient range 16.8Vdc-160Vdc
- Isolated EN50155 rated internal power supply
- Reverse bias protection/overvoltage protection/undervoltage protection

Environmental

- Operating ambient temperature: -40°C to 70°C
- Cooling: integrated forced air
- Shock and vibration: MIL-STD-810G

Mechanical

- Card support: up to 6 LCC control card slots per enclosure
- Dimensions: 15.25” (W) x 11.92” (H) x 11.46” (D)
- Weight fully loaded: ~50lbs

Serial Harness

- 7x isolated RS232: 2 channels slot 1, 1 channel slot 2-6

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CAN Harness

- 6x isolated CAN: 1 channel per LCC card slot
- BUS Network configuration via backplane DIP switches
- CAN2.0A/B, J1939 protocols supported

Remote Data Telemetry

- 4G/5G cellular data or Iridium satellite operation
- Data trending & visualization
- Alarm callouts via SMS, email
- Mobile app connectivity supporting iOS, Android
- Secure web portal access and data retention

Common Control Firmware Modules

- Reverser / direction control
- Dynamic brake control
- Dynamic brake protection
- Dynamic brake extended range
- Engine radiator cooling fan control
- Engine radiator shutter control
- Engine governor control
- Engine LR monitoring
- Hot engine protection
- Auxiliary generator voltage regulation
- Engine turbo lube control
- Ground relay control
- AESS / idle limiting
- Motoring-braking setup control
- Main generator voltage and current control
- Slow speed control (if equipped)
- Maintenance I/O test
- Self-load and load box test
- Rad fan test
- Overspeed test
- Transition test
- LR test
- EAB, DP, LDARS, ECP, HOTD/EOTD (if equipped)
- Sanding control inboard and outboard (if equipped)
- Traction / wheel slip control using motor current & voltage
- Traction motor cutout control
- Traction motor thermal protection
- Vigilance / alerter control
- Main reservoir air compressor control
- Constant power control (if equipped)
- Parking brake control (if equipped)

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CPU Card PCA-0001

- 20x 4-20mA independently isolated current loop inputs
- 2x 4-20mA independently isolated current loop outputs
- 2x 0-100Vdc independently isolated voltage inputs
- 1x 0-10V:0-50mV dual mode load meter output
- 1x speed indicator signal output
- 2x isolated Class B1 RS422 Synchronous HDLC serial channels
- 1x faceplate isolated USB-A 2.0 port
- 1x faceplate isolated RS232 port
- 4Gb non-volatile FLASH memory storage
- 1x EEPROM parameter storage

IO Card PCA-0002

- 32x 74Vdc:24Vdc dual mode digital inputs, organized in groups of 8
- 16x 74Vdc:24Vdc dual mode digital outputs; 6x outputs settable for PWM control
- 1x faceplate diagnostic USB-A 2.0 port
- 1x faceplate diagnostic RS232 port
- 1x EEPROM parameter storage

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TPU Card PCA-0003

- 6x 24Vdc PWM outputs
- 6x 4-20mA independently isolated current loop inputs
- 10x 24Vdc isolated digital inputs
- 1x quadrature encoder speed probe input
- 2x AC voltage sensor inputs
- 4x current sensor inputs
- 1x DC voltage sensor input
- 2x 0-100Vdc independently isolated voltage inputs
- 1x faceplate diagnostic USB-A 2.0 port
- 1x faceplate diagnostic RS232 port
- 1x EEPROM parameter storage

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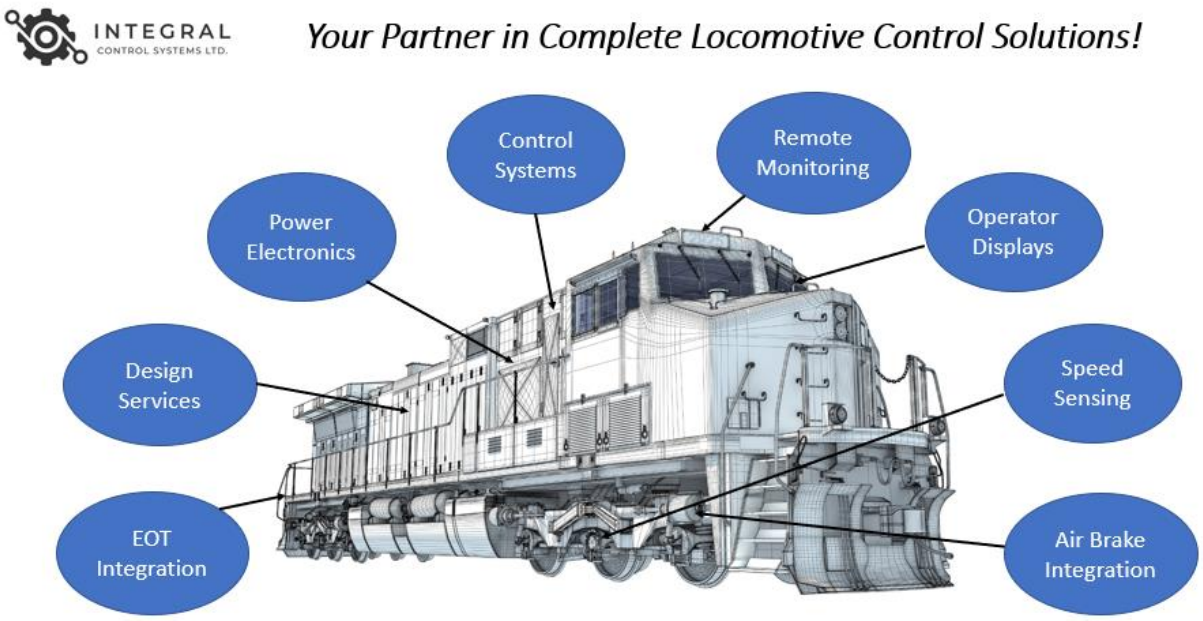
Why work with Integral Control Systems?

- We are customer driven; your success is our primary mission.
- Decades of locomotive control experience; we're ready to solve your toughest project challenges.
- We are experts in locomotive propulsion and traction control; from conventional EMD and GE alternator fed units to DC link AC and DC traction solutions.
- We are innovative and experienced in empowering disruptive, industry leading railway technology development; from multiengine gensets to battery and battery-hydrogen hybrid locomotives.



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