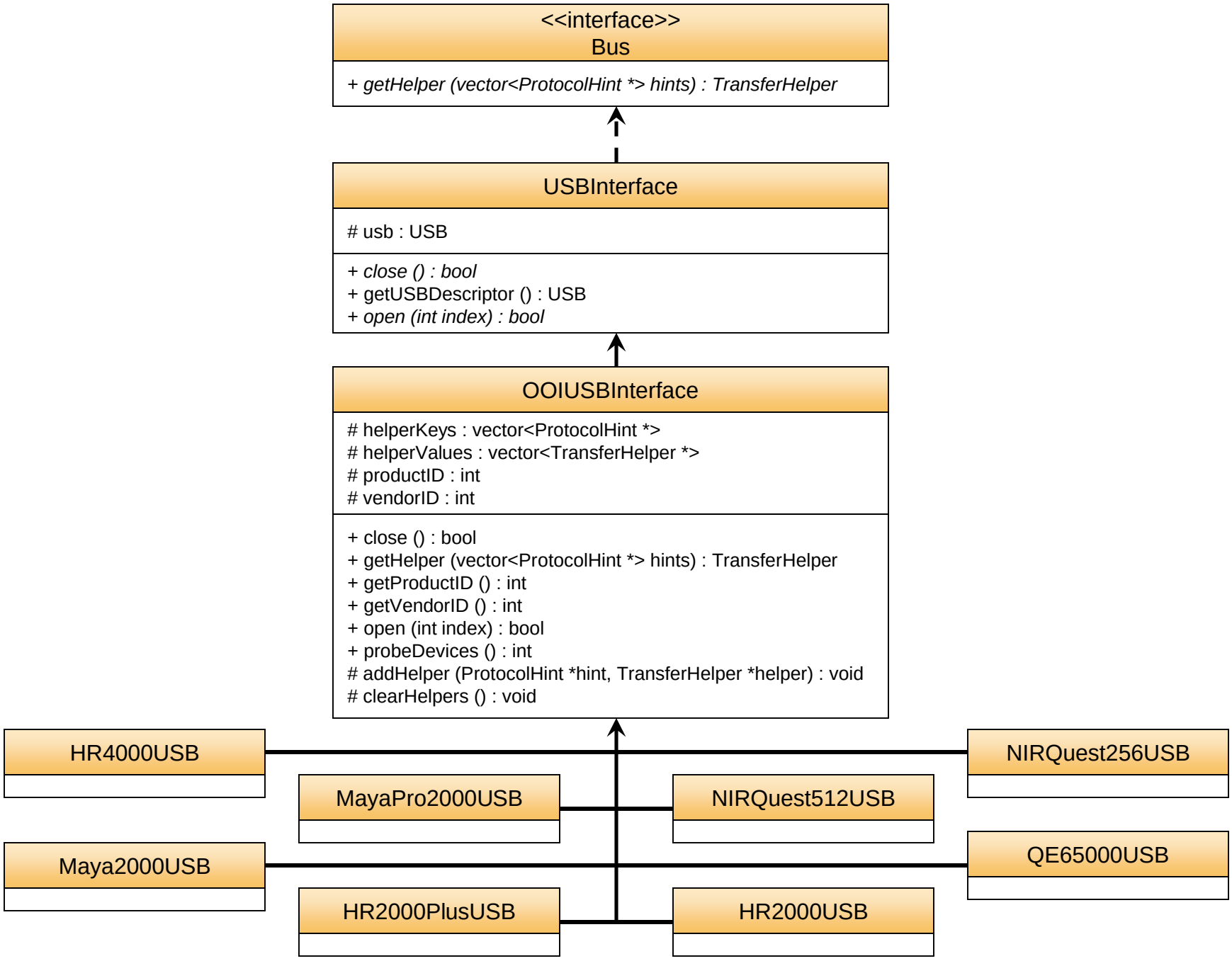
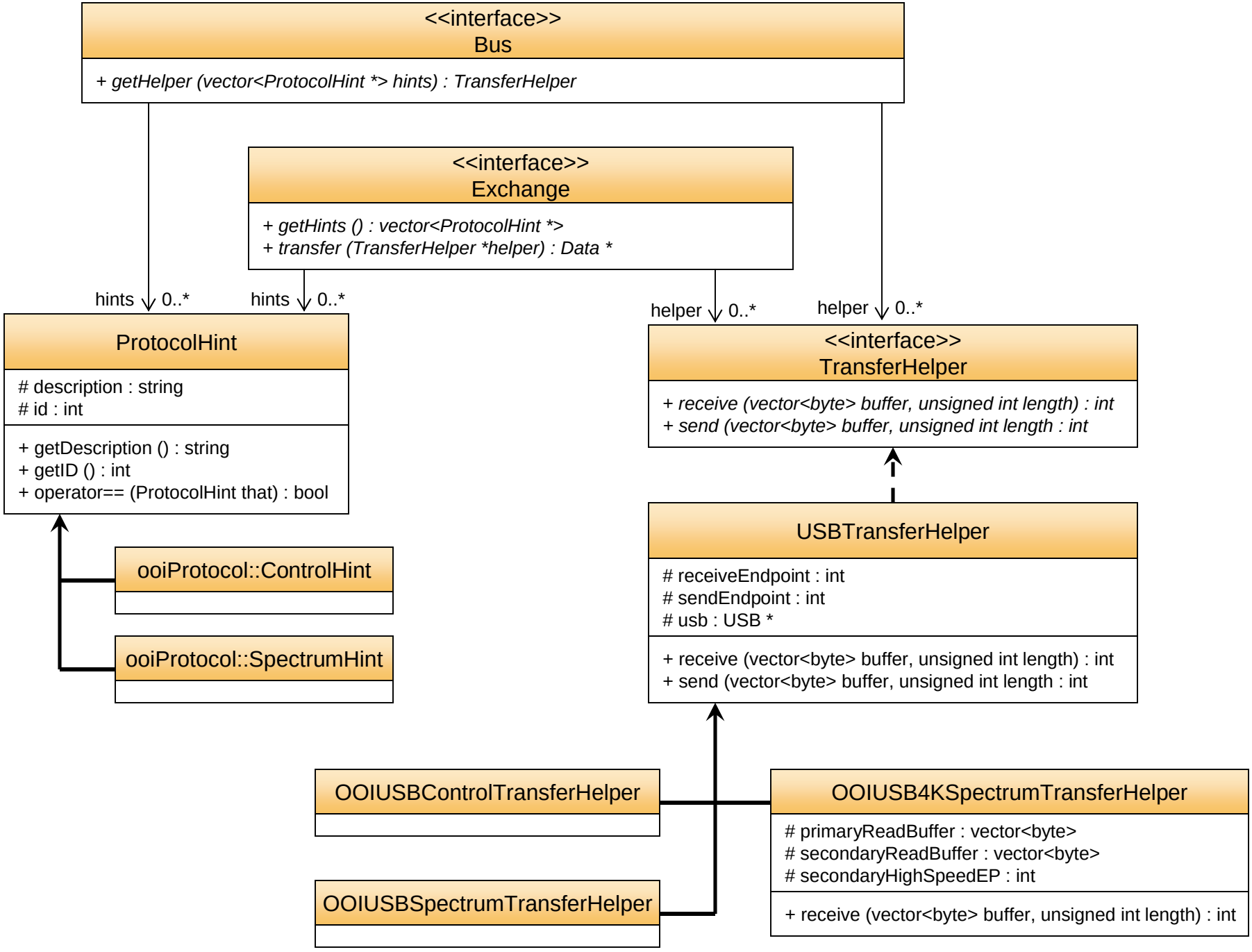
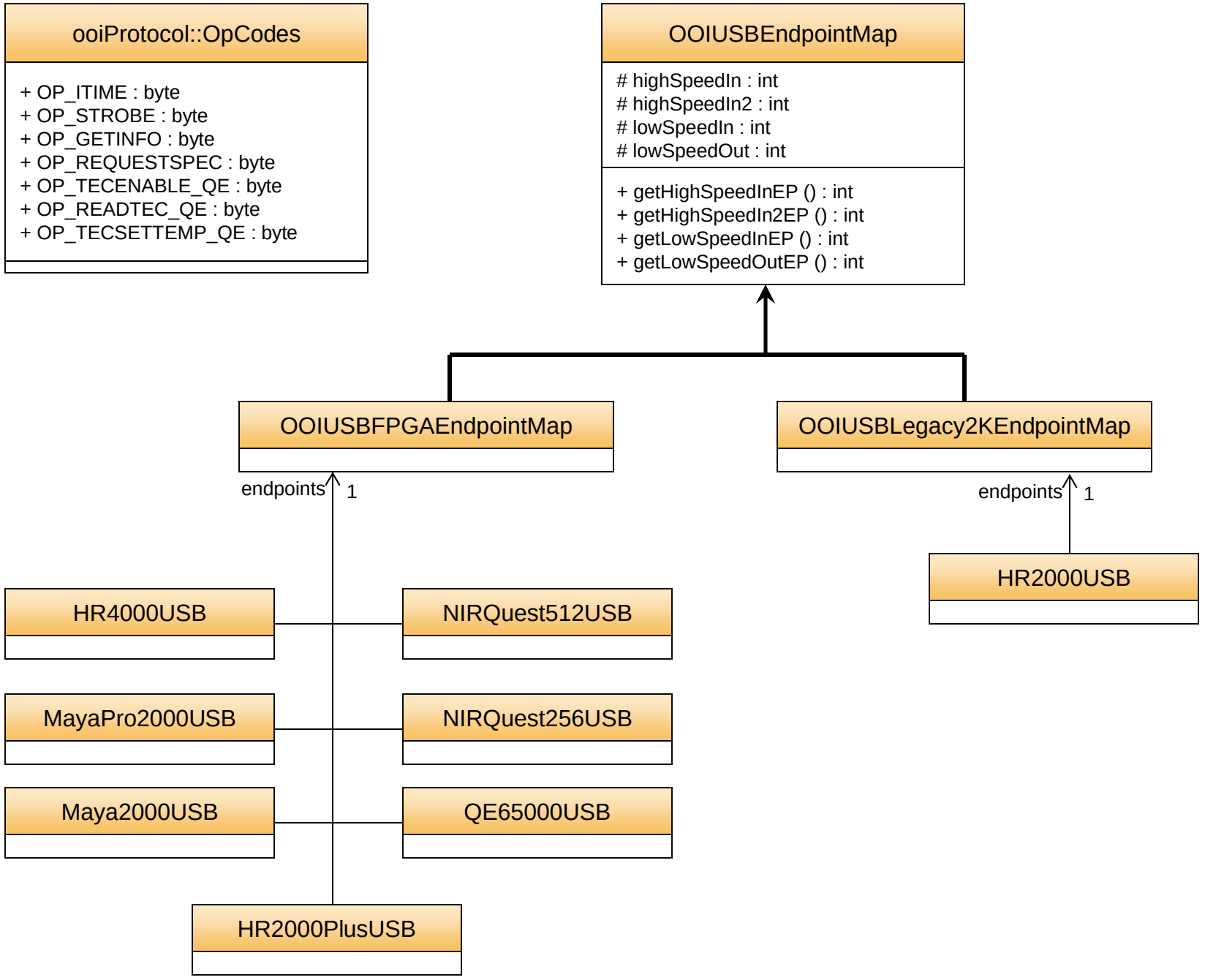
Ocean Optics SeaBreeze UML

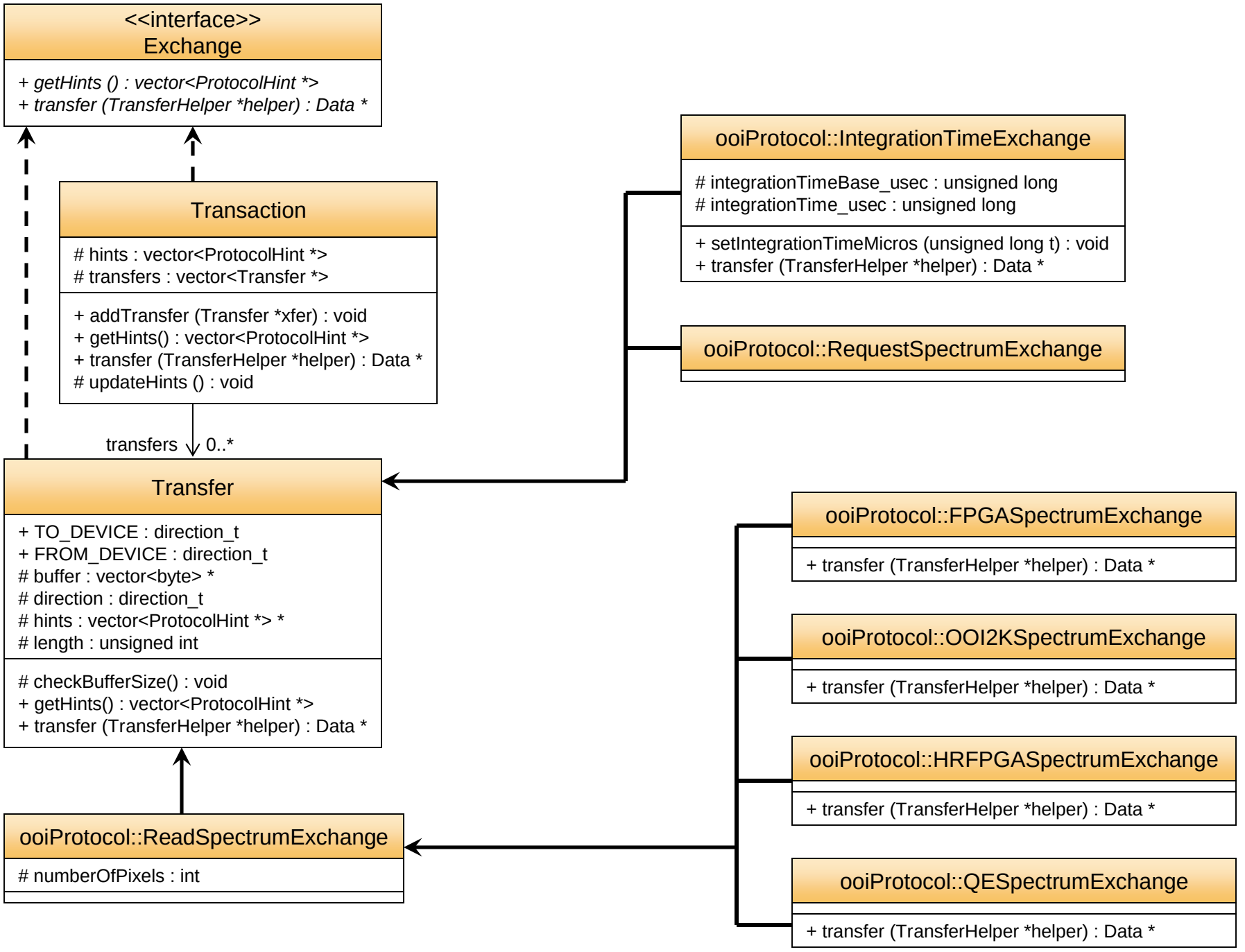
This presentation provides an overview of the object and event models for the Ocean Optics SeaBreeze device driver. This information is Confidential/Proprietary Ocean Optics, Inc. Further redistribution is prohibited.

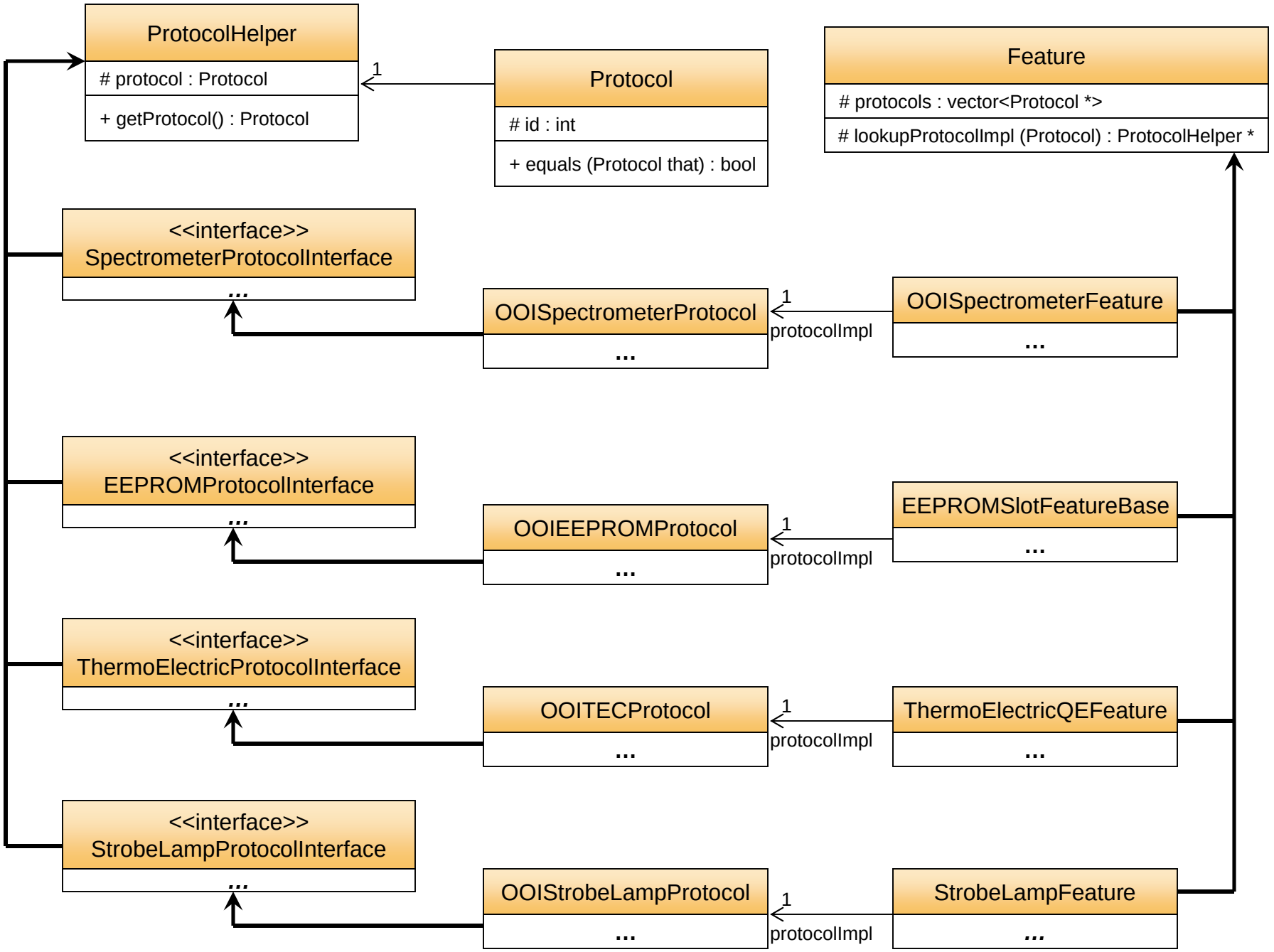
Note that, due to space constraints, not all classes are shown in these UML diagrams; a representative subset may be given where the entire set would not easily fit. Source code should be provided along with this document, and that can be used to determine the extent of the classes included in SeaBreeze.

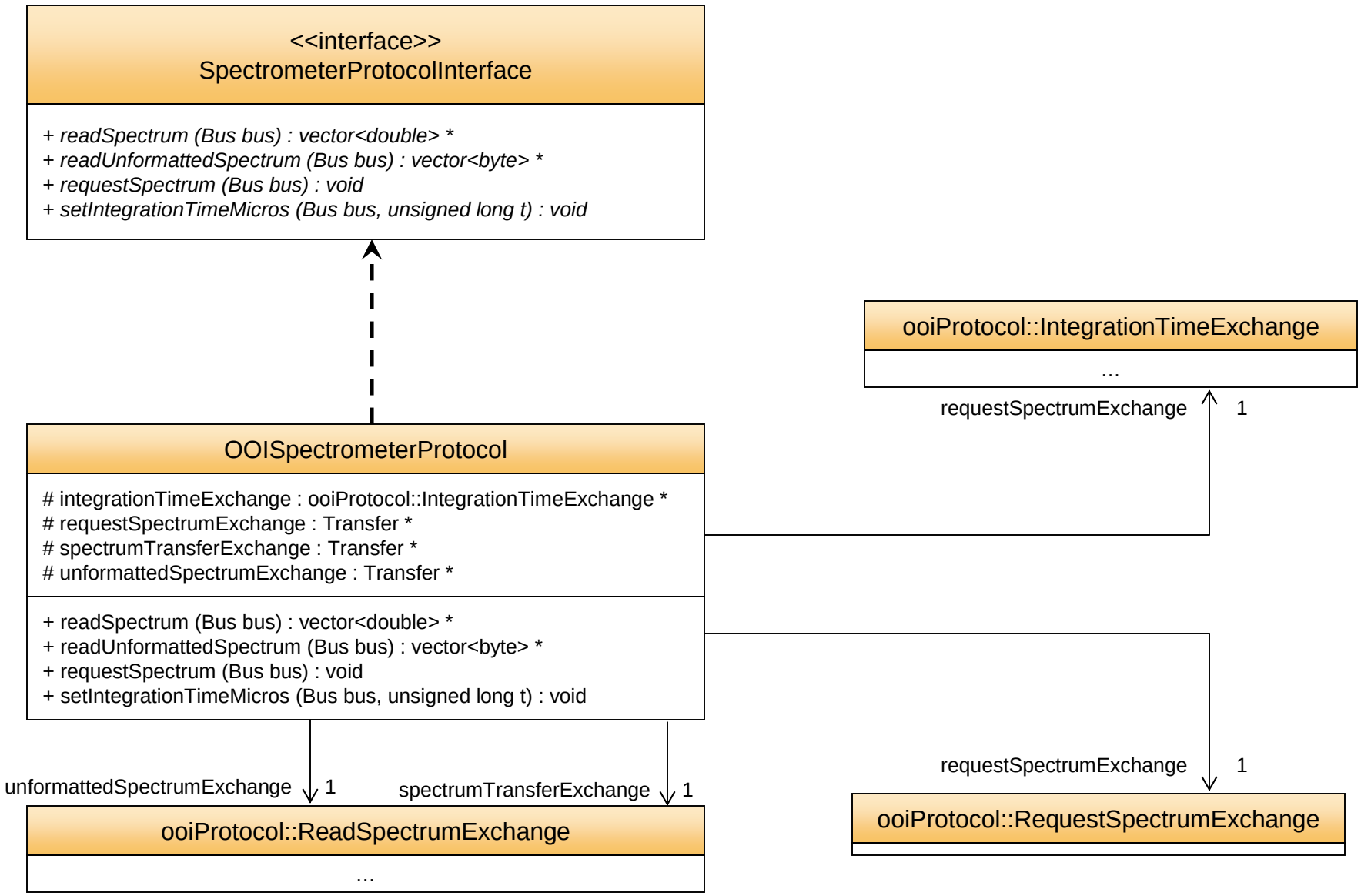

<<interface>>
Bus
+ getHelper (vector<ProtocolHint *> hints) : TransferHelper
USBInterface
usb : USB
+ close () : bool
+ getUSBDescriptor () : USB
+ open (int index) : bool
OOIUSBInterface
helperKeys : vector<ProtocolHint *>
helperValues : vector<TransferHelper *>
productID : int
vendorID : int
+ close () : bool
+ getHelper (vector<ProtocolHint *> hints) : TransferHelper
+ getProductID () : int
+ getVendorID () : int
+ open (int index) : bool
+ probeDevices () : int
# addHelper (ProtocolHint *hint, TransferHelper *helper) : void
# clearHelpers () : void
HR4000USB
MayaPro2000USB
NIRQuest512USB
NIRQuest256USB
Maya2000USB
HR2000PlusUSB
HR2000USB
QE65000USB

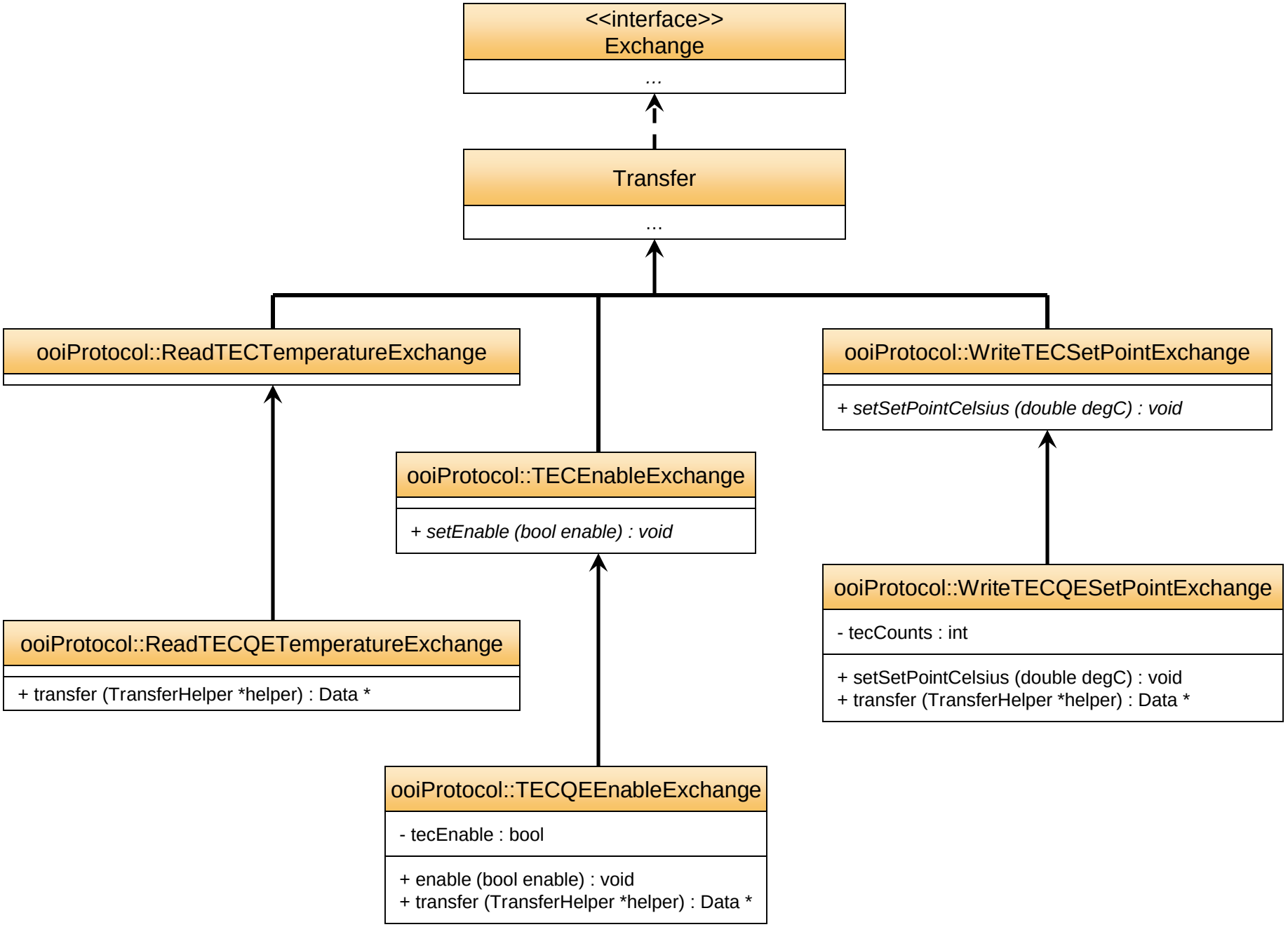

<<interface>>
Bus
+ getHelper (vector<ProtocolHint *> hints) : TransferHelper
<<interface>>
Exchange
+ getHints () : vector<ProtocolHint *>
+ transfer (TransferHelper *helper) : Data *
hints 0..*
hints 0..*
helper 0..*
helper 0..*
ProtocolHint
description : string
id : int
+ getDescription () : string
+ getID () : int
+ operator== (ProtocolHint that) : bool
<<interface>>
TransferHelper
+ receive (vector<byte> buffer, unsigned int length) : int
+ send (vector<byte> buffer, unsigned int length : int
USBTransferHelper
receiveEndpoint : int
sendEndpoint : int
usb : USB *
+ receive (vector<byte> buffer, unsigned int length) : int
+ send (vector<byte> buffer, unsigned int length : int
ooiProtocol::ControlHint
ooiProtocol::SpectrumHint
OOIUSBControlTransferHelper
OOIUSBSpectrumTransferHelper
OOIUSB4KSpectrumTransferHelper
primaryReadBuffer : vector<byte>
secondaryReadBuffer : vector<byte>
secondaryHighSpeedEP : int
+ receive (vector<byte> buffer, unsigned int length) : int

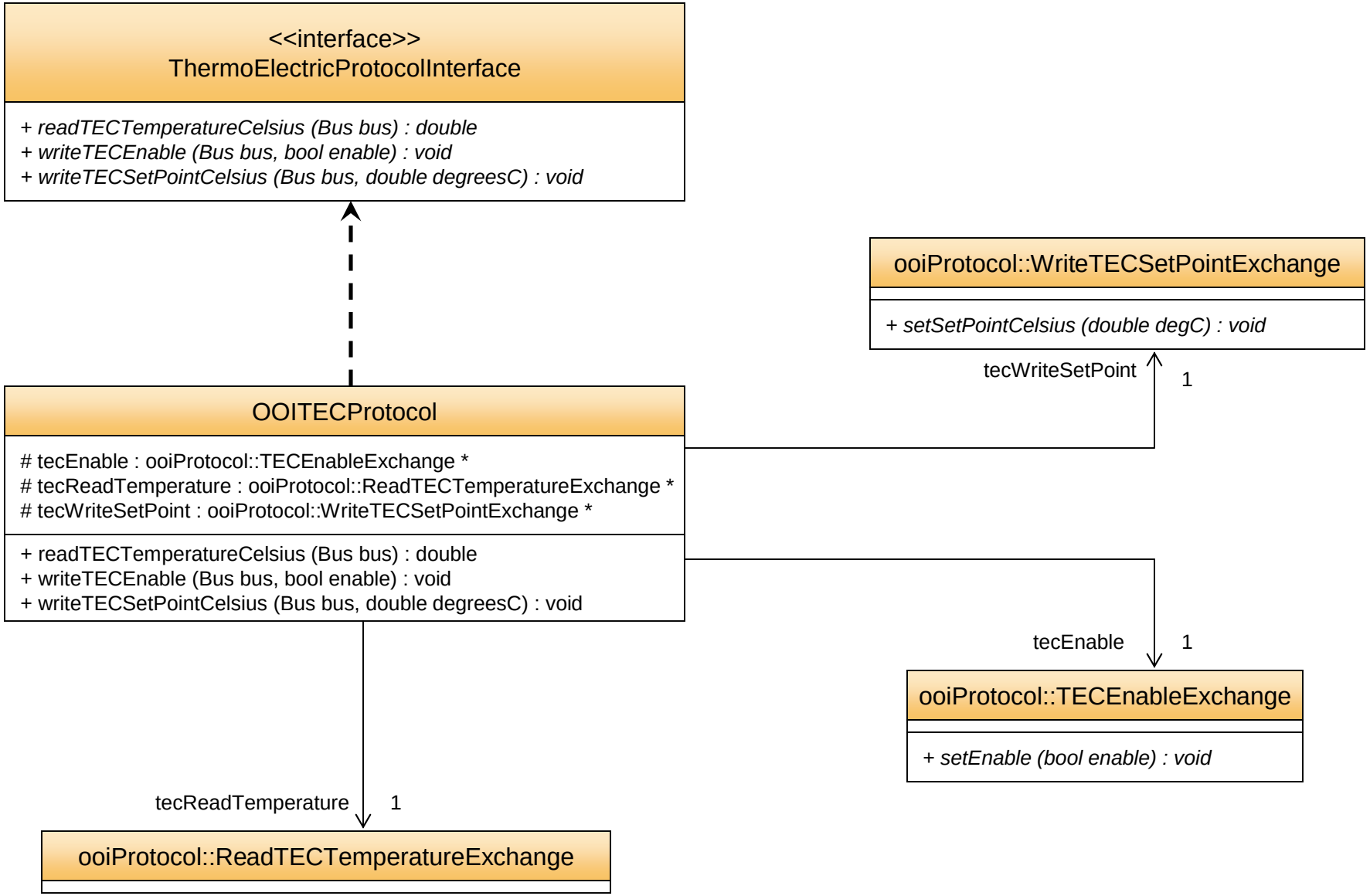

ooiProtocol::OpCodes
+ OP_ITIME : byte
+ OP_STROBE : byte
+ OP_GETINFO : byte
+ OP_REQUESTSPEC : byte
+ OP_TECENABLE_QE : byte
+ OP_READTEC_QE : byte
+ OP_TECSETTEMP_QE : byte
OOIUSBEndpointMap
highSpeedIn : int
highSpeedIn2 : int
lowSpeedIn : int
lowSpeedOut : int
+ getHighSpeedInEP () : int
+ getHighSpeedIn2EP () : int
+ getLowSpeedInEP () : int
+ getLowSpeedOutEP () : int
OOIUSBFPGAEndpointMap
OOIUSBLegacy2KEndpointMap
endpoints
1
endpoints
1
HR4000USB
NIRQuest512USB
MayaPro2000USB
NIRQuest256USB
Maya2000USB
QE65000USB
HR2000PlusUSB
HR2000USB

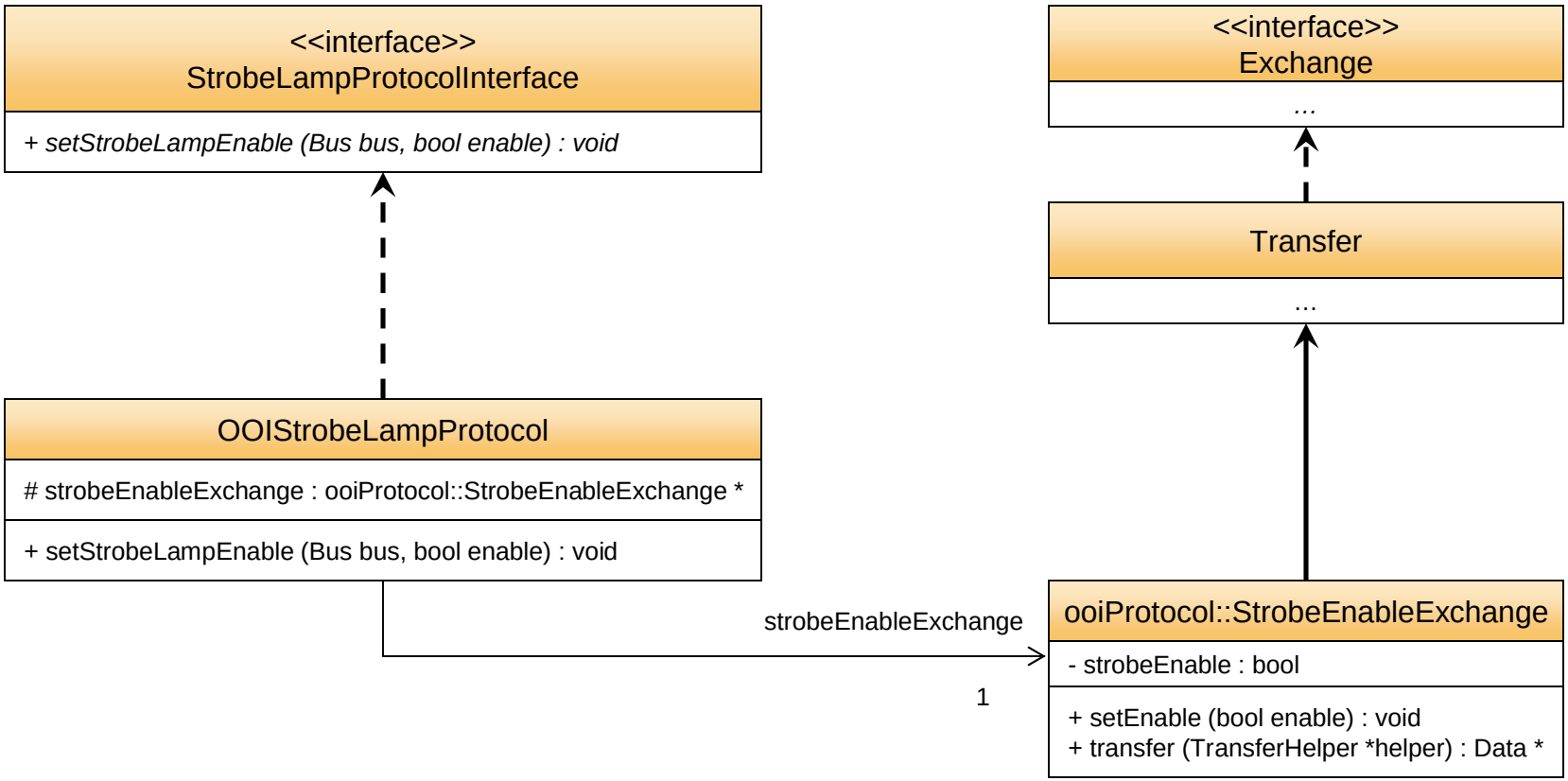

<<interface>>
Exchange
+ getHints () : vector<ProtocolHint *>
+ transfer (TransferHelper *helper) : Data *
Transaction
hints : vector<ProtocolHint *>
transfers : vector<Transfer *>
+ addTransfer (Transfer *xfer) : void
+ getHints() : vector<ProtocolHint *>
+ transfer (TransferHelper *helper) : Data *
# updateHints () : void
transfers
0..*
Transfer
+ TO_DEVICE : direction_t
+ FROM_DEVICE : direction_t
# buffer : vector<byte> *
# direction : direction_t
# hints : vector<ProtocolHint *> *
# length : unsigned int
# checkBufferSize() : void
+ getHints() : vector<ProtocolHint *>
+ transfer (TransferHelper *helper) : Data *
ooiProtocol::ReadSpectrumExchange
numberOfPixels : int
ooiProtocol::IntegrationTimeExchange
integrationTimeBase_usec : unsigned long
integrationTime_usec : unsigned long
+ setIntegrationTimeMicros (unsigned long t) : void
+ transfer (TransferHelper *helper) : Data *
ooiProtocol::RequestSpectrumExchange
ooiProtocol::FPGASpectrumExchange
+ transfer (TransferHelper *helper) : Data *
ooiProtocol::OOI2KSpectrumExchange
+ transfer (TransferHelper *helper) : Data *
ooiProtocol::HRFPGASpectrumExchange
+ transfer (TransferHelper *helper) : Data *
ooiProtocol::QESpectrumExchange
+ transfer (TransferHelper *helper) : Data *

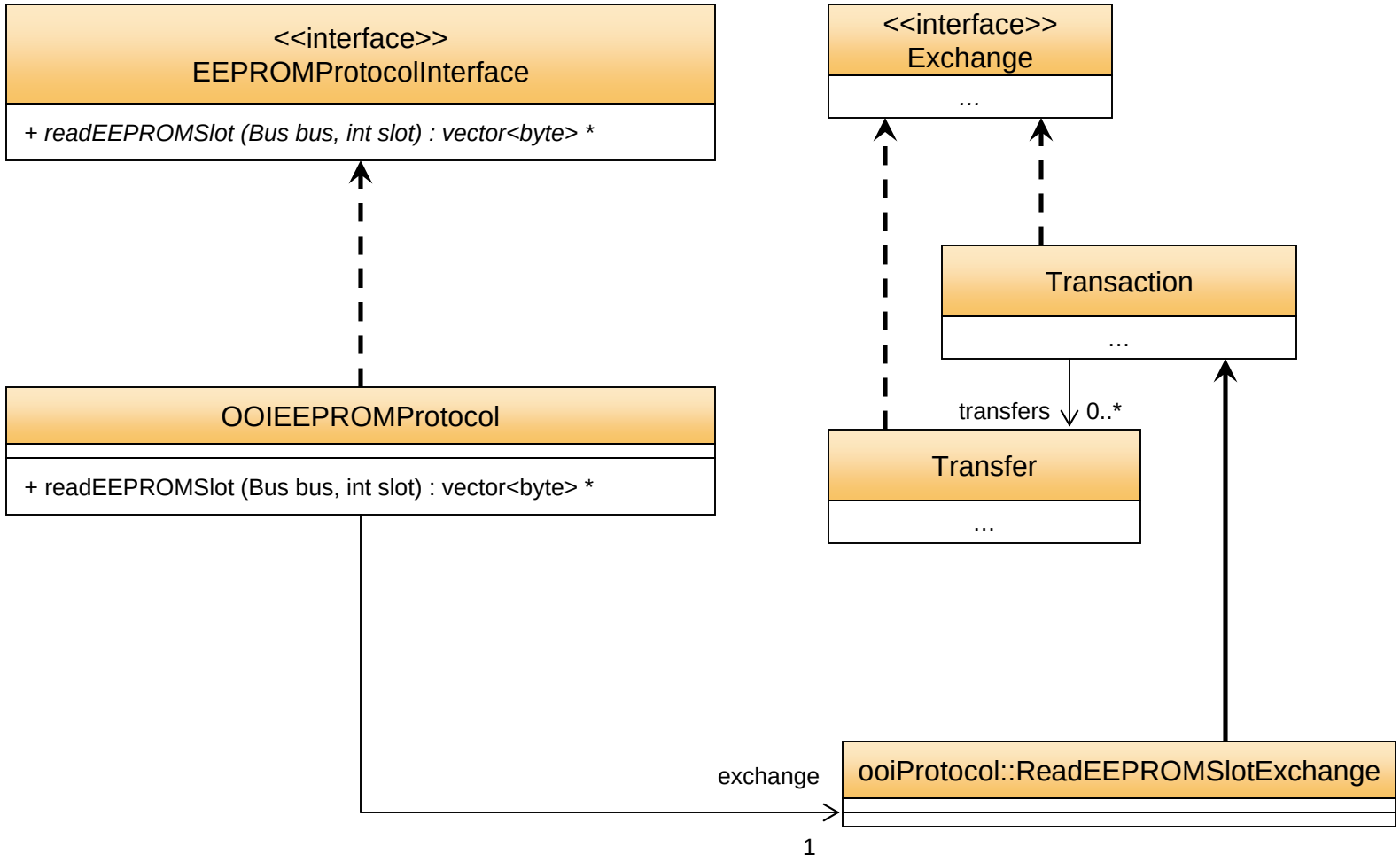

ProtocolHelper
protocol : Protocol
+ getProtocol() : Protocol
1
Protocol
id : int
+ equals (Protocol that) : bool
Feature
protocols : vector<Protocol *>
lookupProtocolImpl (Protocol) : ProtocolHelper *
<<interface>>
SpectrometerProtocolInterface
...
OOISpectrometerProtocol
...
1
protocolImpl
OOISpectrometerFeature
...
<<interface>>
EEPROMProtocolInterface
...
OOIEEPROMProtocol
...
1
protocolImpl
EEPROMSlotFeatureBase
...
<<interface>>
ThermoElectricProtocolInterface
...
OOITECProtocol
...
1
protocolImpl
ThermoElectricQEFeature
...
<<interface>>
StrobeLampProtocolInterface
...
OOIStrobeLampProtocol
...
1
protocolImpl
StrobeLampFeature
...

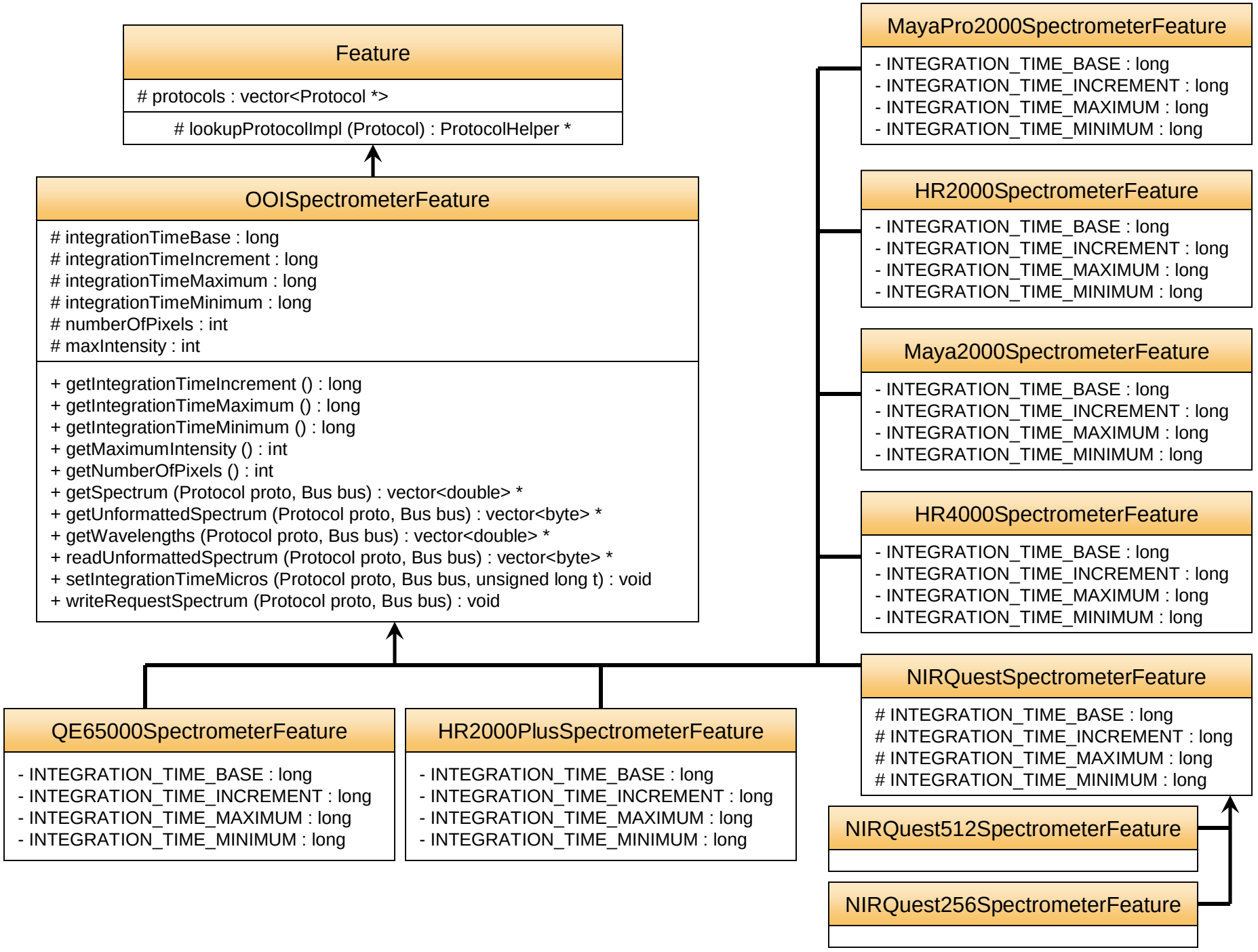

<<interface>>
SpectrometerProtocolInterface
+ readSpectrum (Bus bus) : vector<double> *
+ readUnformattedSpectrum (Bus bus) : vector<byte> *
+ requestSpectrum (Bus bus) : void
+ setIntegrationTimeMicros (Bus bus, unsigned long t) : void
ooiProtocol::IntegrationTimeExchange
...
requestSpectrumExchange
1
OOISpectrometerProtocol
integrationTimeExchange : ooiProtocol::IntegrationTimeExchange *
requestSpectrumExchange : Transfer *
spectrumTransferExchange : Transfer *
unformattedSpectrumExchange : Transfer *
+ readSpectrum (Bus bus) : vector<double> *
+ readUnformattedSpectrum (Bus bus) : vector<byte> *
+ requestSpectrum (Bus bus) : void
+ setIntegrationTimeMicros (Bus bus, unsigned long t) : void
requestSpectrumExchange
1
unformattedSpectrumExchange
1
spectrumTransferExchange
1
ooiProtocol::ReadSpectrumExchange
...
ooiProtocol::RequestSpectrumExchange

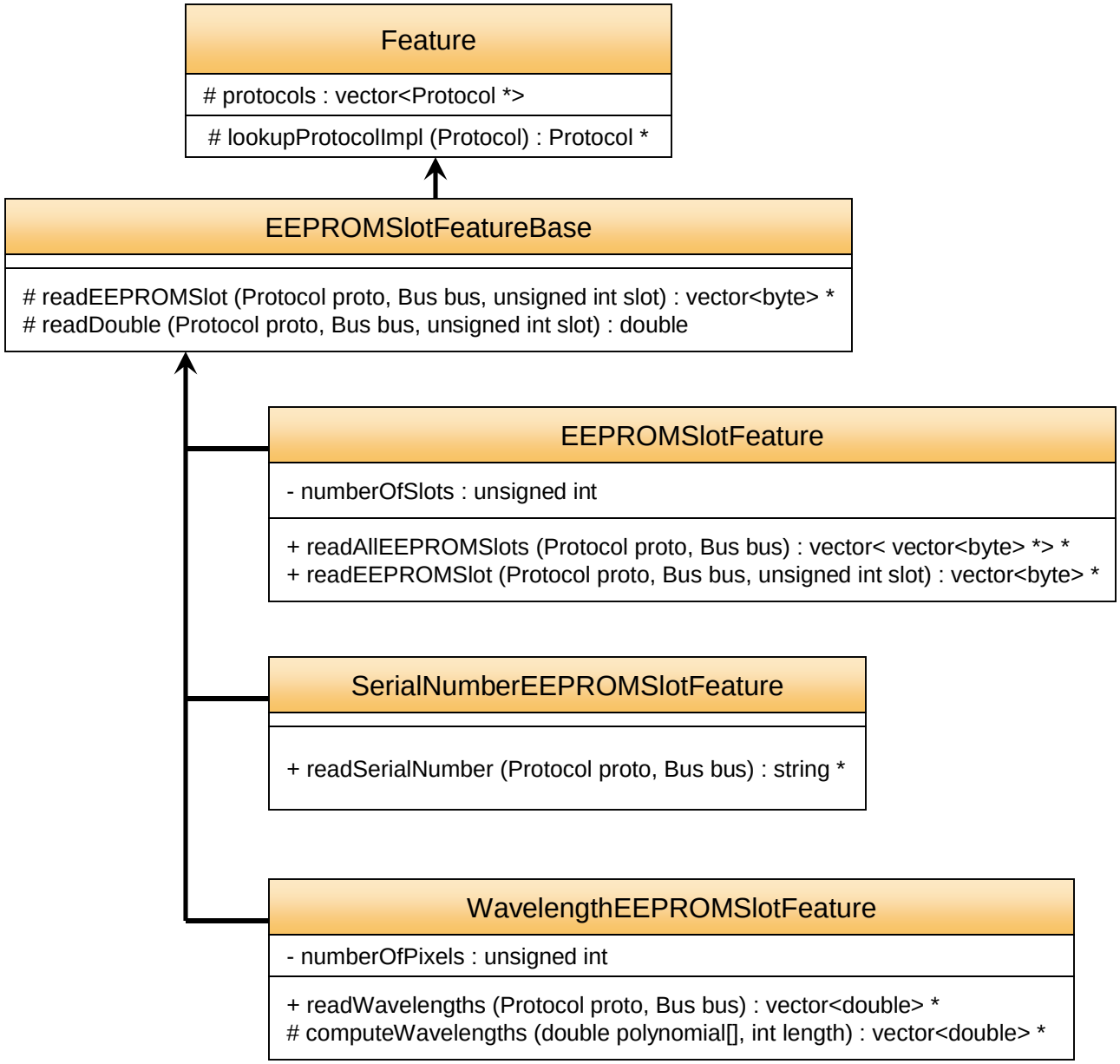

<<interface>>
Exchange
...
Transfer
...
ooiProtocol::ReadTECTemperatureExchange
ooiProtocol::WriteTECSetPointExchange
+ setSetPointCelsius (double degC) : void
ooiProtocol::TECEnableExchange
+ setEnable (bool enable) : void
ooiProtocol::WriteTECQESetPointExchange
- tecCounts : int
+ setSetPointCelsius (double degC) : void
+ transfer (TransferHelper *helper) : Data *
ooiProtocol::ReadTECQETemperatureExchange
+ transfer (TransferHelper *helper) : Data *
ooiProtocol::TECQEEnableExchange
- tecEnable : bool
+ enable (bool enable) : void
+ transfer (TransferHelper *helper) : Data *

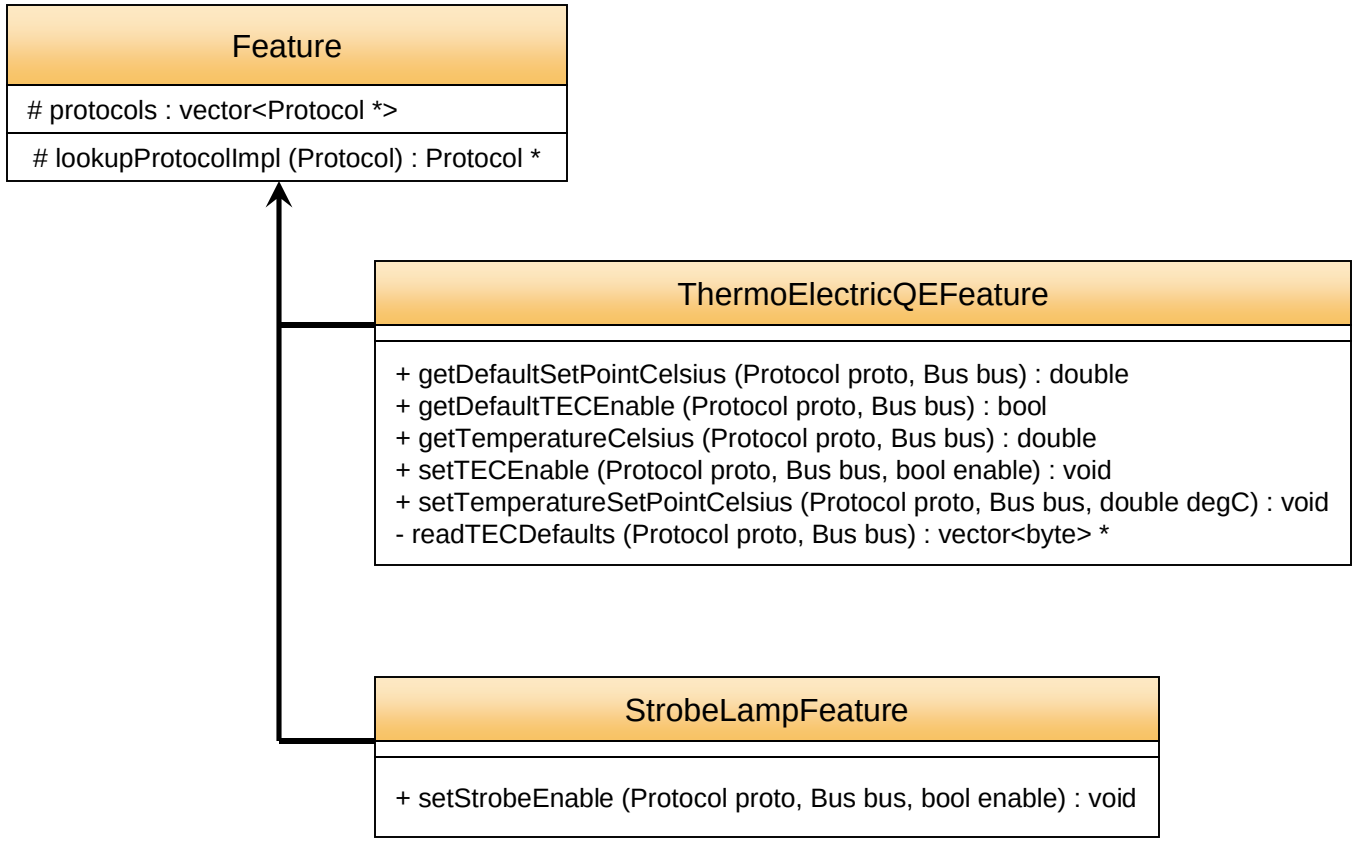

<<interface>>
ThermoElectricProtocolInterface
+ readTECTemperatureCelsius (Bus bus) : double
+ writeTECEnable (Bus bus, bool enable) : void
+ writeTECSetPointCelsius (Bus bus, double degreesC) : void
ooiProtocol::WriteTECSetPointExchange
+ setSetPointCelsius (double degC) : void
tecWriteSetPoint
1
OOITECProtocol
tecEnable : ooiProtocol::TECEnableExchange *
tecReadTemperature : ooiProtocol::ReadTECTemperatureExchange *
tecWriteSetPoint : ooiProtocol::WriteTECSetPointExchange *
+ readTECTemperatureCelsius (Bus bus) : double
+ writeTECEnable (Bus bus, bool enable) : void
+ writeTECSetPointCelsius (Bus bus, double degreesC) : void
tecEnable
1
ooiProtocol::TECEnableExchange
+ setEnable (bool enable) : void
tecReadTemperature
1
ooiProtocol::ReadTECTemperatureExchange

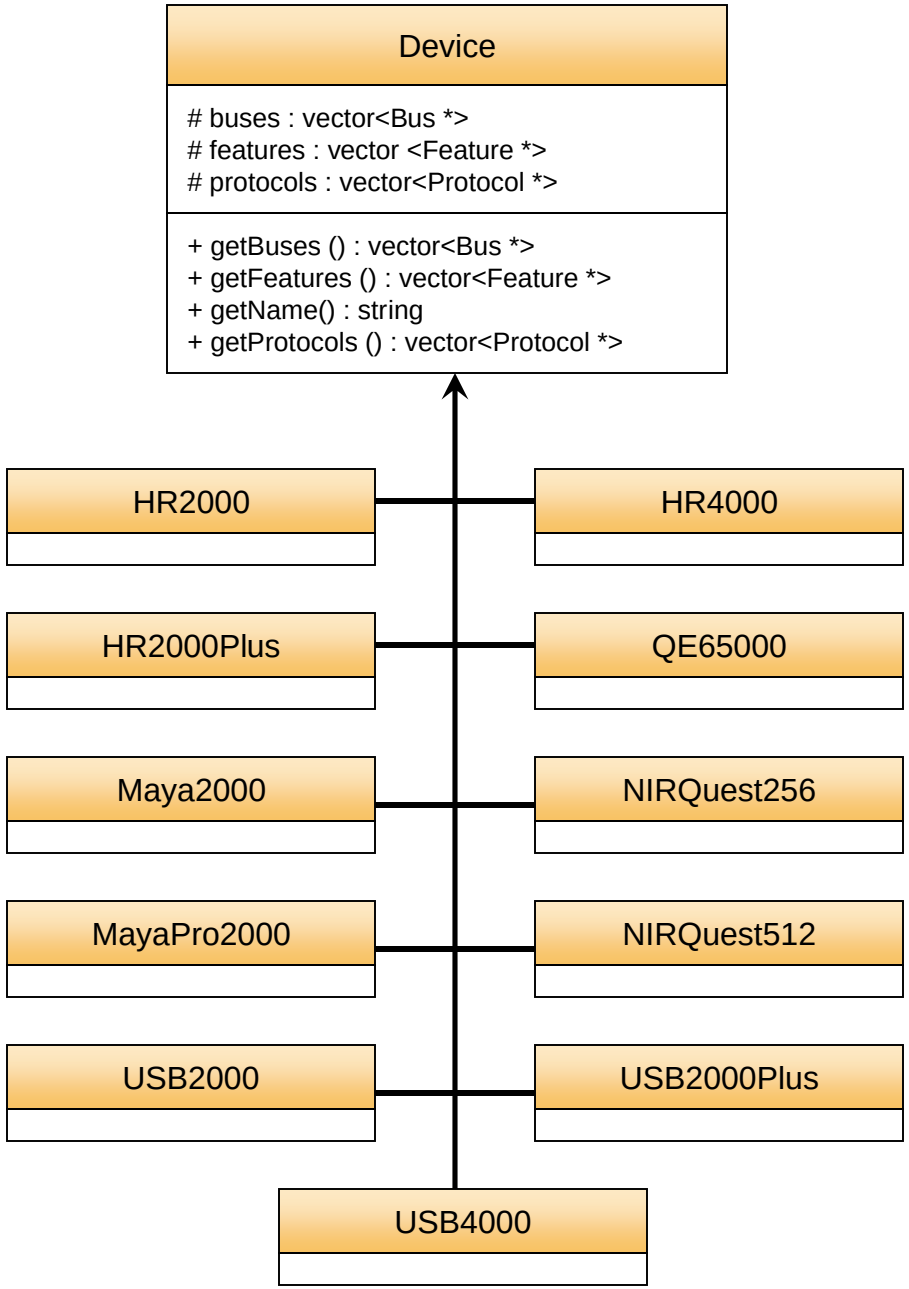

<<interface>>
StrobeLampProtocolInterface
+ setStrobeLampEnable (Bus bus, bool enable) : void
<<interface>>
Exchange
...
Transfer
...
OOIStrobeLampProtocol
strobeEnableExchange : ooiProtocol::StrobeEnableExchange *
+ setStrobeLampEnable (Bus bus, bool enable) : void
strobeEnableExchange
1
ooiProtocol::StrobeEnableExchange
- strobeEnable : bool
+ setEnable (bool enable) : void
+ transfer (TransferHelper *helper) : Data *


<<interface>>
EEPROMProtocolInterface
+ readEEPROMSlot (Bus bus, int slot) : vector<byte> *
<<interface>>
Exchange
...
Transaction
...
transfers
0..*
Transfer
...
OOIEEPROMProtocol
+ readEEPROMSlot (Bus bus, int slot) : vector<byte> *
exchange
1
ooiProtocol::ReadEEPROMSlotExchange

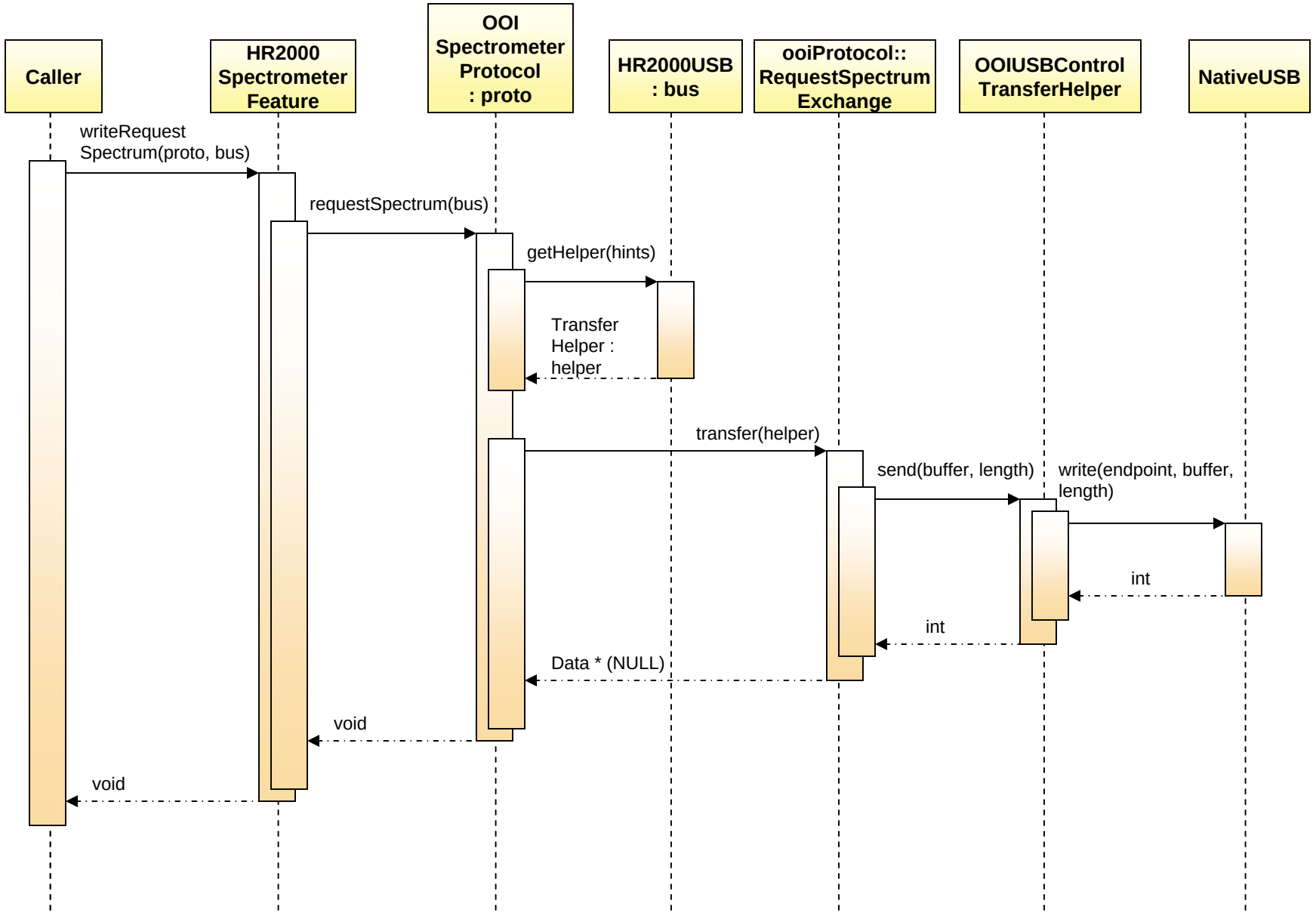

Feature
protocols : vector<Protocol *>
lookupProtocolImpl (Protocol) : ProtocolHelper *
OOISpectrometerFeature
integrationTimeBase : long
integrationTimeIncrement : long
integrationTimeMaximum : long
integrationTimeMinimum : long
numberOfPixels : int
maxIntensity : int
+ getIntegrationTimeIncrement () : long
+ getIntegrationTimeMaximum () : long
+ getIntegrationTimeMinimum () : long
+ getMaximumIntensity () : int
+ getNumberOfPixels () : int
+ getSpectrum (Protocol proto, Bus bus) : vector<double> *
+ getUnformattedSpectrum (Protocol proto, Bus bus) : vector<byte> *
+ getWavelengths (Protocol proto, Bus bus) : vector<double> *
+ readUnformattedSpectrum (Protocol proto, Bus bus) : vector<byte> *
+ setIntegrationTimeMicros (Protocol proto, Bus bus, unsigned long t) : void
+ writeRequestSpectrum (Protocol proto, Bus bus) : void
QE65000SpectrometerFeature
- INTEGRATION_TIME_BASE : long
- INTEGRATION_TIME_INCREMENT : long
- INTEGRATION_TIME_MAXIMUM : long
- INTEGRATION_TIME_MINIMUM : long
HR2000PlusSpectrometerFeature
- INTEGRATION_TIME_BASE : long
- INTEGRATION_TIME_INCREMENT : long
- INTEGRATION_TIME_MAXIMUM : long
- INTEGRATION_TIME_MINIMUM : long
MayaPro2000SpectrometerFeature
- INTEGRATION_TIME_BASE : long
- INTEGRATION_TIME_INCREMENT : long
- INTEGRATION_TIME_MAXIMUM : long
- INTEGRATION_TIME_MINIMUM : long
HR2000SpectrometerFeature
- INTEGRATION_TIME_BASE : long
- INTEGRATION_TIME_INCREMENT : long
- INTEGRATION_TIME_MAXIMUM : long
- INTEGRATION_TIME_MINIMUM : long
Maya2000SpectrometerFeature
- INTEGRATION_TIME_BASE : long
- INTEGRATION_TIME_INCREMENT : long
- INTEGRATION_TIME_MAXIMUM : long
- INTEGRATION_TIME_MINIMUM : long
HR4000SpectrometerFeature
- INTEGRATION_TIME_BASE : long
- INTEGRATION_TIME_INCREMENT : long
- INTEGRATION_TIME_MAXIMUM : long
- INTEGRATION_TIME_MINIMUM : long
NIRQuestSpectrometerFeature
INTEGRATION_TIME_BASE : long
INTEGRATION_TIME_INCREMENT : long
INTEGRATION_TIME_MAXIMUM : long
INTEGRATION_TIME_MINIMUM : long
NIRQuest512SpectrometerFeature
NIRQuest256SpectrometerFeature


Feature
protocols : vector<Protocol *>
lookupProtocolImpl (Protocol) : Protocol *
EEPROMSlotFeatureBase
readEEPROMSlot (Protocol proto, Bus bus, unsigned int slot) : vector<byte> *
readDouble (Protocol proto, Bus bus, unsigned int slot) : double
EEPROMSlotFeature
- numberOfSlots : unsigned int
+ readAllEEPROMSlots (Protocol proto, Bus bus) : vector< vector<byte> *> *
+ readEEPROMSlot (Protocol proto, Bus bus, unsigned int slot) : vector<byte> *
SerialNumberEEPROMSlotFeature
+ readSerialNumber (Protocol proto, Bus bus) : string *
WavelengthEEPROMSlotFeature
- numberOfPixels : unsigned int
+ readWavelengths (Protocol proto, Bus bus) : vector<double> *
# computeWavelengths (double polynomial[], int length) : vector<double> *

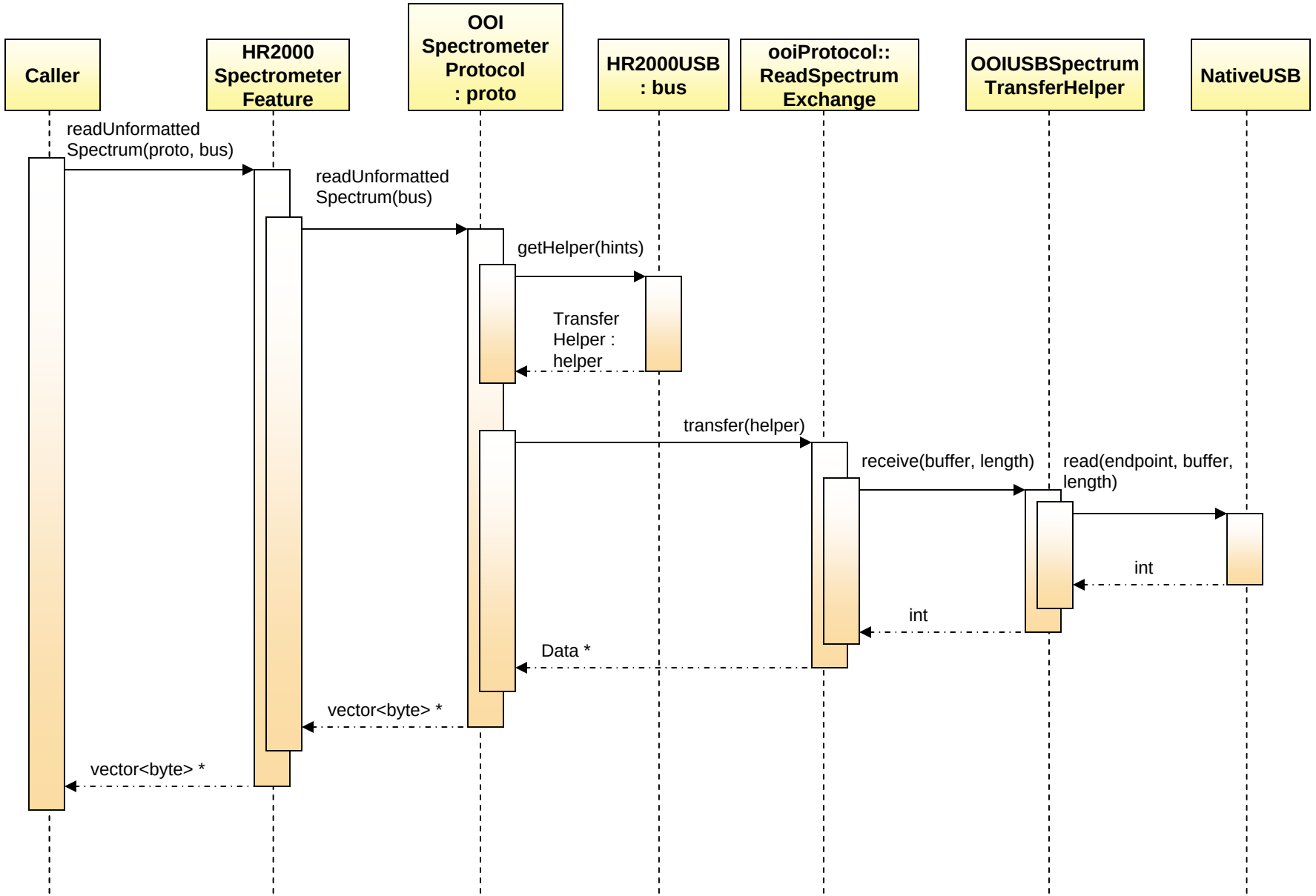

Feature
protocols : vector<Protocol *>
lookupProtocolImpl (Protocol) : Protocol *
ThermoElectricQEFeature
+ getDefaultSetPointCelsius (Protocol proto, Bus bus) : double
+ getDefaultTECEnable (Protocol proto, Bus bus) : bool
+ getTemperatureCelsius (Protocol proto, Bus bus) : double
+ setTECEnable (Protocol proto, Bus bus, bool enable) : void
+ setTemperatureSetPointCelsius (Protocol proto, Bus bus, double degC) : void
- readTECDefaults (Protocol proto, Bus bus) : vector<byte> *
StrobeLampFeature
+ setStrobeEnable (Protocol proto, Bus bus, bool enable) : void


Device
buses : vector<Bus *>
features : vector <Feature *>
protocols : vector<Protocol *>
+ getBuses () : vector<Bus *>
+ getFeatures () : vector<Feature *>
+ getName() : string
+ getProtocols () : vector<Protocol *>
HR2000
HR4000
HR2000Plus
QE65000
Maya2000
NIRQuest256
MayaPro2000
NIRQuest512
USB2000
USB2000Plus
USB4000

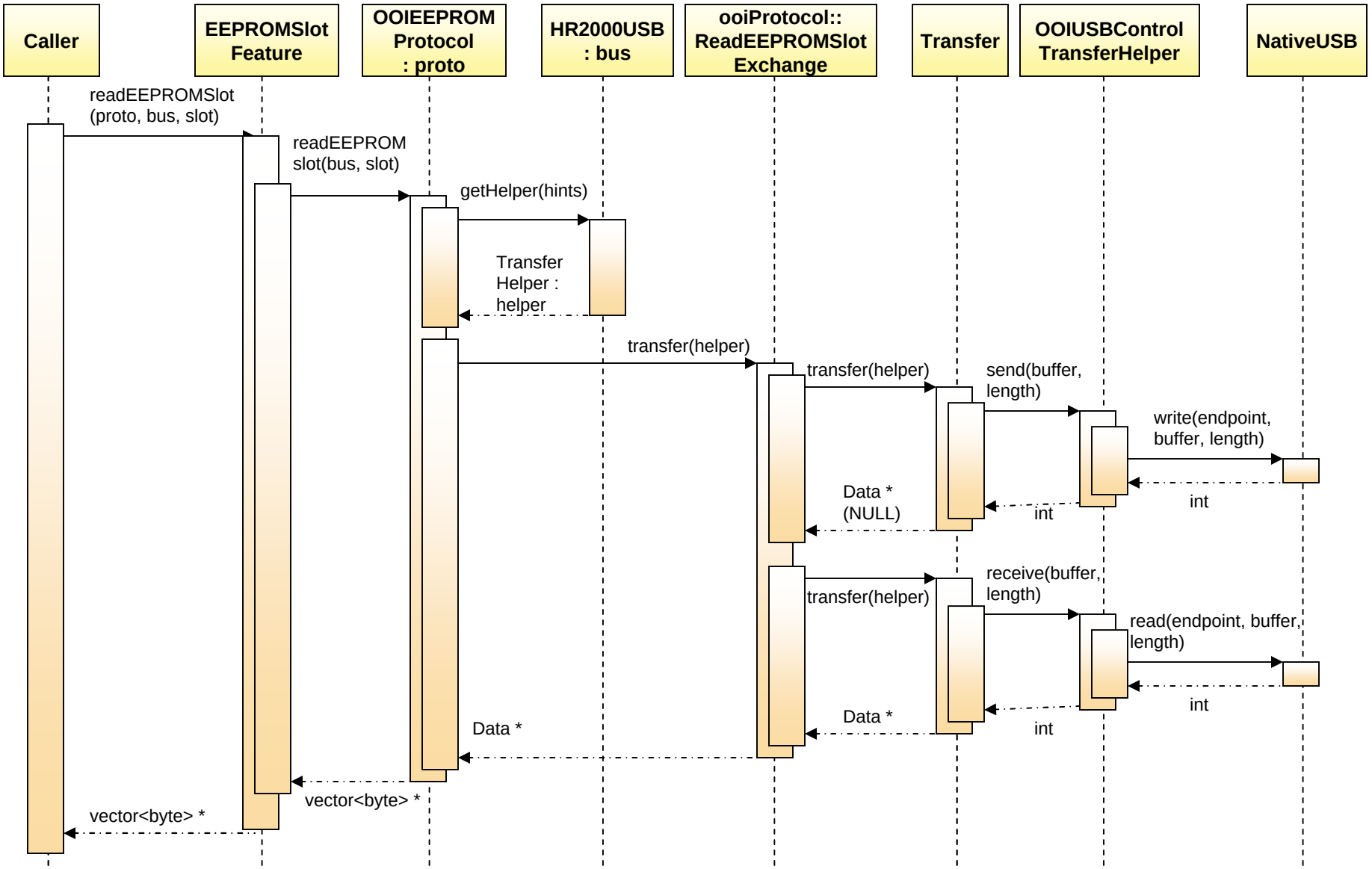
HR2000 Spectrum Request (simple write)



HR2000 Spectrum Read (simple read)



HR2000 EEPROM Read (write/read)



HR2000 Set Lamp Enable (value write)