



Meteorcomm 220 MHz PTC System

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Positive Train Control 220 MHz System

- PTC 220 is a system of hardware and specifically developed software
 - Hardware has built-in proprietary firmware & software
 - System requires proprietary Messaging and System Management System proprietary software
 - Ensures integration between system software and hardware components
 - Ensures interoperability between components and railroads
- Federal Railroad Administration partially funded hardware development with Federal grant
- Software funded privately but available to all railroads

Hardware Manufacturing & Implementation

- Currently 2 sources for hardware
 - Meteorcomm and CalAmp are OEM's
- Both sources produce functionally identical radios
 - Both meet Meteorcomm's preference design
 - Meet similar test and performance standards
 - MCC fully tested upon shipment
- Regardless of sourcing, Meteorcomm and CalAmp can assist user with customer support
 - Training programs, customer service and system design/set-up
- Meteorcomm to provide limited support
 - Other manufacturers seeking to produce hardware upon request

Radio Firmware & Software

- Regardless of manufacturer, all radios leave factory with identical operational firmware & software
 - FW/SW developed privately but made available to all at cost recovery prices
 - Set-up includes any FW/SW updates required to bring current
- Radio purchase price includes license for proprietary Meteorcomm FW/SW required to run radios
 - License entitles purchaser to all FW/SW updates
- Other hardware manufacturers may enter market
 - Will require licensed FW/HW or
 - May develop own code but must prove interoperability with MCC system
 - Must meet same standards as current hardware & software

Testing

- System has passed lab testing, closed track field testing and open track field testing
 - Proof of concept, product validation, fabrication
 - Hardware component testing
 - Reliability, noise & EMI, operating environment, life cycle
 - Locomotive performance tested on 8 families covering
 - Software integration
 - Software
 - System integration/regression testing
 - Interoperability testing
 - Mobility, back office federation
 - Test results to be available through AAR and FRA
- Operators work with MCC and TTCl to perform field tests

Technical & Product Support

- **Manufacturer Support - Hardware**
 - MCC will provide briefing and documentation (on request)
 - Systems design guidelines & requirements
 - Hardware performance specifications
 - Manufacturing specifications (July 2012)
 - BOM's (July 2012)
 - Test specifications (July 2012)
 - Licensed software for total system operation
- **Operators – Hardware & Software**
 - Hardware warranty on MCC purchases
 - Software updates as part of licenses (Fee)
 - System design and set-up (Fee)
 - Lab and field testing plans (Fee)
 - Troubleshooting and problem resolution (Fee)

Technical & Product Support

- For more information
 - Please contact our [Service Desk](https://support.meteorcomm.com/home) (<https://support.meteorcomm.com/home>) if you have any questions.
- Cost recovery and support pricing – next presentation