

TCAL Calibration Engine

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Purpose

Give an overview on how to use, showing simplified extracted code

Followed by practical exercise with Ralf Plag on Mapped2Cal conversion

Not to duplicate the code

Multiple detectors use the same algorithm for time calibration

Create one implementation in a library, easy to use and reliable

With extra functionality to allow “human-like” operations on a binary ROOT file

Usage in calibration task:

2 Stages

I. Mapped2CalPar

II. Mapped2Cal

I. Calculate parameters: Mapped2CalPar

1. Create parameter container

Init()

2. Fill TDC values

Exec()

// Event loop

3. Calculate calibration parameters

FinishTask()

1. Init()

```
fCal_Par = (R3BTCalPar*) FairRuntimeDb::instance()->getContainer( // Create parameter
"LandTCalPar"); // container

fCal_Par->setChanged();

fEngine = new R3BTCalEngine(fCal_Par, fMinStats); // Create TCAL engine
```

2. Exec()

```
// Loop over mapped data
{
    fEngine->Fill(iPlane, iPaddle, iSide, hit->GetTacData());    // Stores TDC value of current module
}
```

3. FinishTask()

```
fEngine->CalculateParamTacquila();
```

```
// Calculate and store parameters,  
assuming Tacquila electronics
```

or

```
fEngine->CalculateParamVFTX();
```

```
// VFTX electronics
```


II. Apply parameters: Mapped2Cal

1. Read parameters

SetParContainers()

2. Apply them for calculation of time [ns]

Exec()

1. SetParContainers()

```
fCal_Par = (R3BTCalPar*)  
FairRuntimeDb::instance()->getContainer( "LandTCalPar");
```

```
// Get pointer to parameters
```

2. Exec()

```
// Loop over mapped data
{
    R3BTCalModulePar* par =                // Get parameters for the current module
fCal_Par->GetModuleParAt(iPlane, iPaddle,
iSide);

    Double_t time = par->GetTimeVFTX(tdc);  // Get time for the TDC channel
}
```

Insight

Open the ROOT file with parameters

Create new instance of TBrowser and navigate to the file

Right-click on the object (name which was used in `getContainer("...")`) for context menu

Available functions

printParams

// Dump values for all modules

PrintModuleParams ... plane, paddle, side

// Dump values for a specific module

DrawModuleParams ... plane, paddle, side

// Display values graphically on a canvas

Advanced

One can manually change value for a specific module in some (range of) channel(s)

Instructions here:

Restricted document “Manually edit ROOT time calibration parameters” on the r3broot website