

BCDA Cross Training

Love Controller Support

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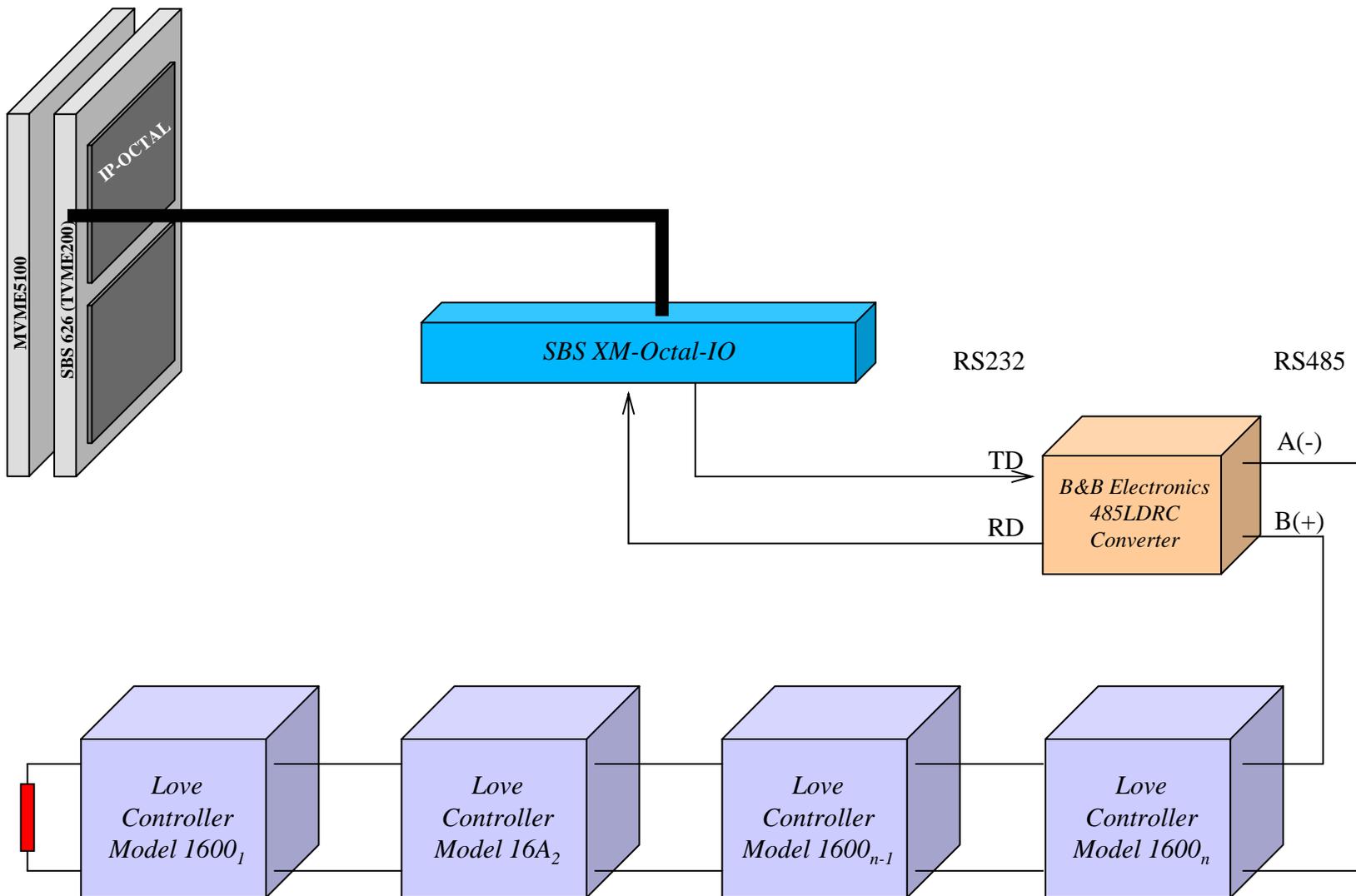
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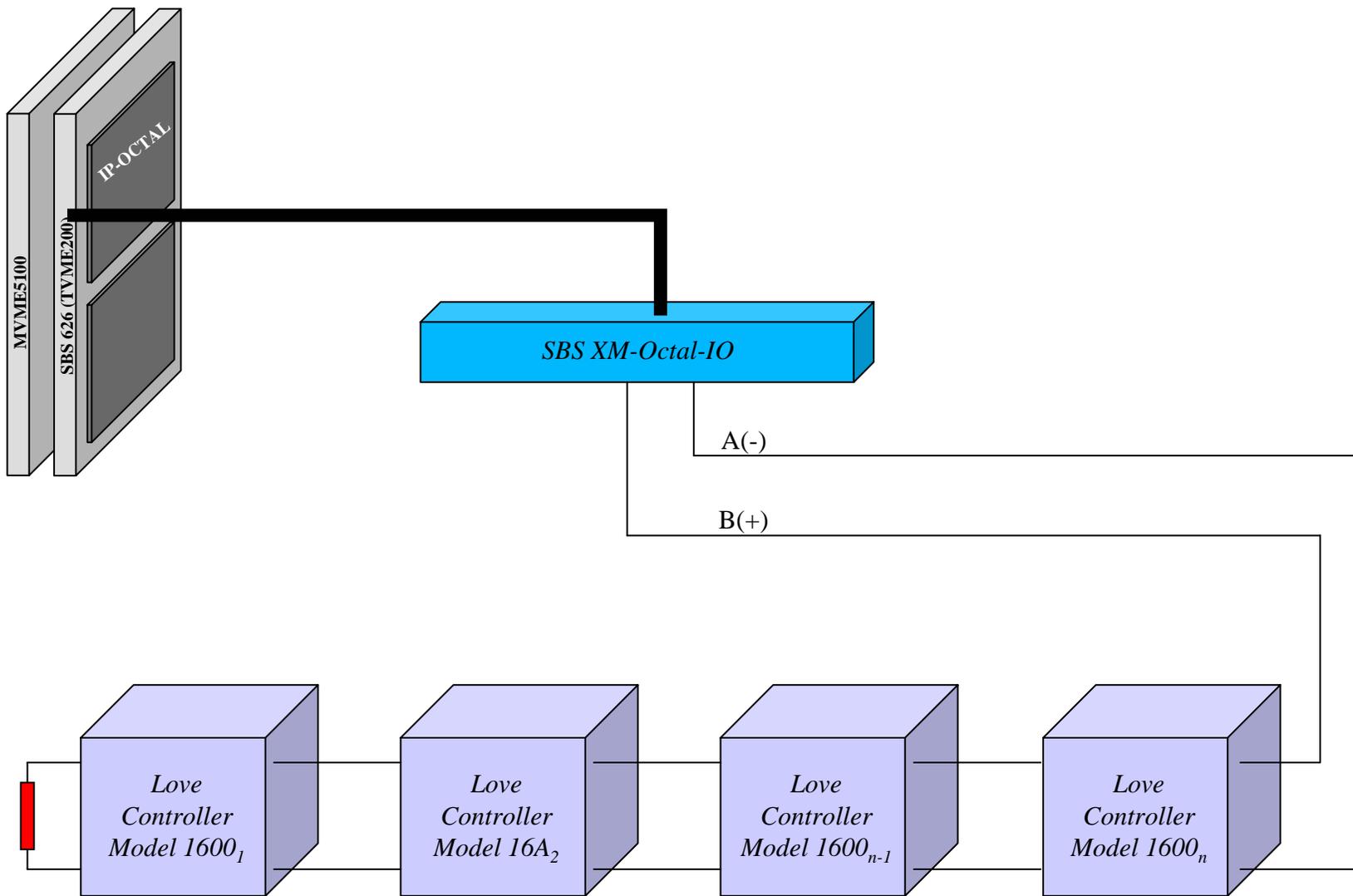
Overview

- **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



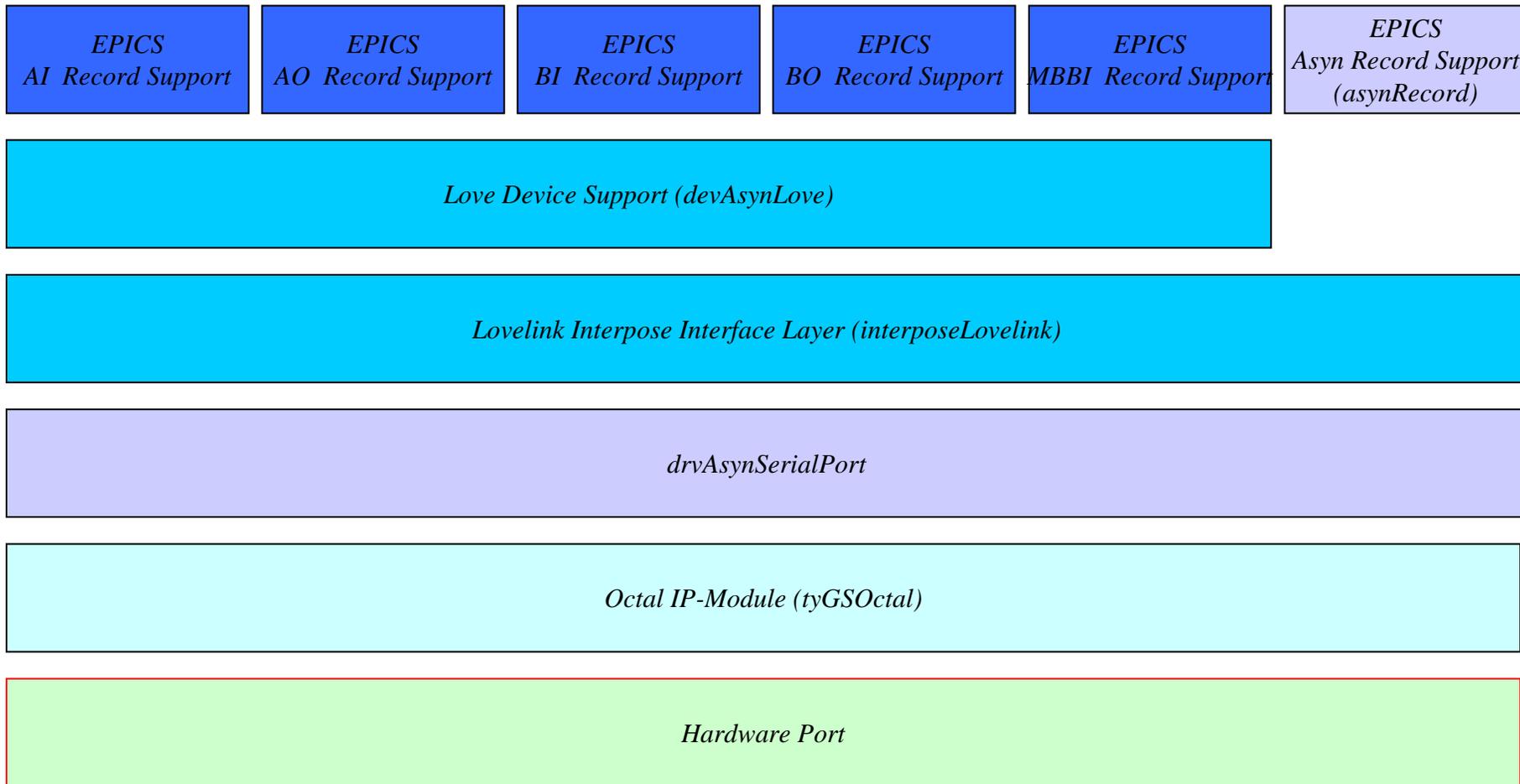
Hardware Configuration – RS485



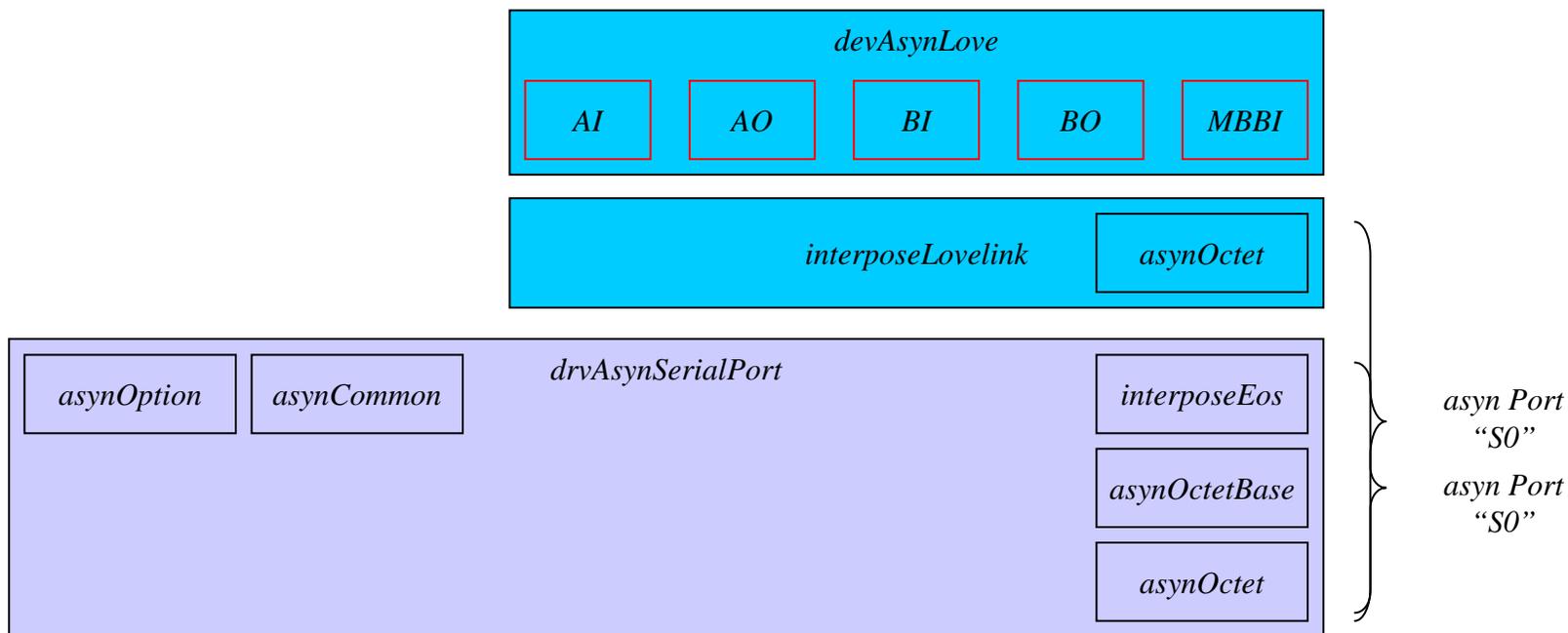
Communication

- **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")

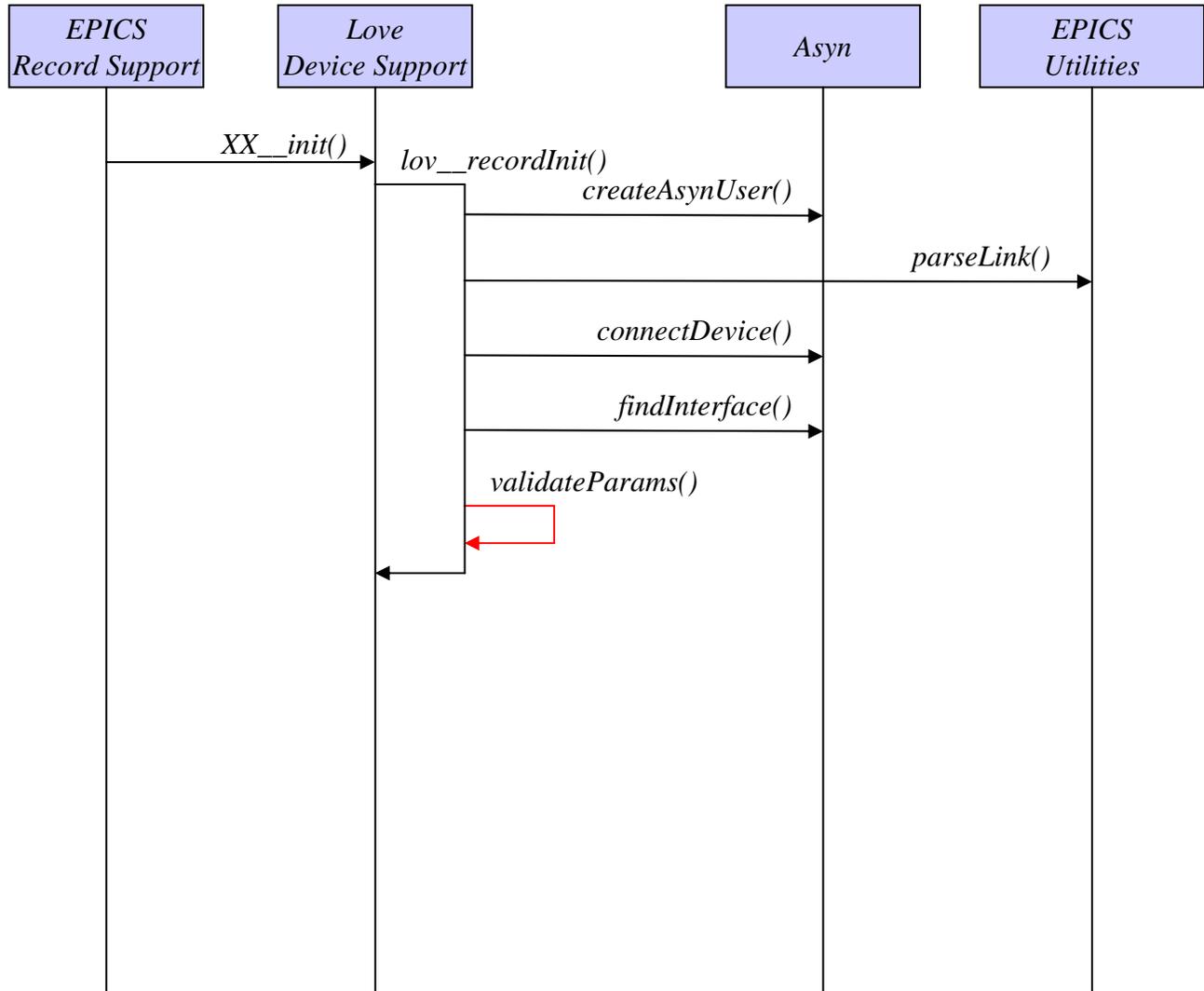
Software Architecture (coarse granularity)



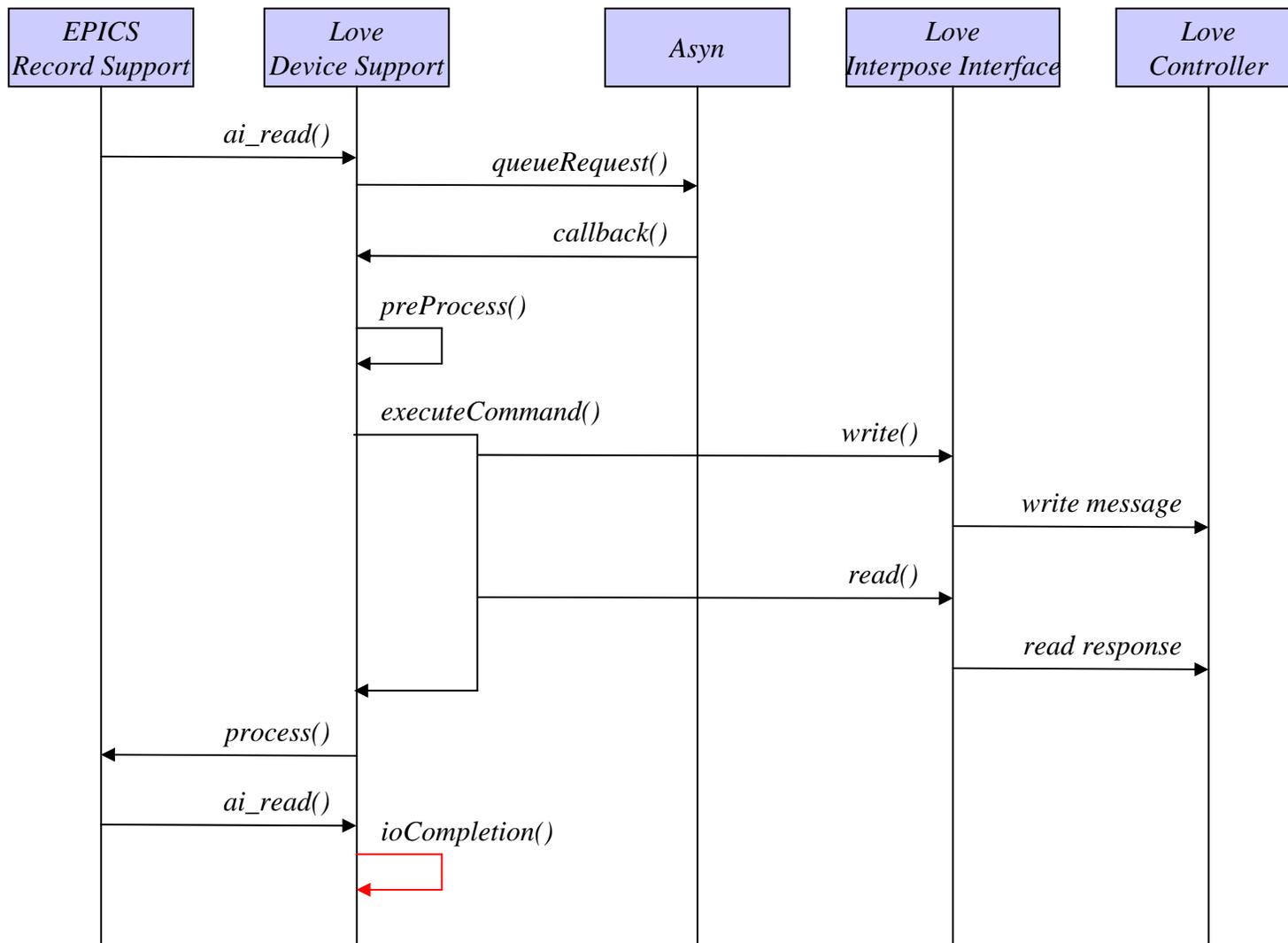
Software Architecture (fine granularity)



Common record initialization scenario



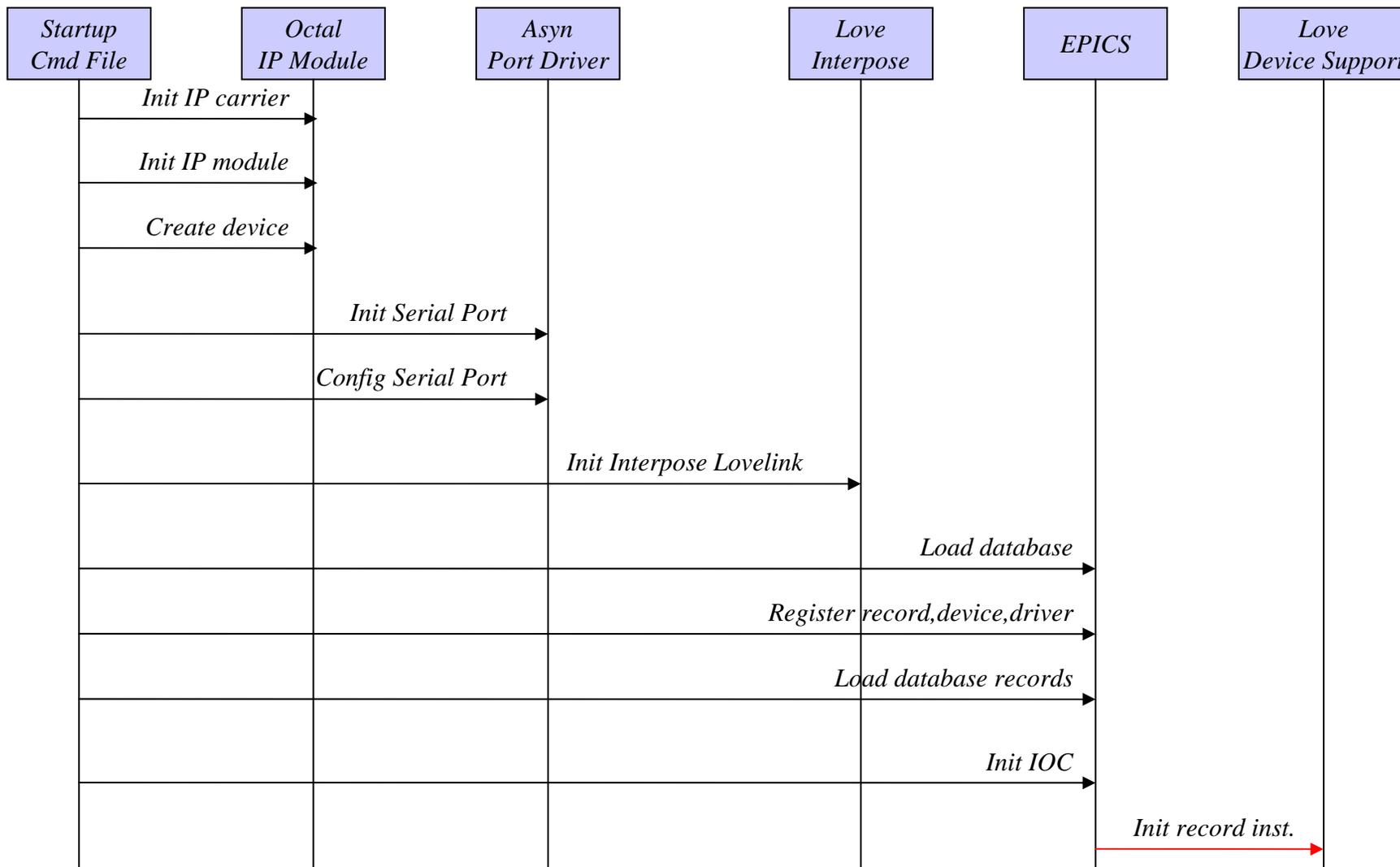
Read AI record scenario



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)

Terminal
_ □ ×

File Edit View Terminal

General Information

IP Carrier 0: SBS/GreenSpring VIPC616

Device Support: devAiAsynLove

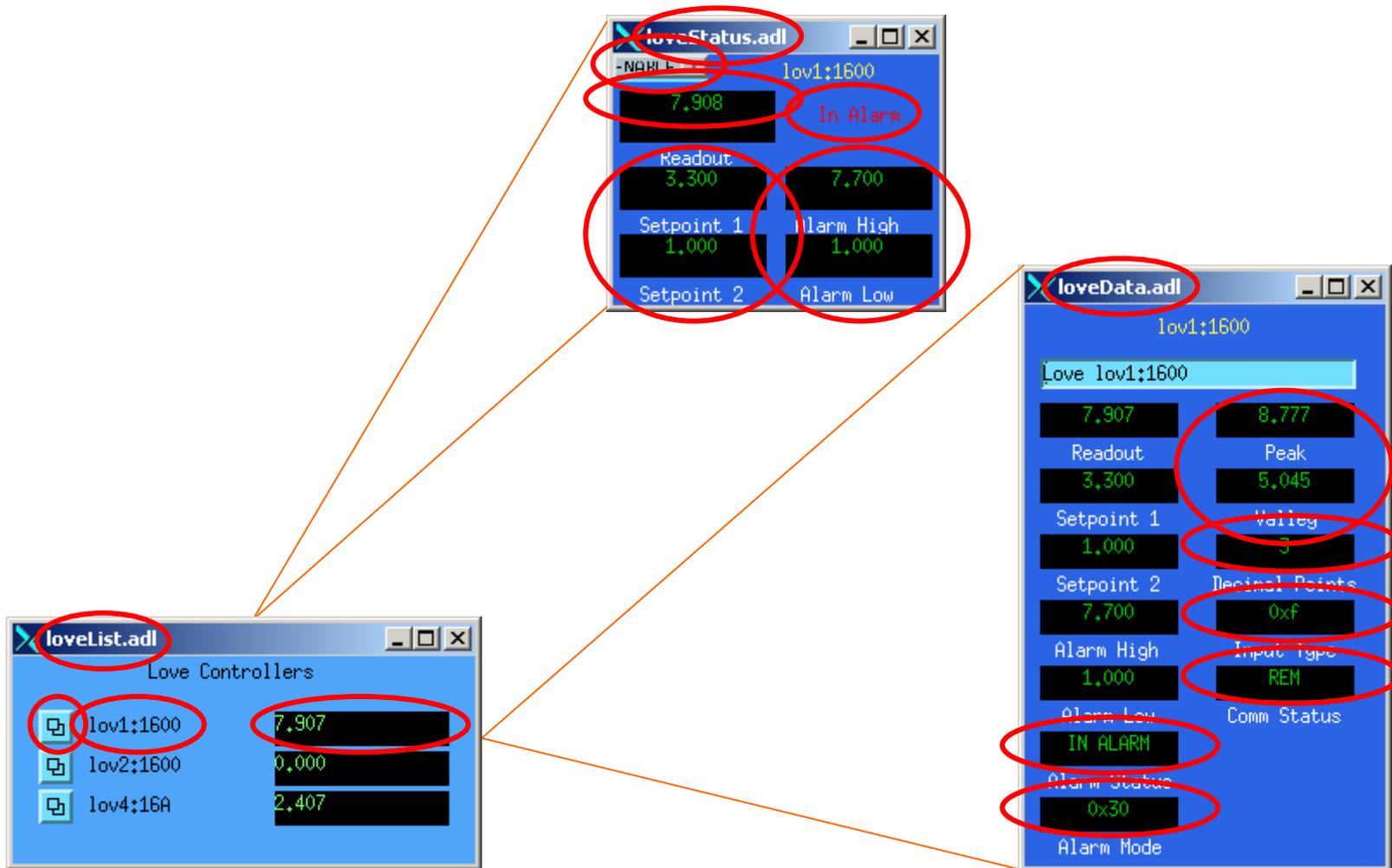
Lo	Cont N	Control Add	Control Mode	Control Comma	R	PACT State	Asyn Port Name	PV Name
								Record instance count - 20
								EPICS release version - EPICS R3.14.7 \$R3-14-7\$ \$2004/12/06 22:31:52\$
01	0x01	1600	getInptype	mbbi	OK	N	000000	"LO" "lov1:1600:getInpTyp"
02	0x01	1600	getAlMode	mbbi	OK	N	000000	"LO" "lov1:1600:getAlMode"
03	0x01	1600	setRemote	bo	OK	N	000000	"LO" "lov1:1600:setRemote"
04	0x01	1600	setLocal	bo	OK	N	000000	"LO" "lov1:1600:setLocal"
05	0x01	1600	resetValley	bo	OK	N	000000	"LO" "lov1:1600:resetValley"
06	0x01	1600	resetPeak	bo	OK	N	000000	"LO" "lov1:1600:resetPeak"
07	0x01	1600	getCommStatus	bi	OK	N	000000	"LO" "lov1:1600:getCommStatus"
08	0x01	1600	getAlStatus	bi	OK	N	000000	"LO" "lov1:1600:getAlStatus"
09	0x01	1600	putSP2	ao	OK	N	000000	"LO" "lov1:1600:putSP2"
10	0x01	1600	putSP1	ao	OK	N	000000	"LO" "lov1:1600:putSP1"
11	0x01	1600	putAlLo	ao	OK	N	000000	"LO" "lov1:1600:putAlLo"
12	0x01	1600	putAlHi	ao	OK	N	000000	"LO" "lov1:1600:putAlHi"
13	0x01	1600	getVally	ai	OK	N	000000	"LO" "lov1:1600:getValley"
14	0x01	1600	getValue	ai	OK	N	000000	"LO" "lov1:1600:getVal"
15	0x01	1600	getSP2	ai	OK	N	000000	"LO" "lov1:1600:getSP2"
16	0x01	1600	getSP1	ai	OK	N	000000	"LO" "lov1:1600:getSP1"
17	0x01	1600	getPeak	ai	OK	N	000000	"LO" "lov1:1600:getPeak"
18	0x01	1600	getDecPt	ai	OK	N	000000	"LO" "lov1:1600:getDecPts"
19	0x01	1600	getAlLo	ai	OK	N	000000	"LO" "lov1:1600:getAlLo"
20	0x01	1600	getAlHi	ai	OK	N	000000	"LO" "lov1:1600:getAlHi"

value - 0 - 0x0

ioclove>

CTRL-A Z for help | 9600 8N1 | NOR | Minicom 2.00.0 | VT102 | Offline

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,

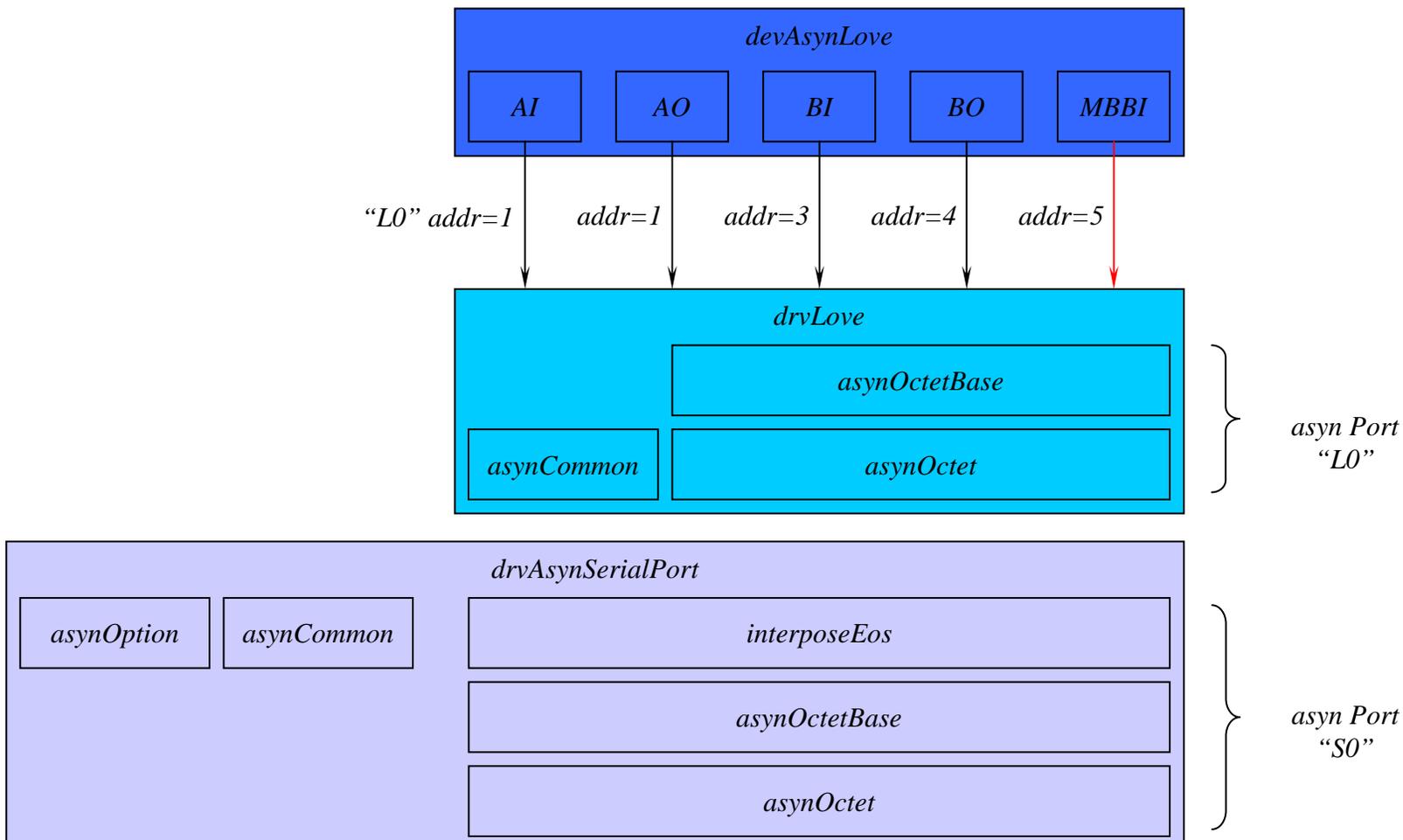
Improvements

- **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,**

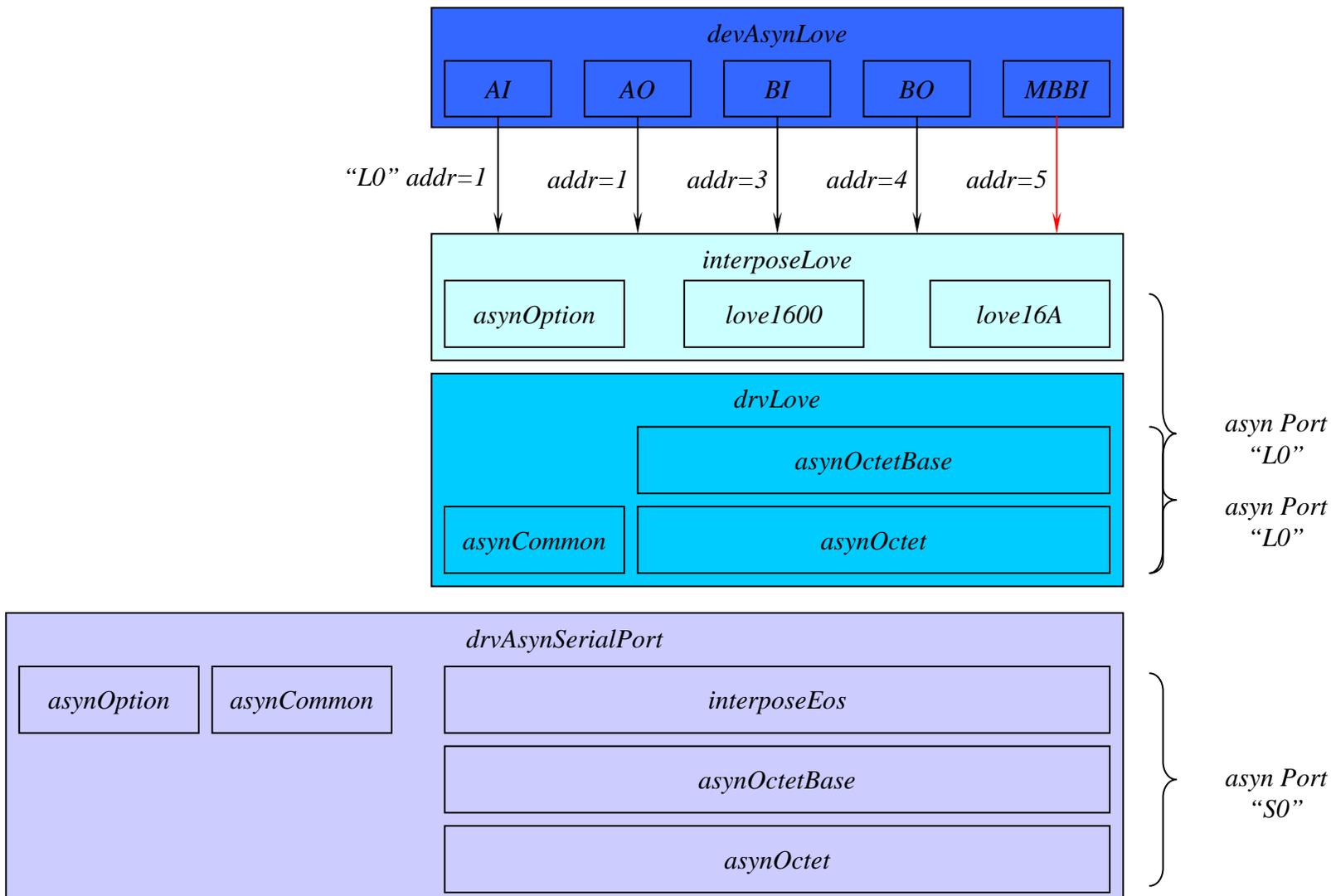
Improvements – Multidevice port driver



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