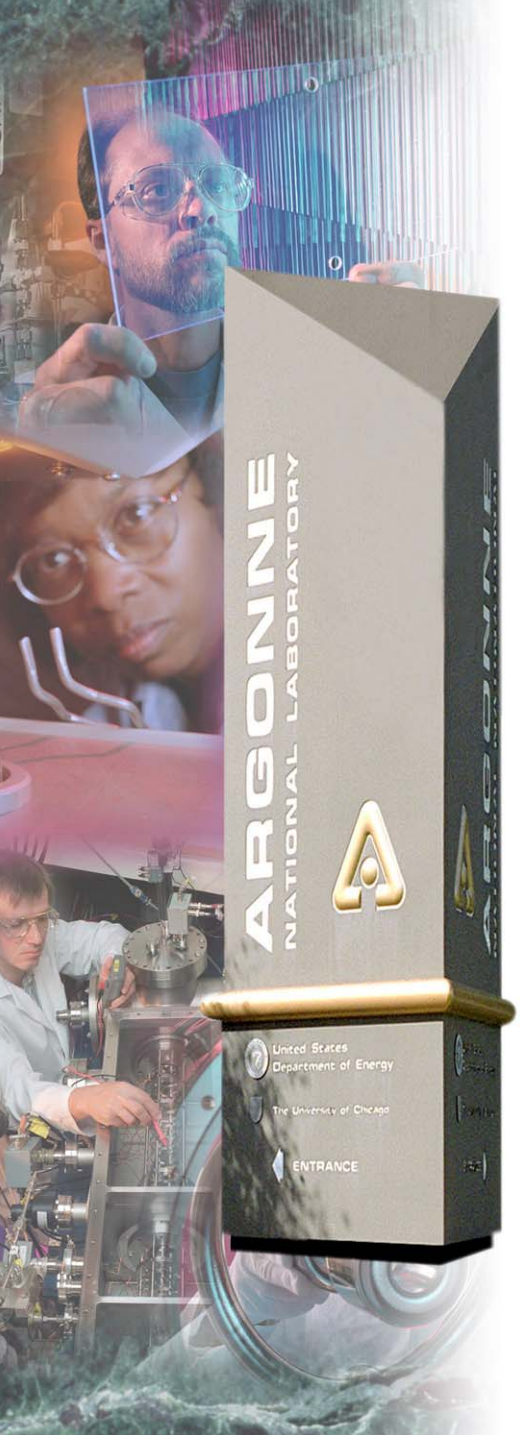

BCDA Cross Training

Love Controller Support

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Argonne National Laboratory

A U.S. Department of Energy
Office of Science Laboratory
Operated by The University of Chicago

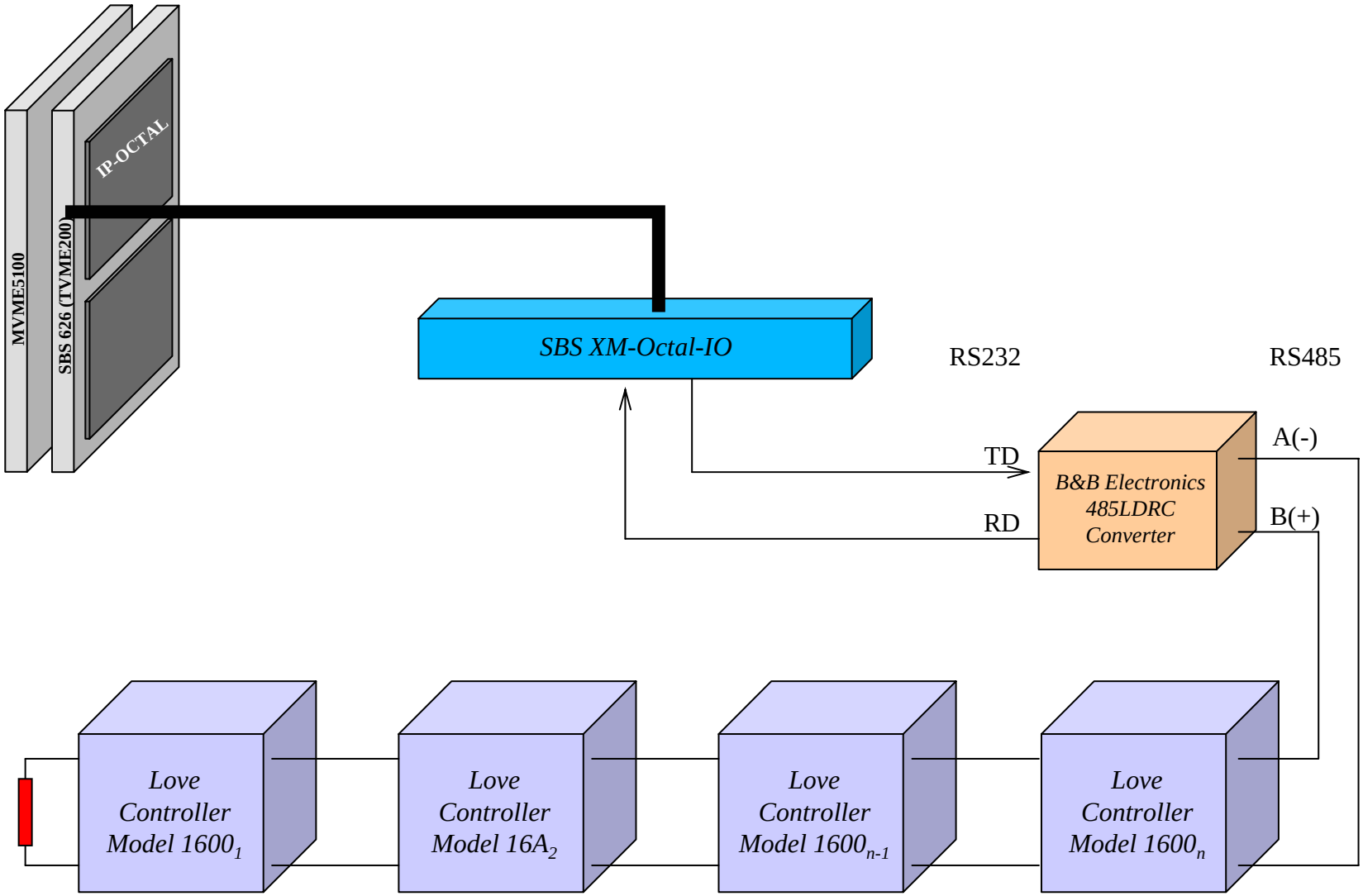
Office of Science
U.S. Department of Energy

Contents

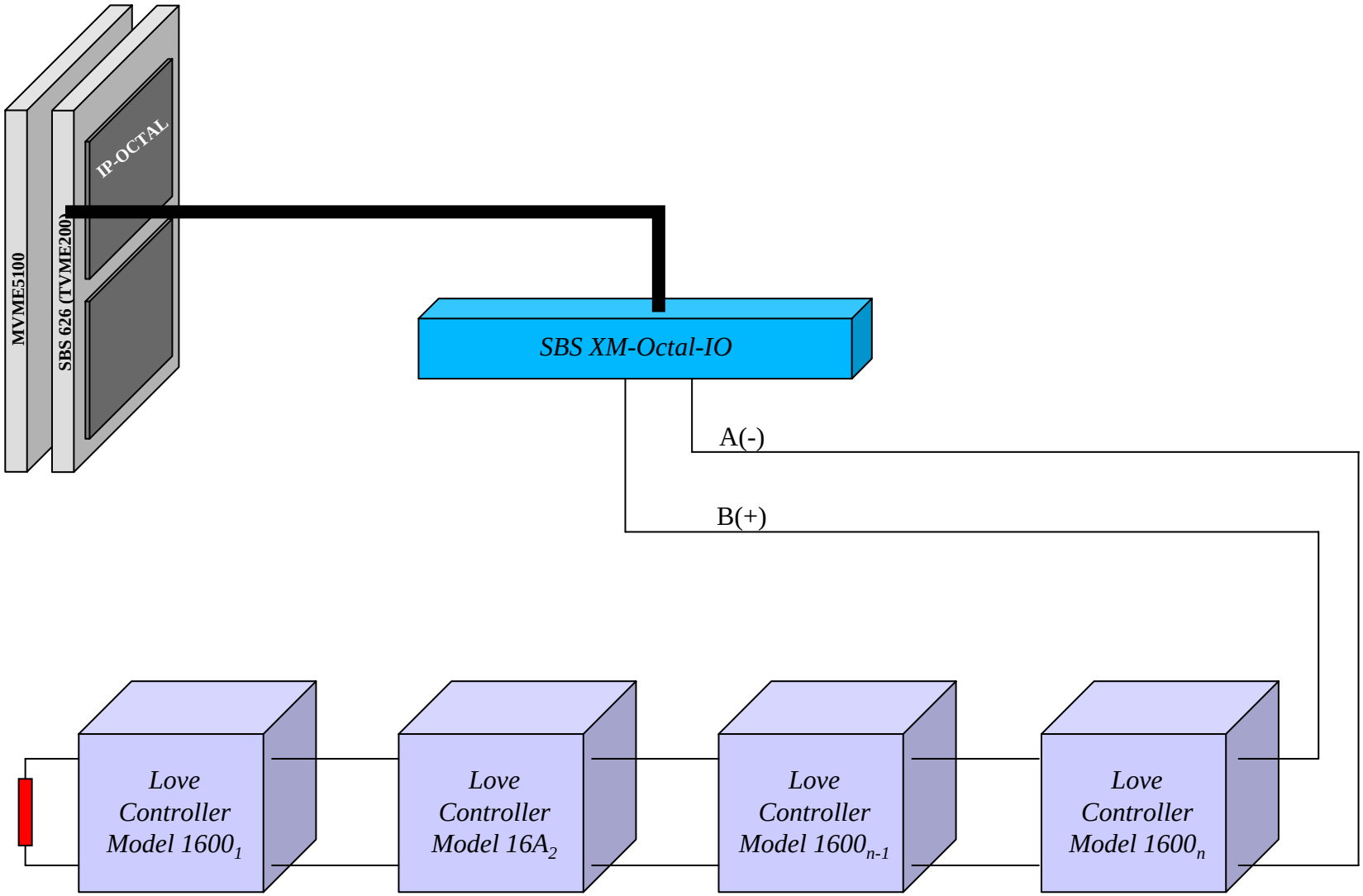
Overview

- **Love Controller,**
  - Instrument to measure voltage, current, thermocouple,
  - Support models 1600 and 16A,
  - Communication is through 2-wire RS485,
- **Device support,**
  - Old support based on MPF,
  - New support based on Asyn,
  - The echoServer and devMPC were departure points,
  - Includes an interpose interface,
  - Standalone application is available,
  - IP-Octal RS232 and RS485 modules can be used,
- **Purpose of the new device support,**
  - Use as a learning tool for Asyn-based device support,
  - Migrate from the unsupported MPF to Asyn,
  - Appoint one as the owner of the module,
  - Provide OS independence,

Hardware Configuration – RS232 <-> RS485



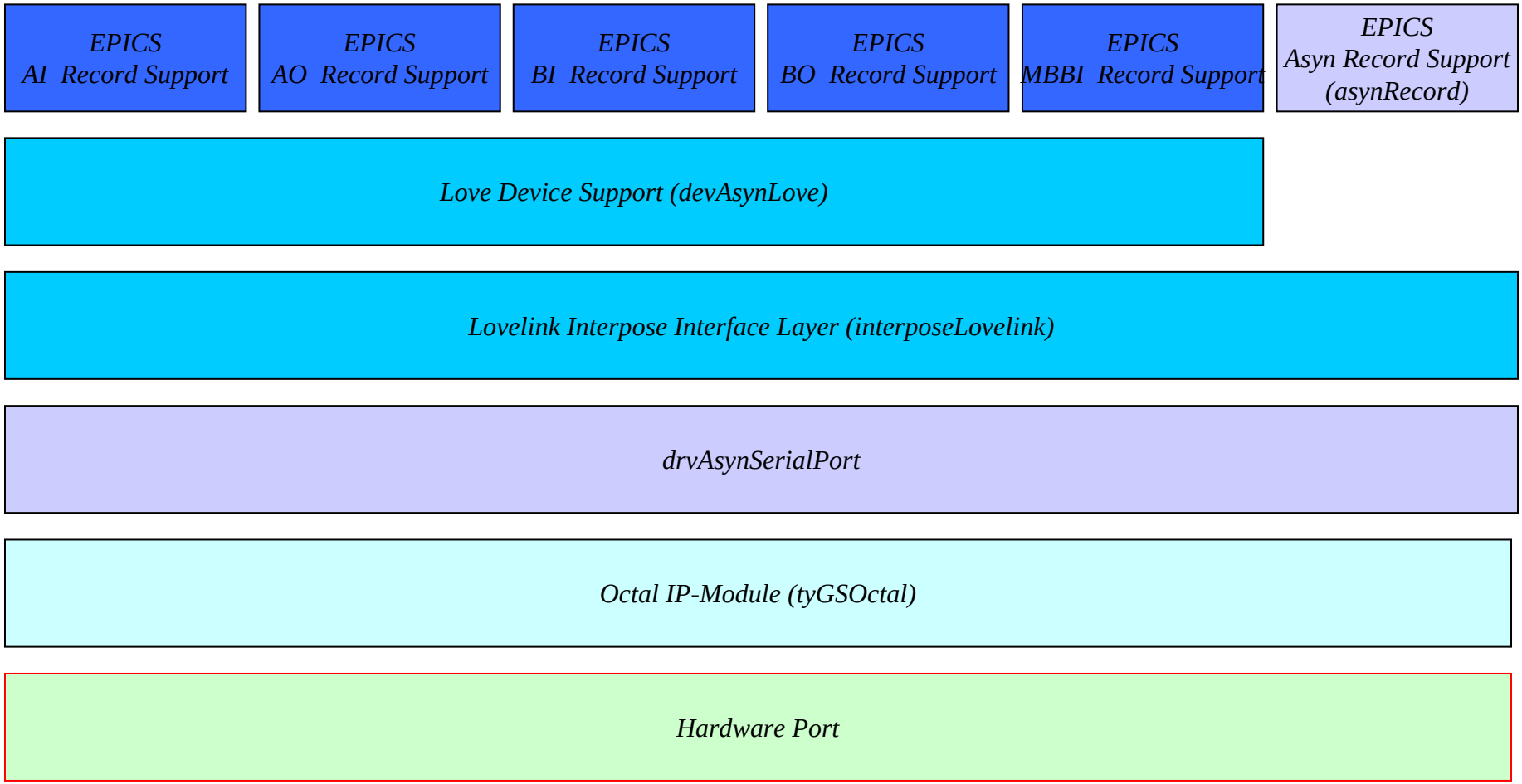
Hardware Configuration – RS485



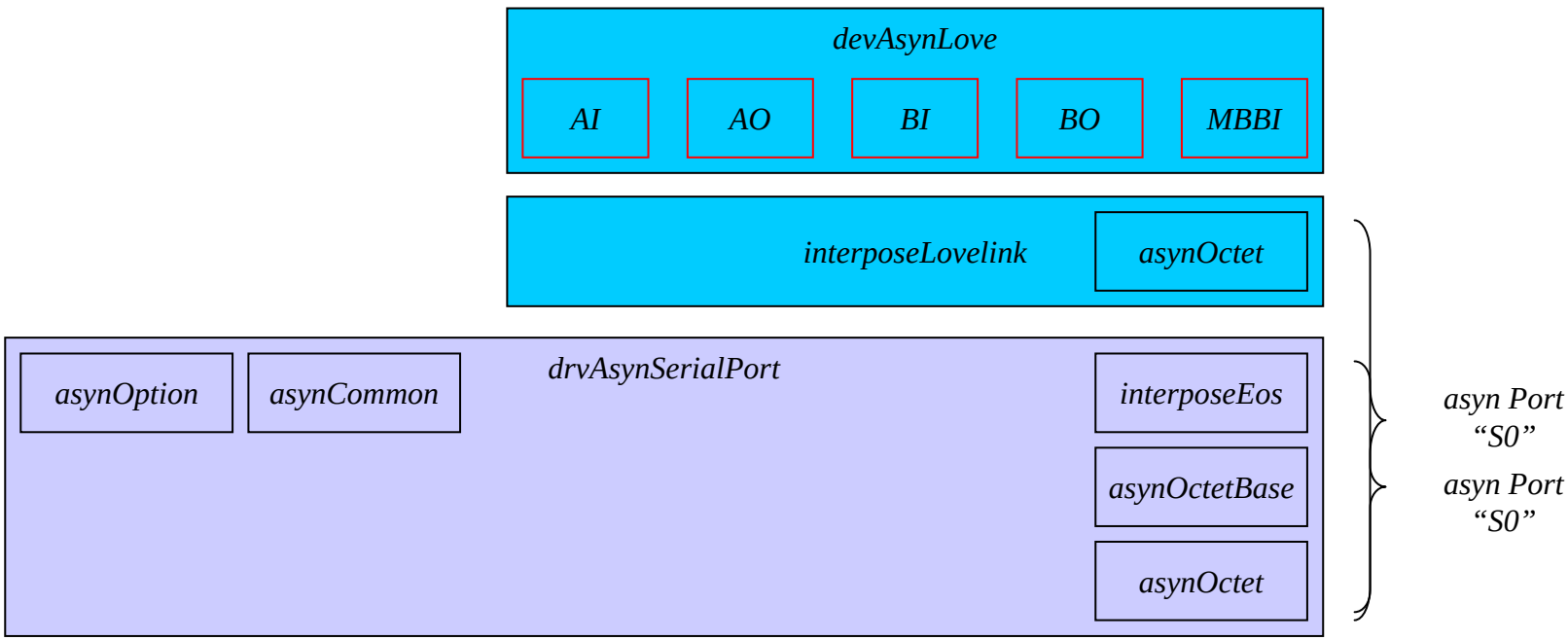
Communication

- **2-wire RS485,**
- **Master/slave protocol, command, response messages,**
- **Message format (simple),**
  - Sent and received as ASCII hex,
  - Cmd:
    - *Read: <STX>L<ADDR><CMD><CS><ETX>*
    - *Write: <STX>L<ADDR><CMD><VALUE><CS><ETX>*
  - Rsp:
    - *Data: <STX>L<ADDR><RSP><CS><ACK>*
    - *Err: <STX>L<ADDR>N<CODE><ACK>*
- **How does device support know commands?**
  - INP/OUT fields,
  - field(INP,"@asyn(PORT,ADDR) CMD MODEL")

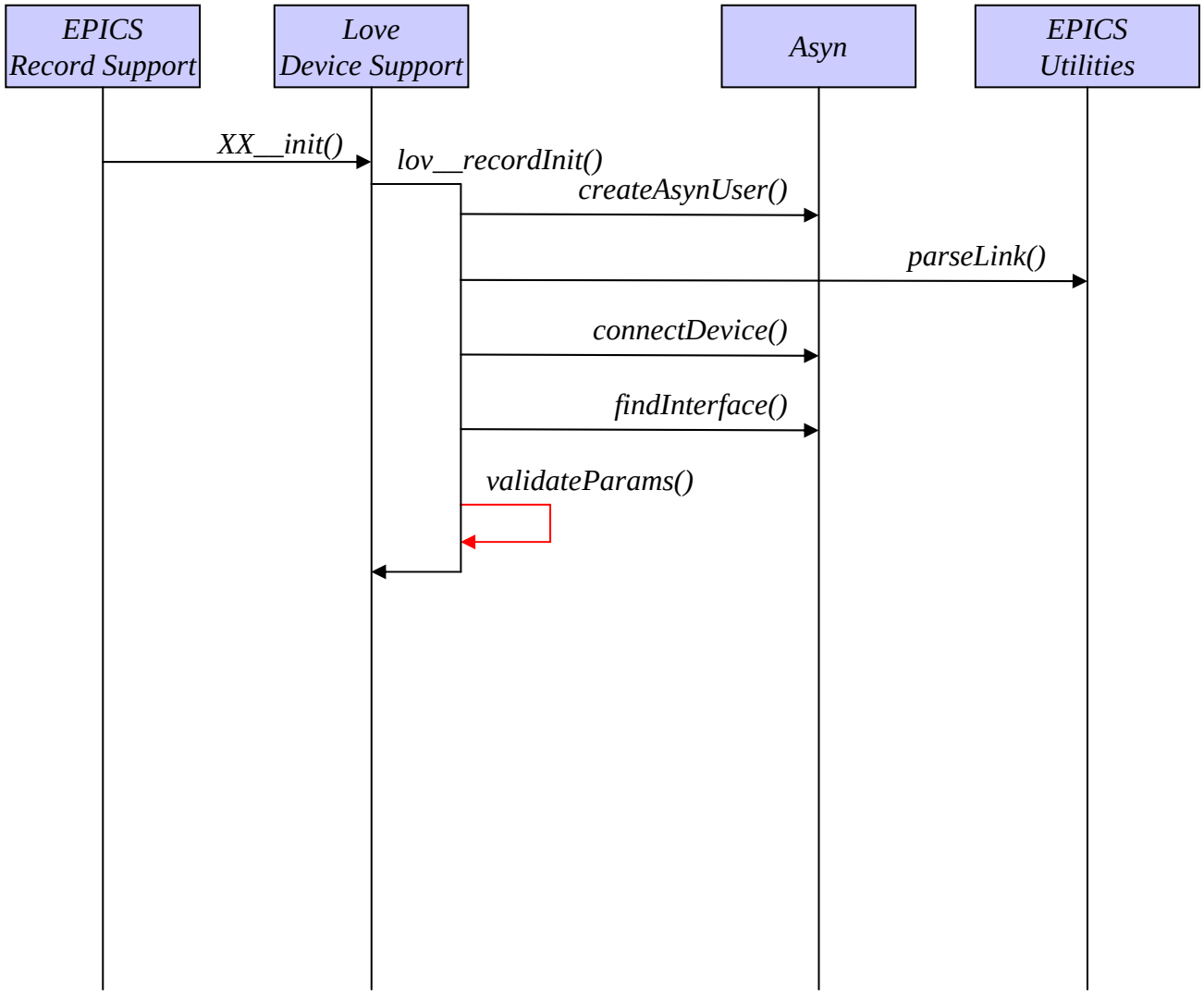
Software Architecture (coarse granularity)



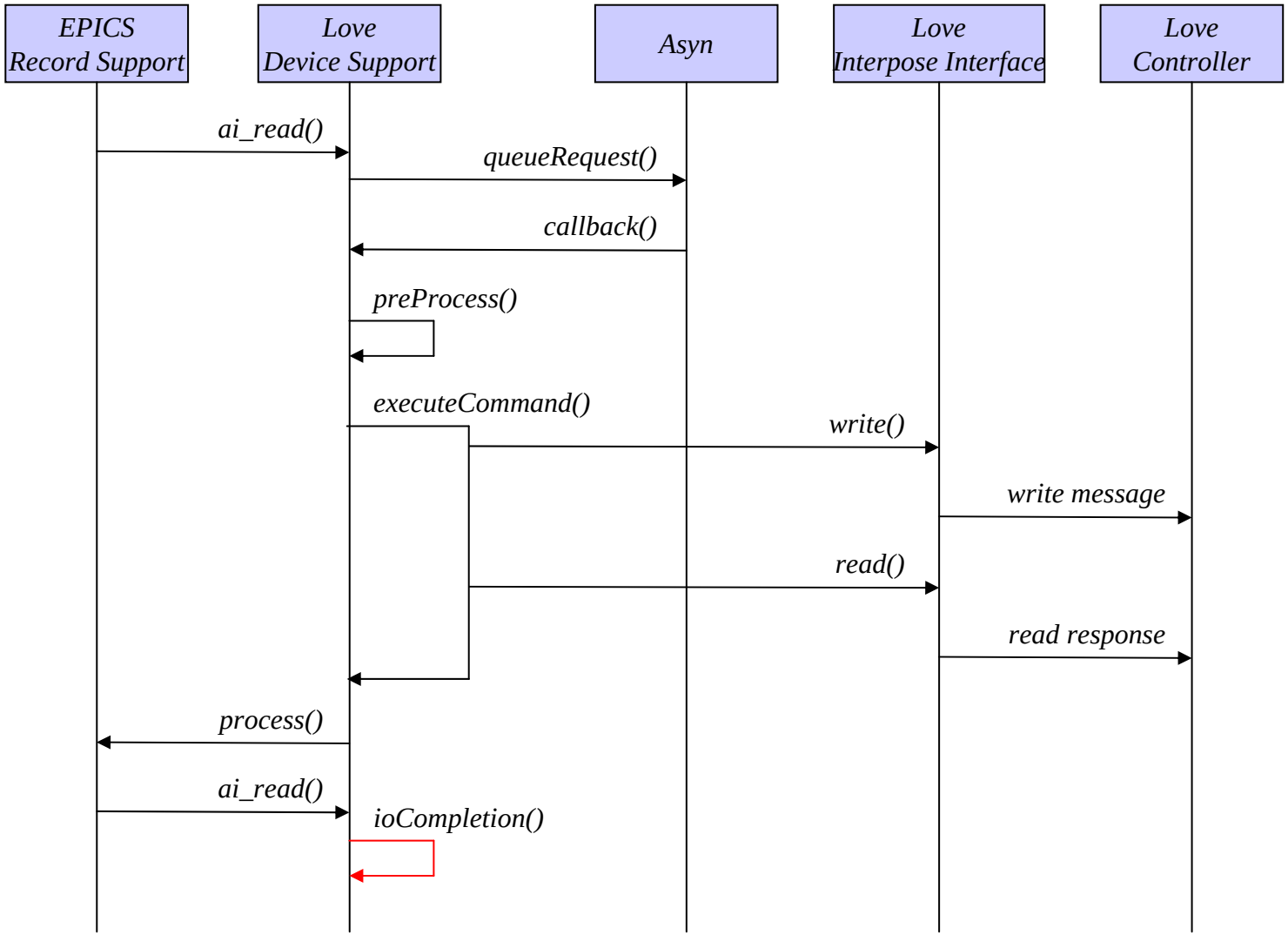
Software Architecture (fine granularity)



Common record initialization scenario



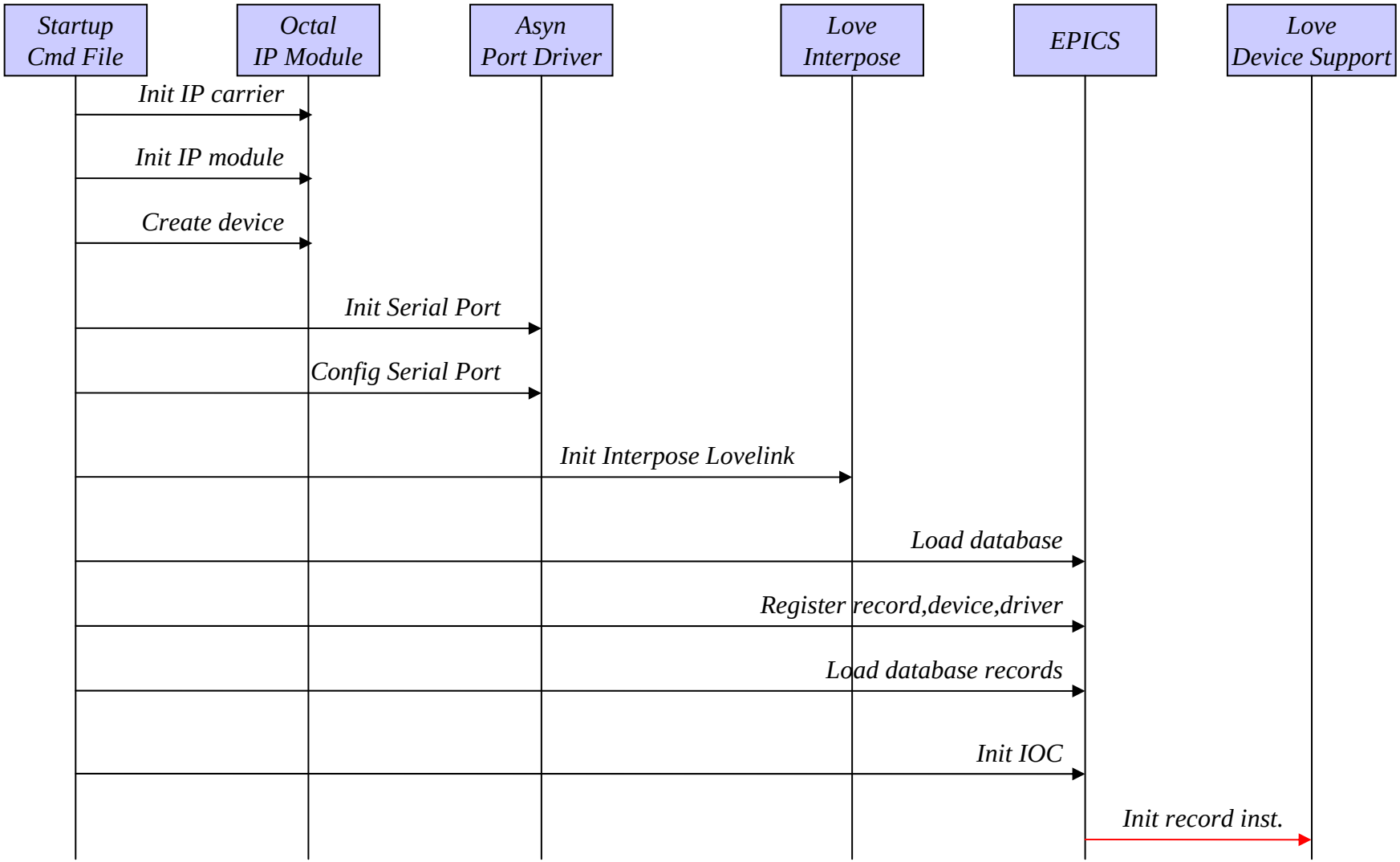
Read AI record scenario



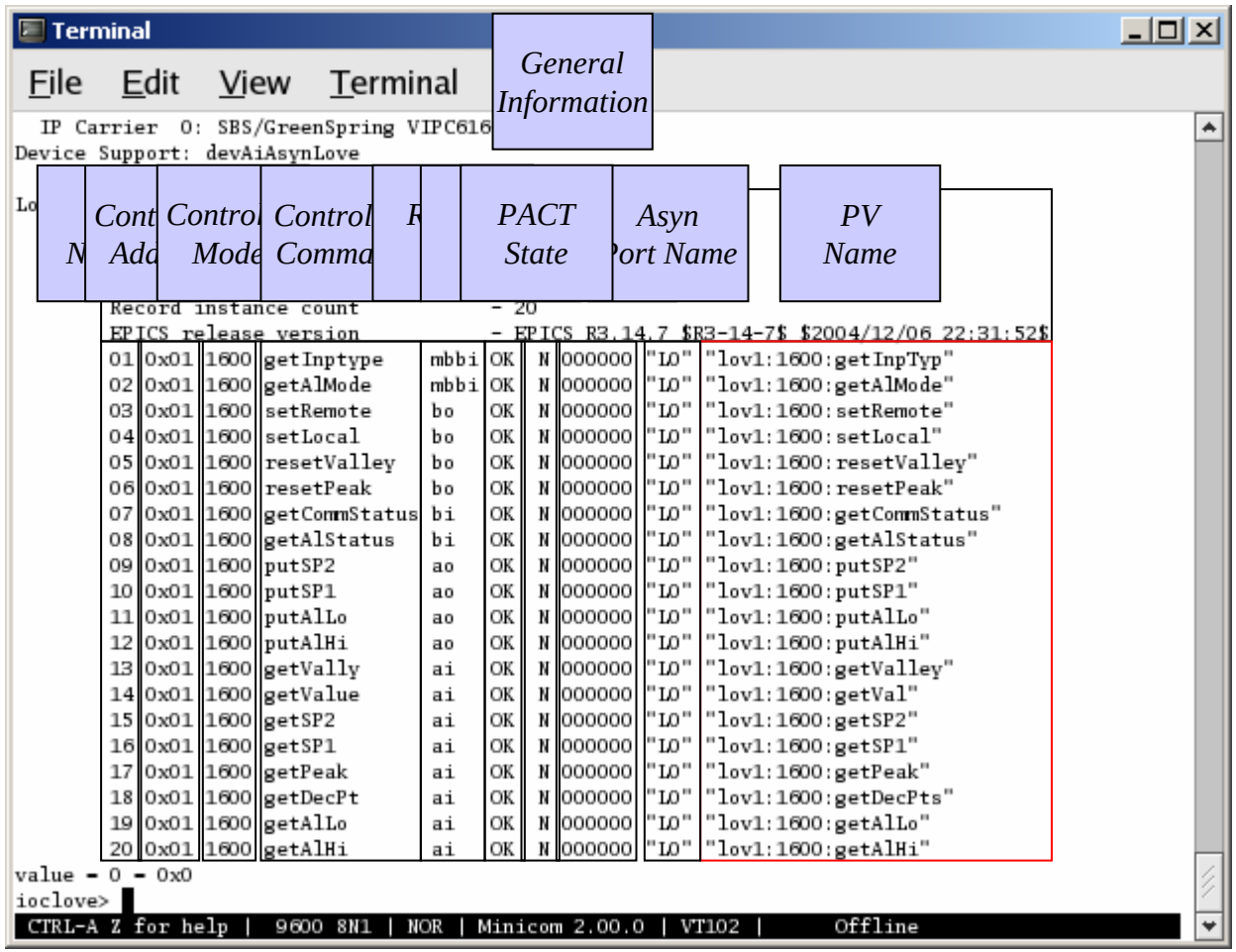
loveApp standalone application

- Sample application,
- New with the release (R3-0-0),
- Supports vxWorks and Linux,
- Database with PVs for each command,

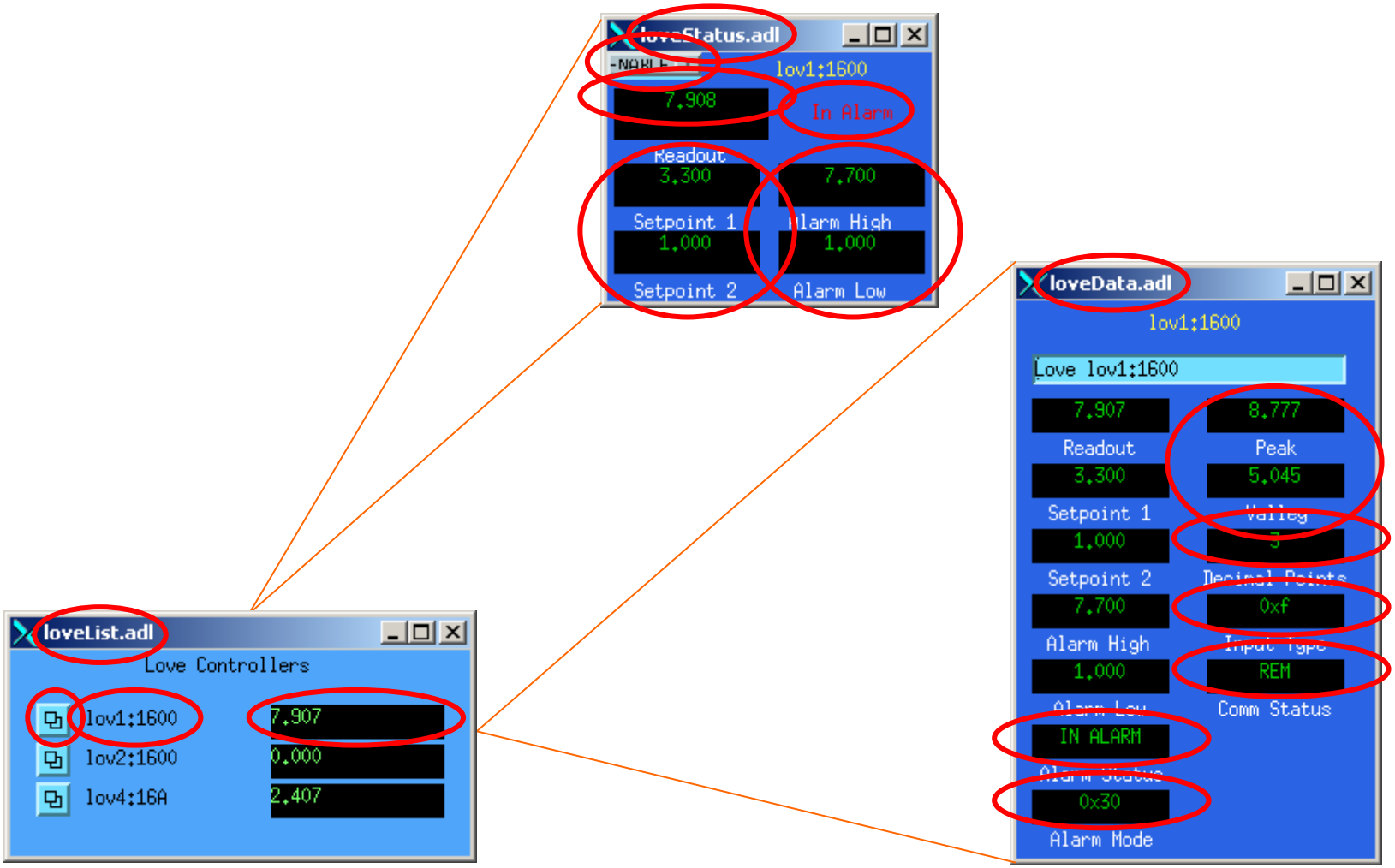
loveApp Initialization Scenario



Reporting (dbior)



MEDM screens



Distribution

- **Standard directories,**
  - Configuration,
    - *Requires Asyn 4-2 and Ipac 2-8,*
  - Documentation,
    - *Controller and converter Information,*
    - *Release notes, known issues,*
    - *Wiring diagram,*
  - Database, record instance files,
  - iocBoot for Linux and vxWorks (startup scripts),
  - MEDM displays,
- **Contains the sources,**
  - devAsynLove.c,
  - interposeLovelink.c,
  - devLove.cc,
  - loveServer.cc,

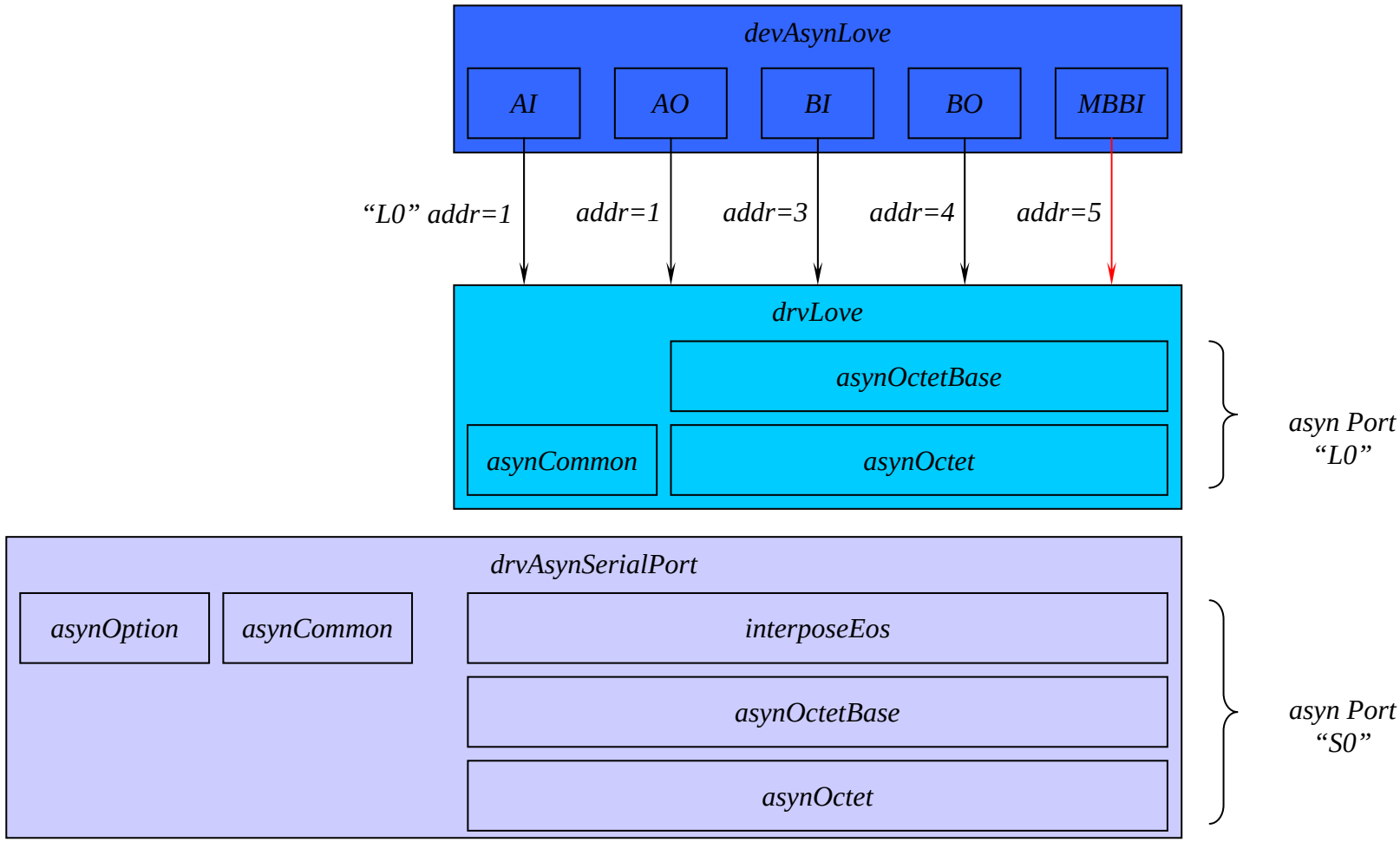
Improvements

- **Current issues,**
  - Cannot easily debug an individual controller,
  - Tight coupling between device support and model type (i.e. INP/OUT),
  - Device support controls the command / response processing,
- **Solutions,**
  - Develop a multidevice driver,
  - Employ different approach to reduce coupling,

Improvements – Multidevice port driver

- **Develop a multidevice port driver,**
- **Replaces the existing interposeLovelink layer,**
- **Placed on top of drvAsynSerialPort,**
- **Creates multiple connections to an Asyn port,**
- **Allows connections to individual controllers,**
- **Monitor individual controller communication,**

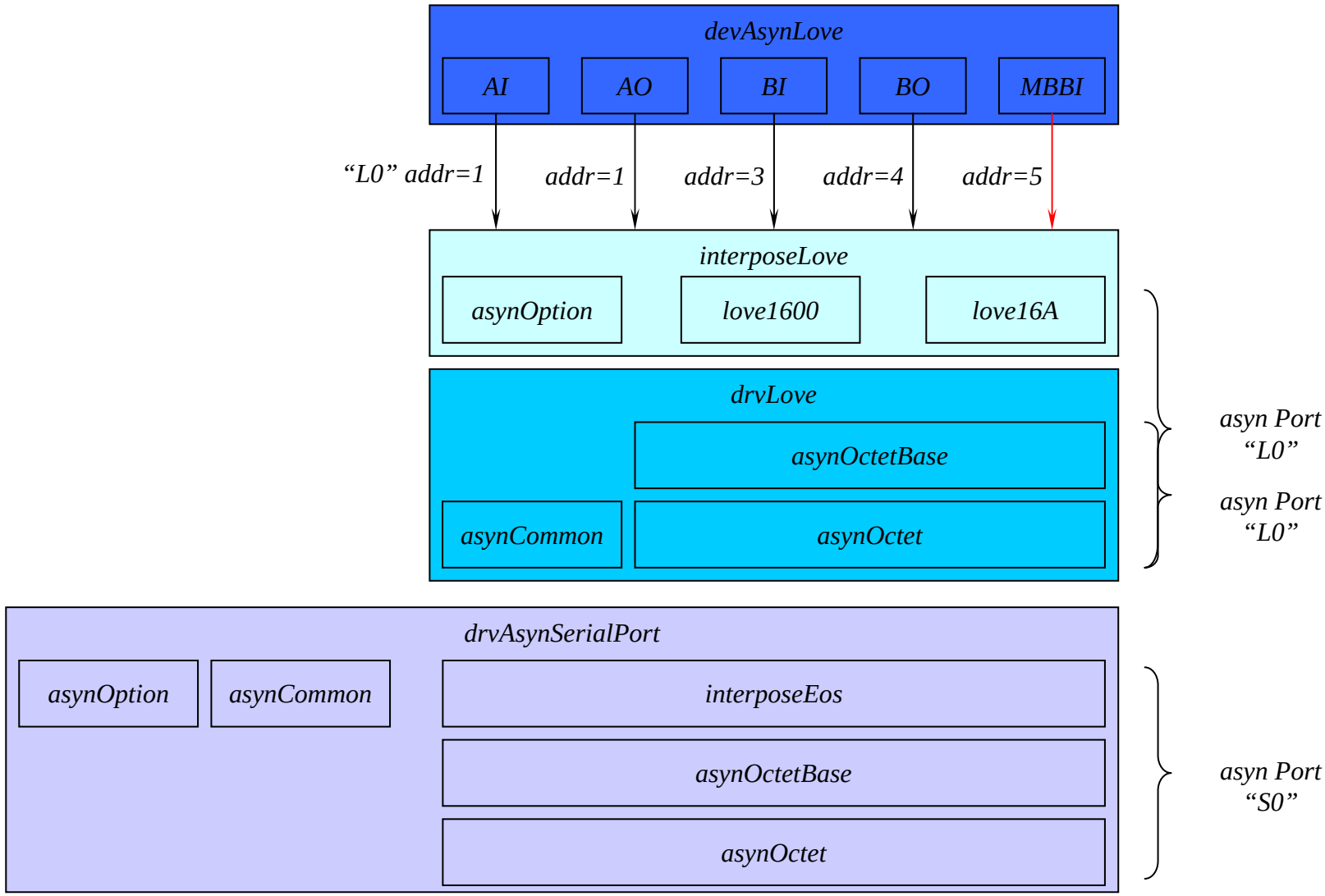
Improvements – Multidevice port driver



Improvements – Different approach

- **Modify the information supplied to INP/OUT,**
- **Employ the drvAsynSerialPort and drvLove drivers,**
- **Implement an interpose at layer to,**
  - Define interfaces for the specific model (i.e. love1600),
  - Provide a method to map the controller address to model type,
  - Reduces the need for conditional statements,
  - Introducing new model type is cleaner,

Improvements – Different approach, cont…



Acknowledgements

- **Marty Kraimer,**
- **Ron Sluiter,**

Observation

…it's all about the interfaces and the methods that implement that interface…

Thank You

Cross Training

Beamline Controls and Data Acquisition

APS Operations Division