



LabVIEW solutions based on utilising Front Panel Object References

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Summary

- The lecture presents several advanced solutions utilising FP object references. Discussed examples consider reduction of SW development time, creation of convenient reusable procedures, code decomposition approaches and even design of macros-like UI behaviour. **The lecture is targeted to CLD-level developers while some of presented ideas could be interesting for CLAD or for CLA as well.**

Overview

- Utilising FP object references
- Reduction of SW development time:
 - convenient reusable procedures
 - code decomposition
 - at which cost?
- Examples... examples, examples

Content

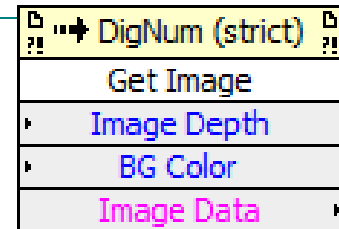
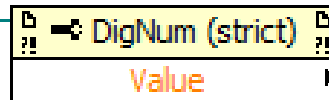
- Introduction
- Simple localisation example
- UI reference collector
- Initialisation of control
- Macros

Basics

Numeric



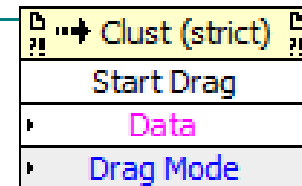
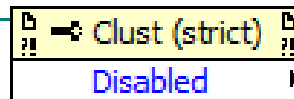
Numeric



Cluster



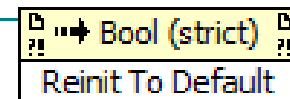
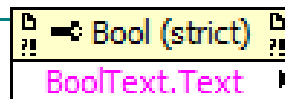
Cluster



Boolean



Boolean



Good programming practice

- ~~Readability~~

- ~~Maint~~

- ~~Exten~~

- Library VIs

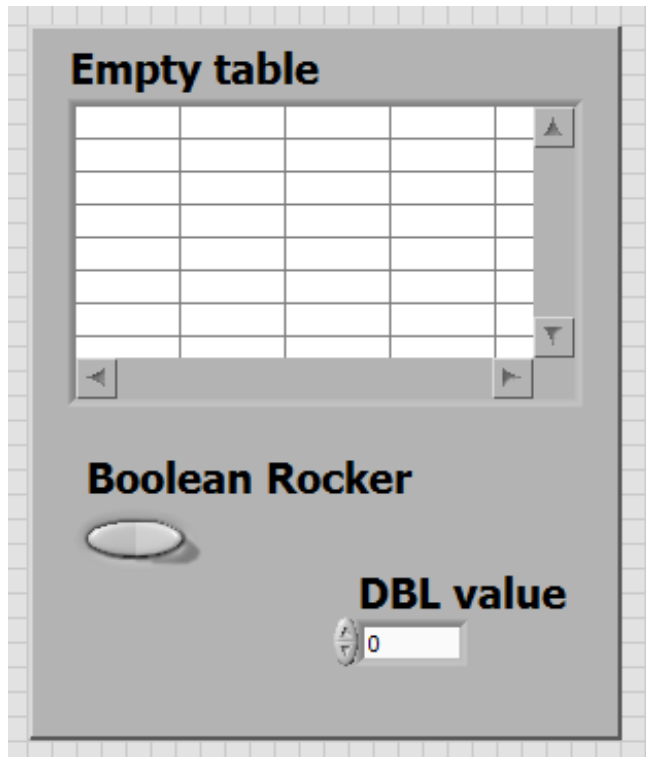
- Reliable library VIs

- Reusable VI-s

- Templates

Language Localiser

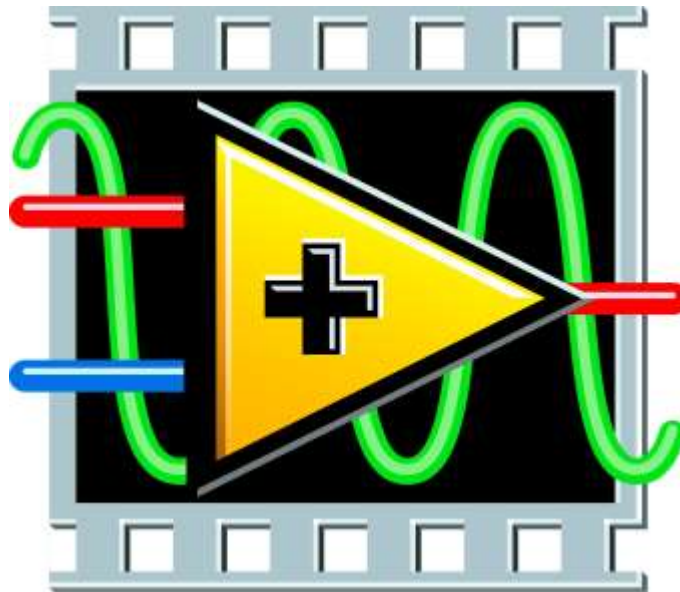
- Problem:
 - Changing SW language without altering the code



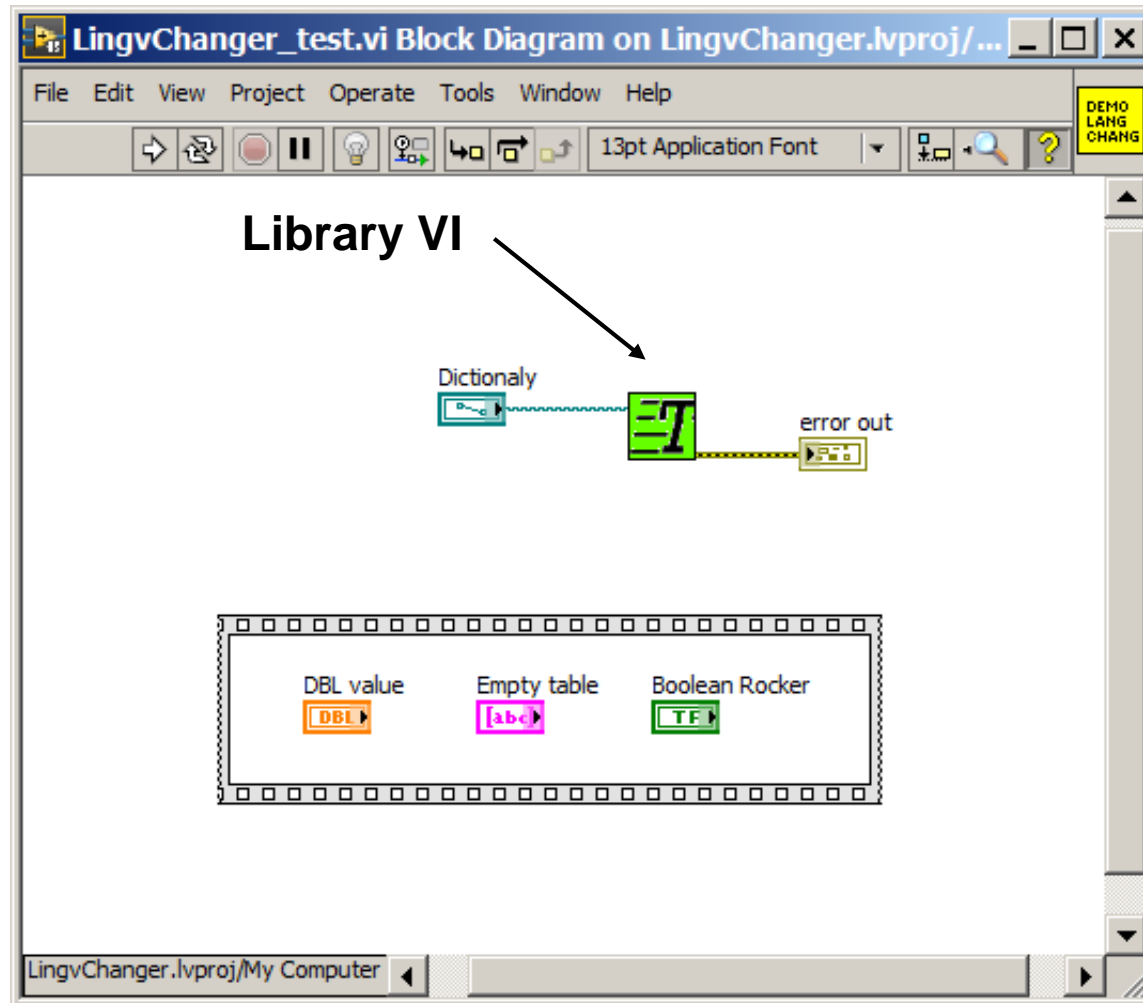
DBL value
Boolean Rocker
Empty table

DBL
Skinknutte
Tom tabell

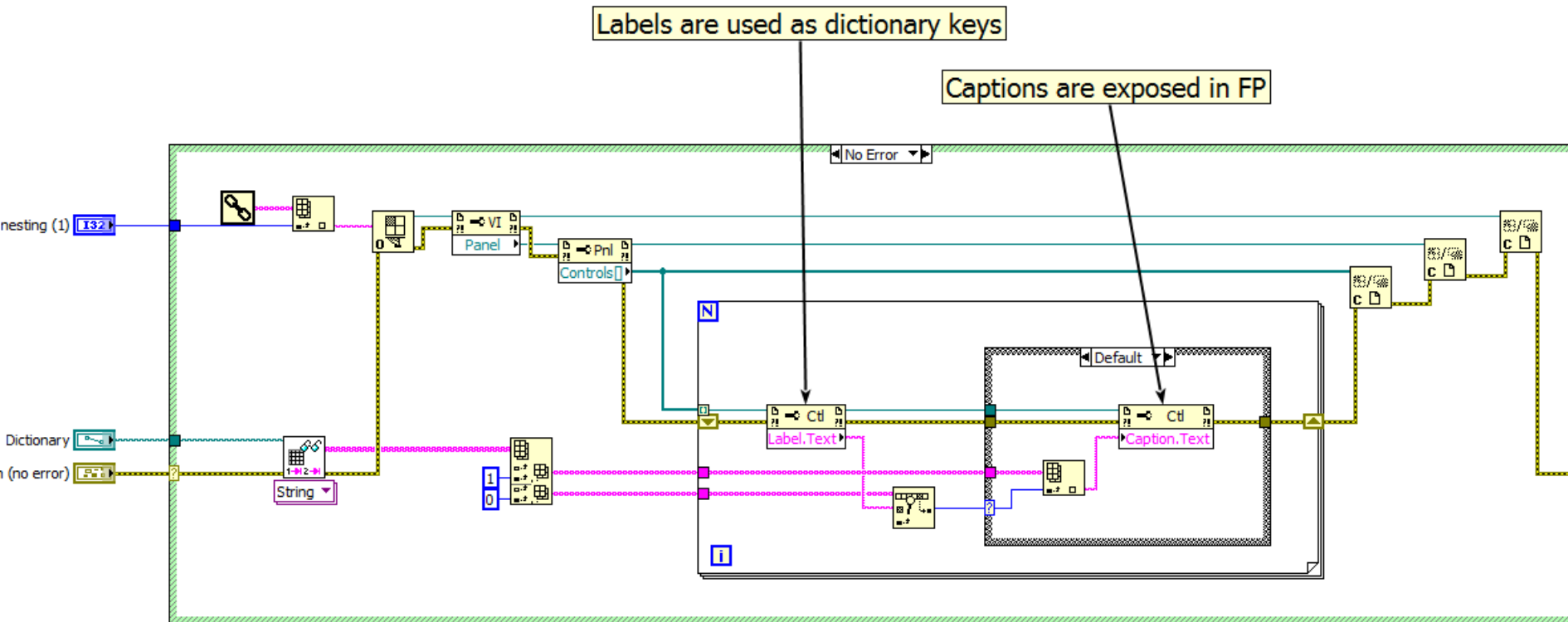
Language Localiser



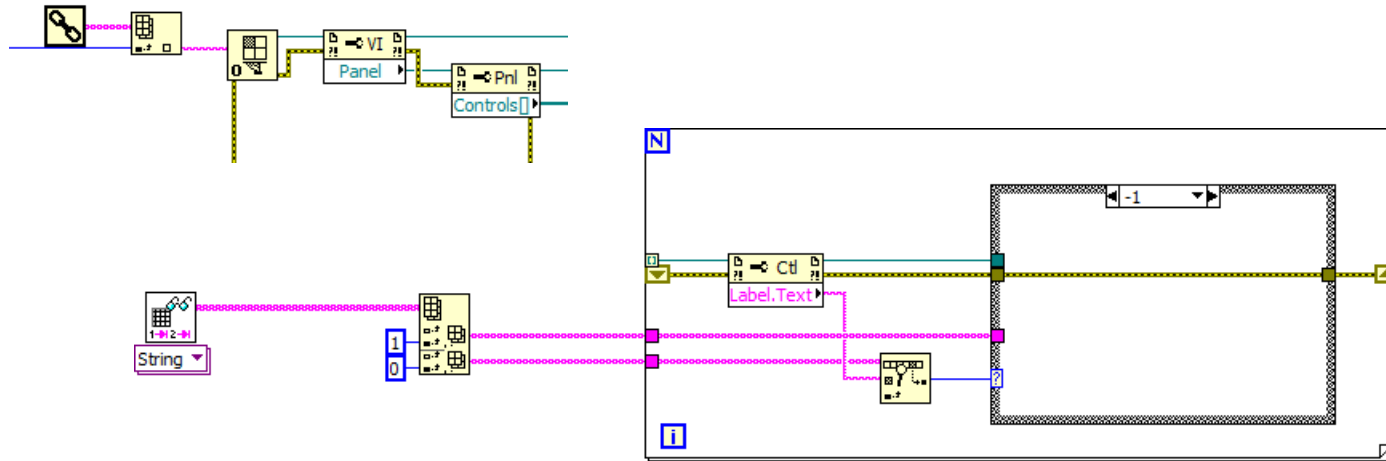
Language Localiser



Language Localiser

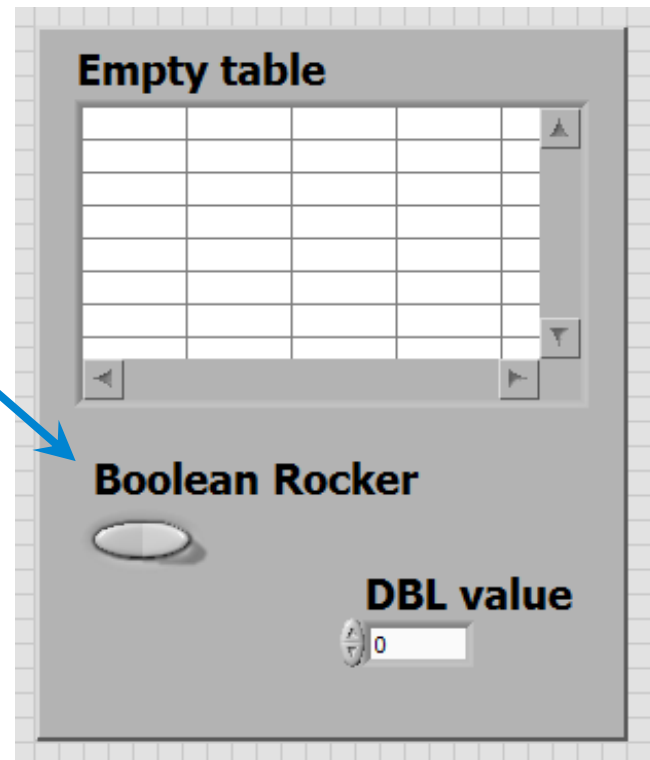


Language Localiser



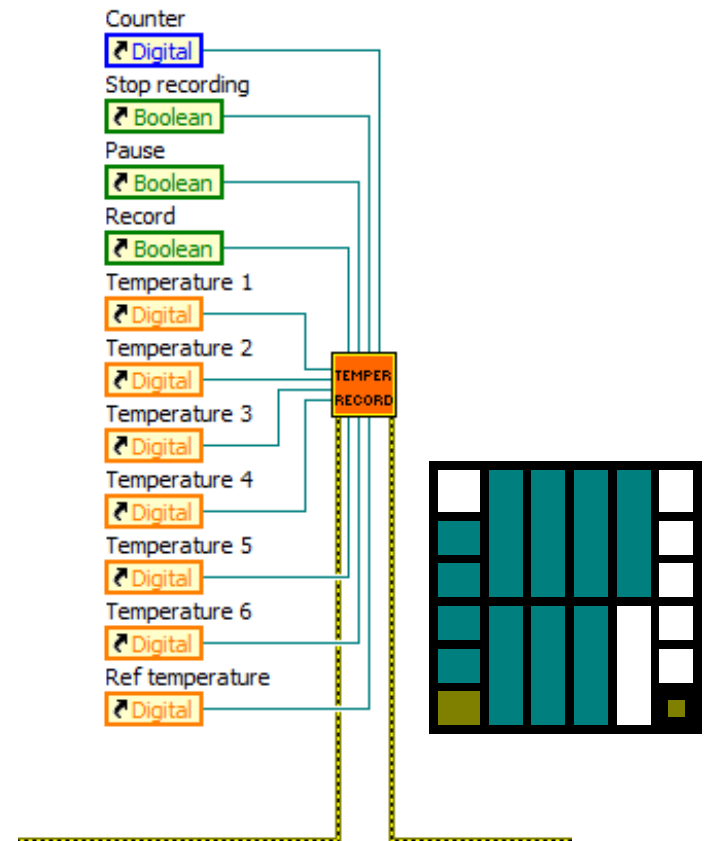
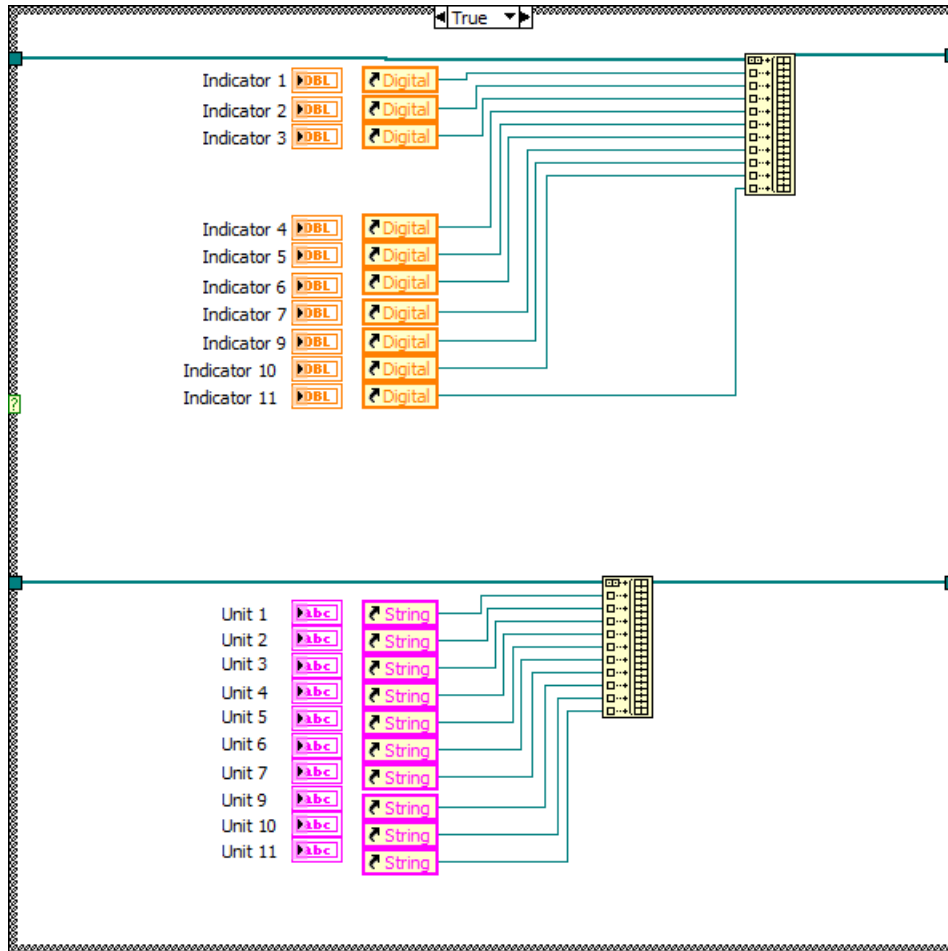
Language Localiser

- The only restrictions
 - Use unique Labels
 - Show Captions



The screenshot shows a software interface with a grid background. At the top, there is a section titled "Empty table" containing a 10x5 grid. Below the table is a "Boolean Rocker" control, which is a horizontal slider. To the right of the rocker is a label "DBL value" and a small input field containing the number "0". A blue arrow points from the "Show Captions" bullet point in the list to the "Boolean Rocker" control.

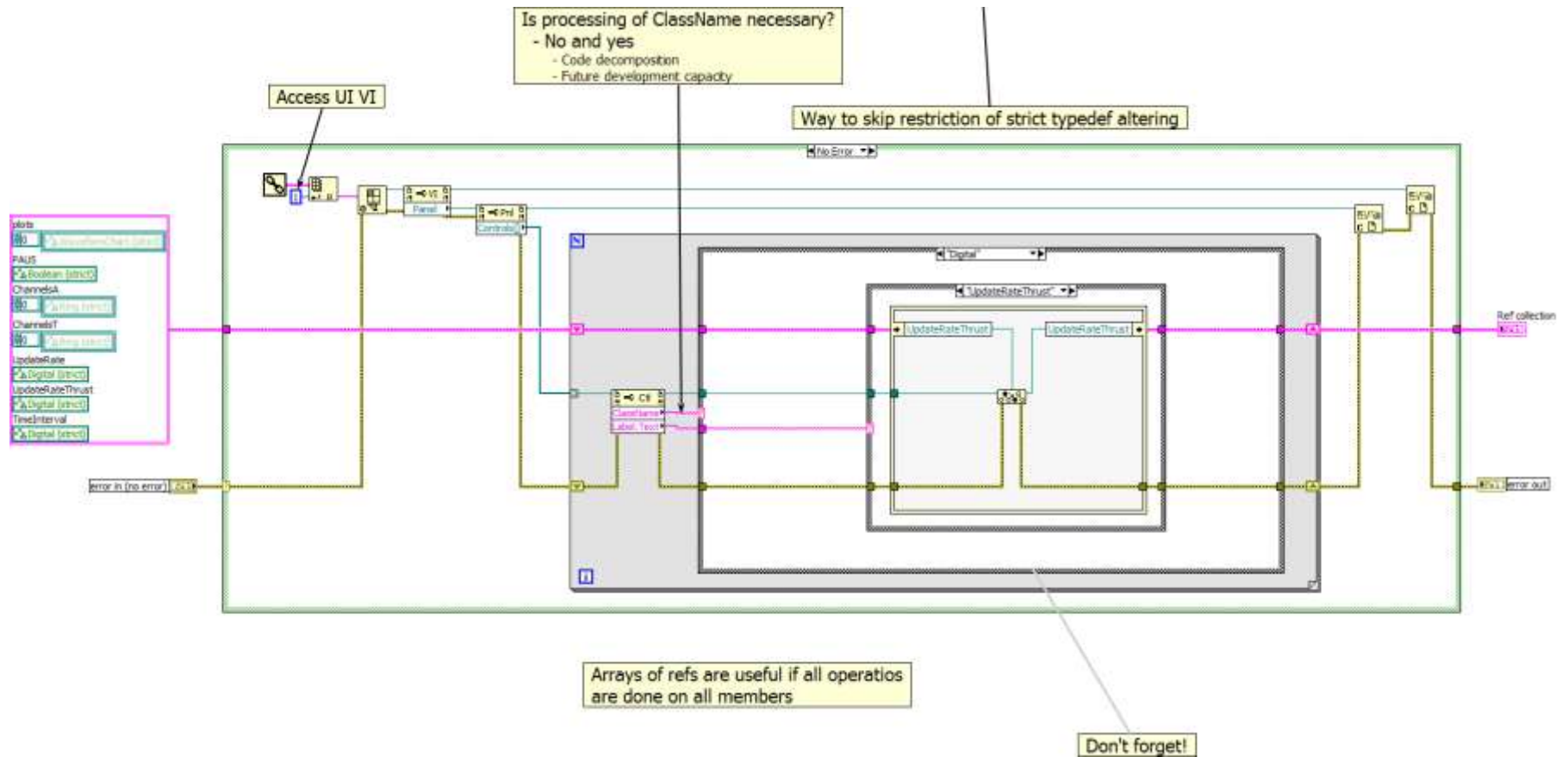
UI refs do code ugly?



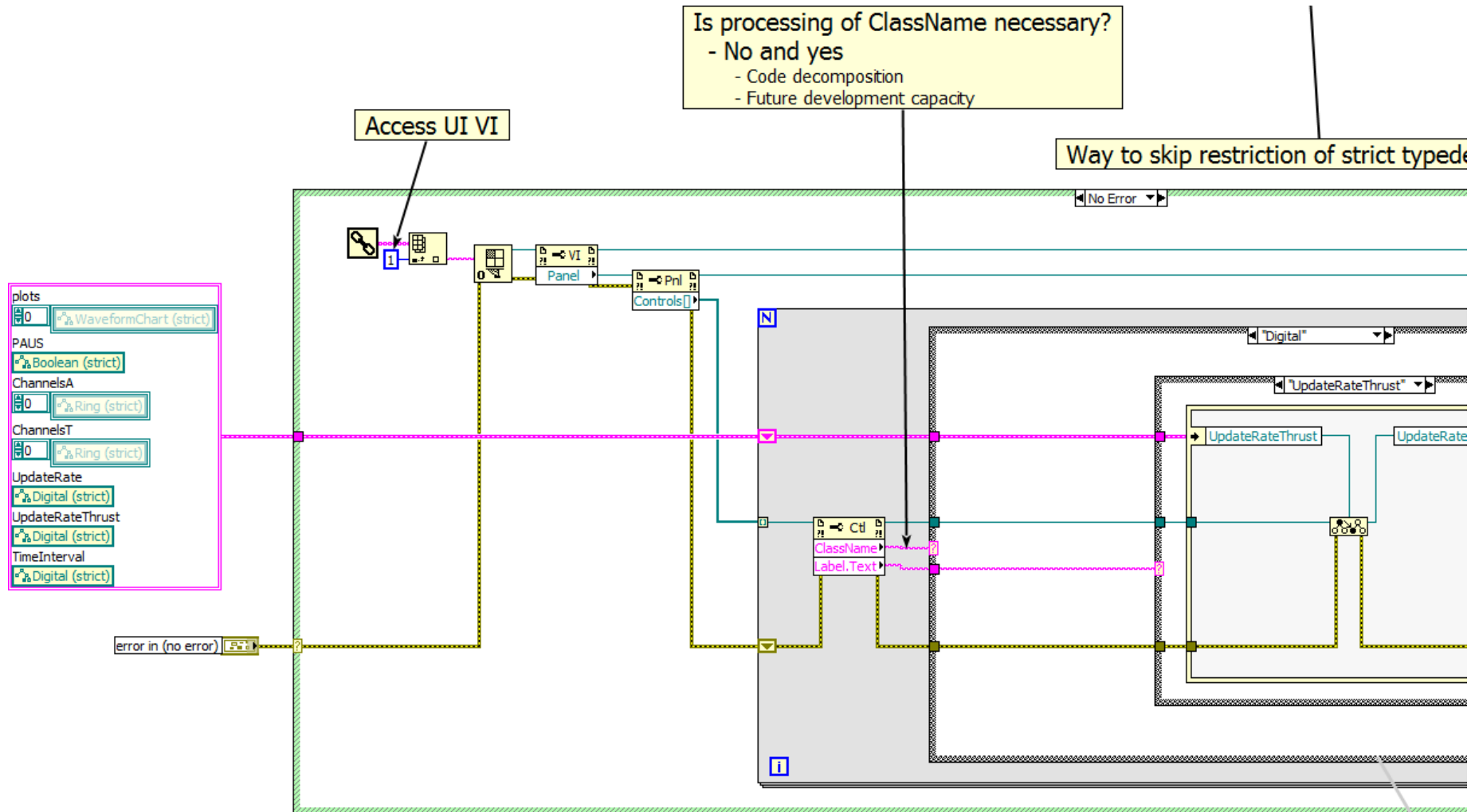
UI reference collector

- Problem:
 - Extensive UI VI almost always has too large BD
 - Sub-VI-s are difficult to use:
 - Terminals
 - Local variables
 - Property nodes

UI reference collector



UI reference collector



UI reference collector

plots

0 WaveformChart (strict)

PAUS

Boolean (strict)

ChannelsA

0 Ring (strict)

ChannelsT

0 Ring (strict)

UpdateRate

Digital (strict)

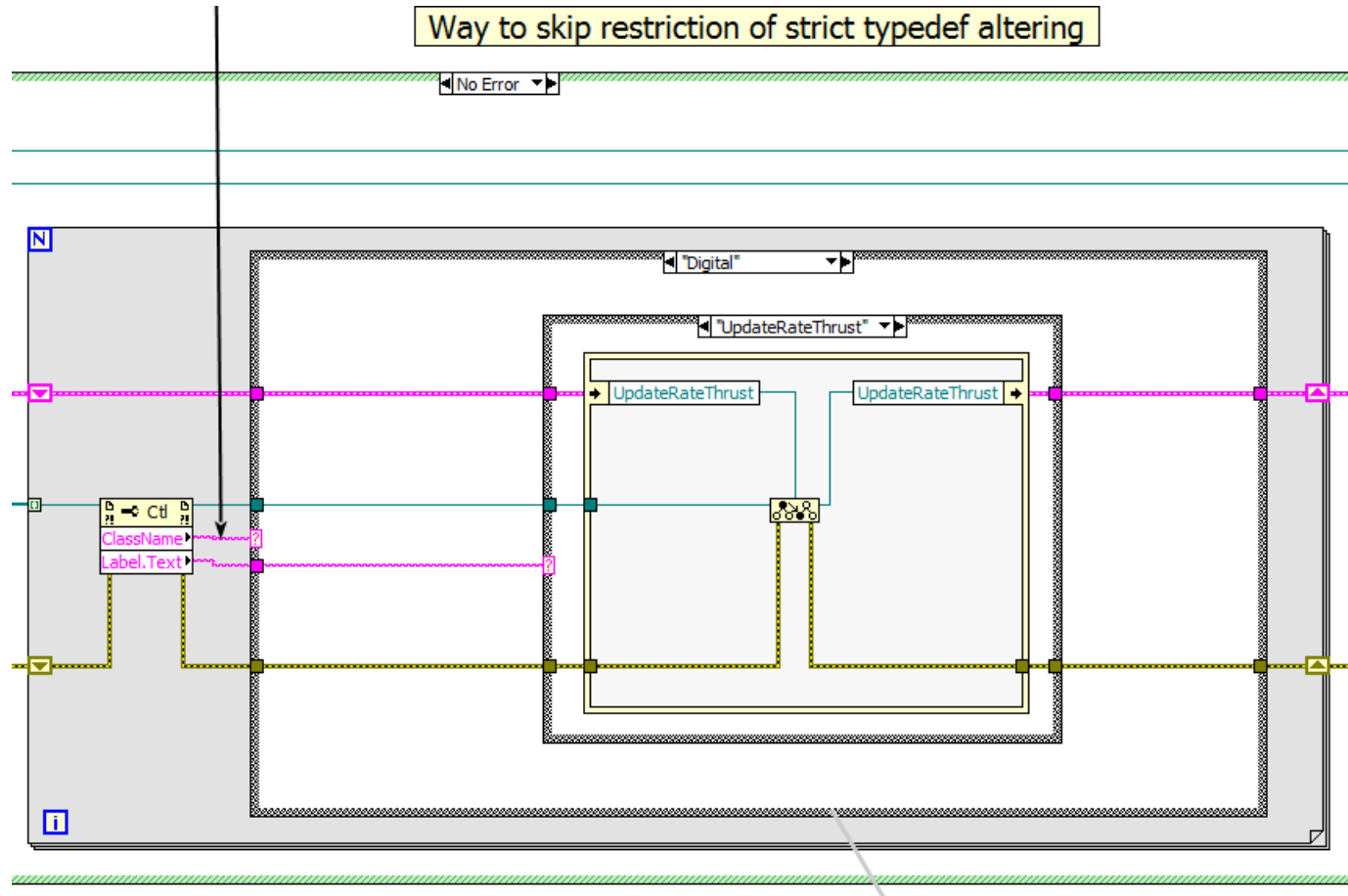
UpdateRateThrust

Digital (strict)

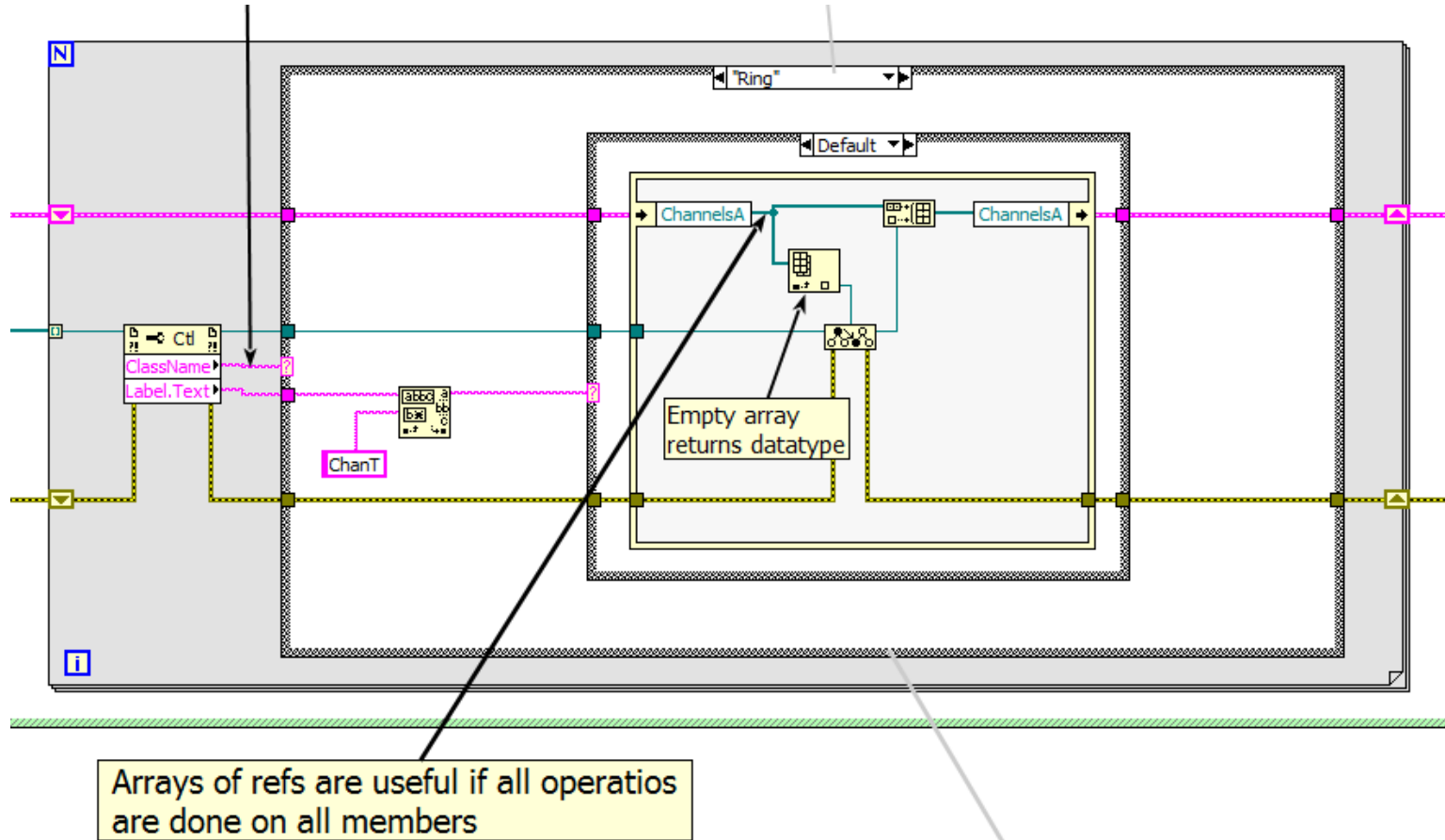
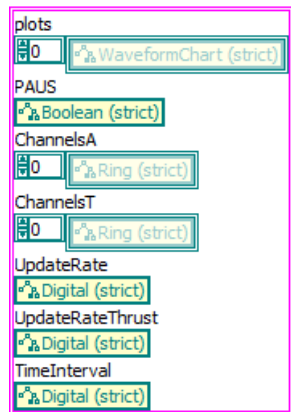
TimeInterval

Digital (strict)

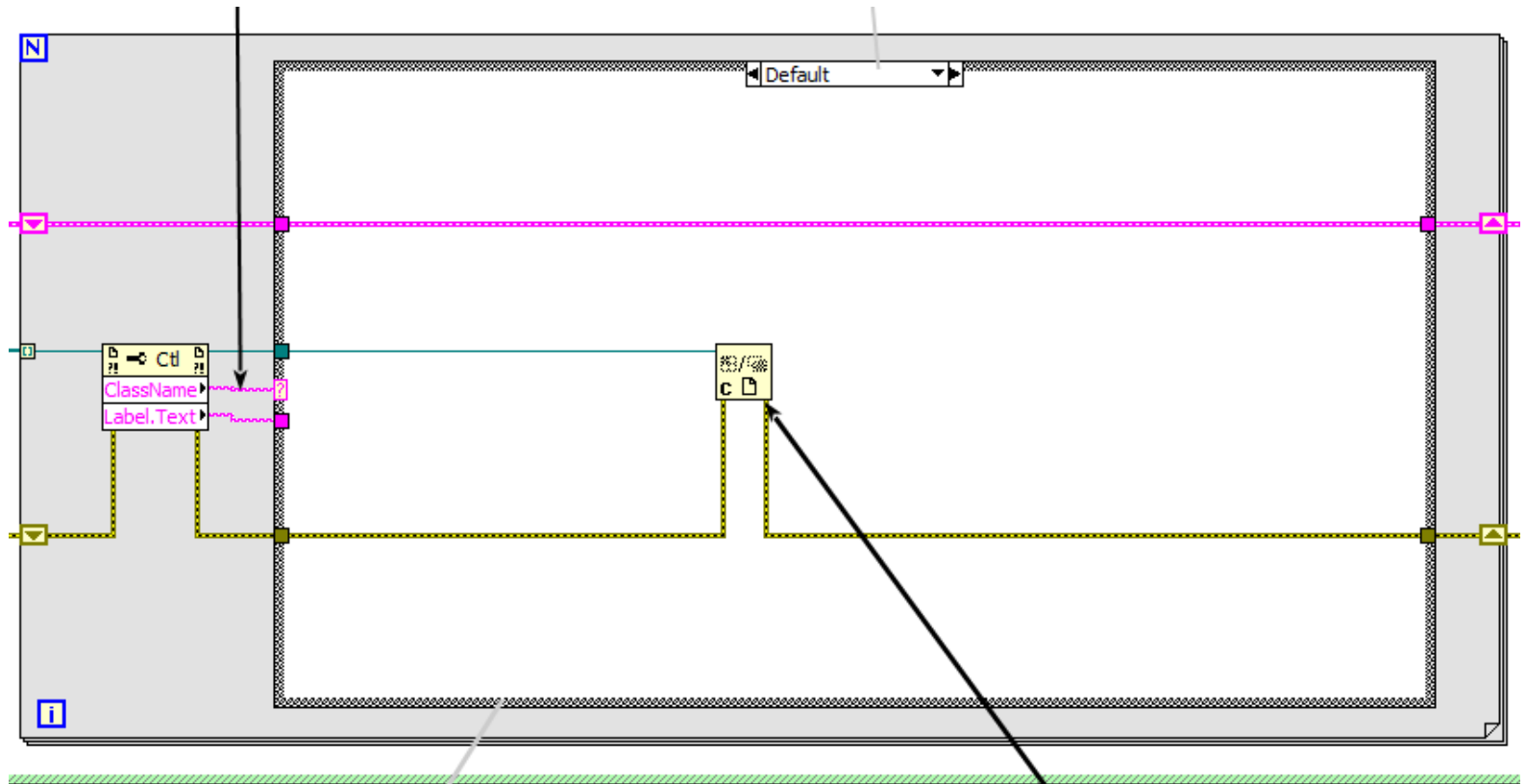
Way to skip restriction of strict typedef altering



UI reference collector



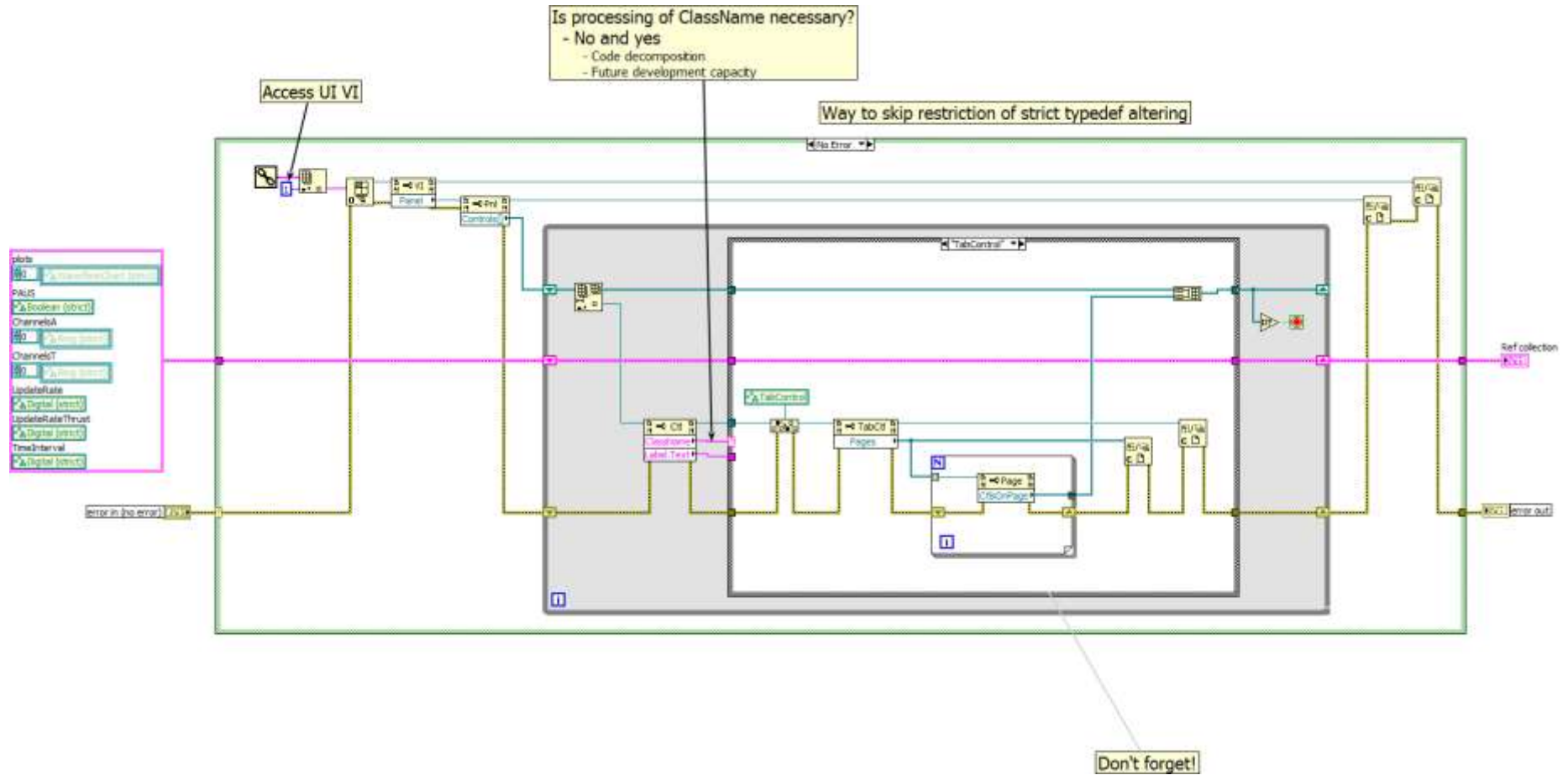
UI reference collector



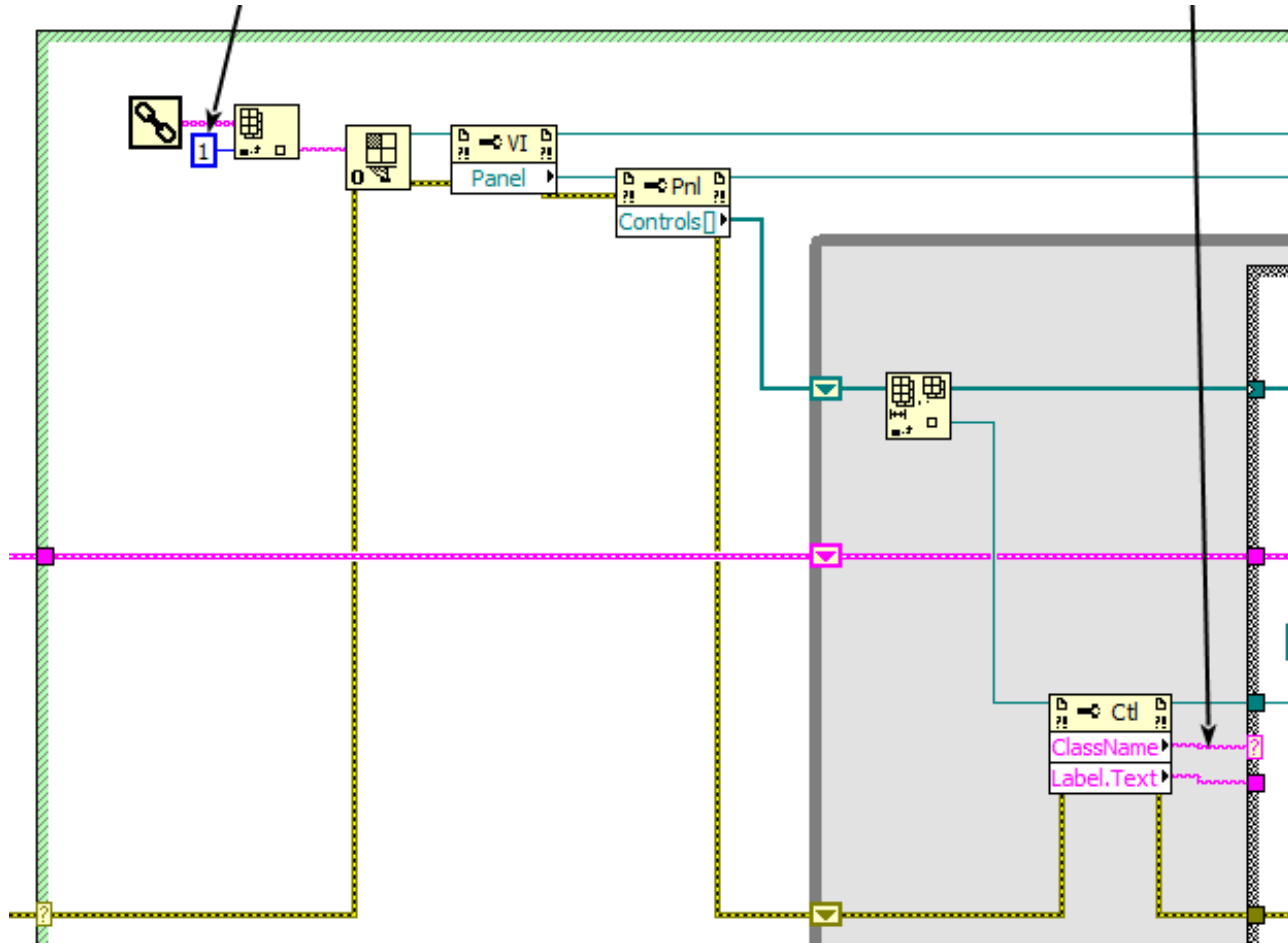
Arrays of refs are useful if all operations are done on all members

Don't forget!

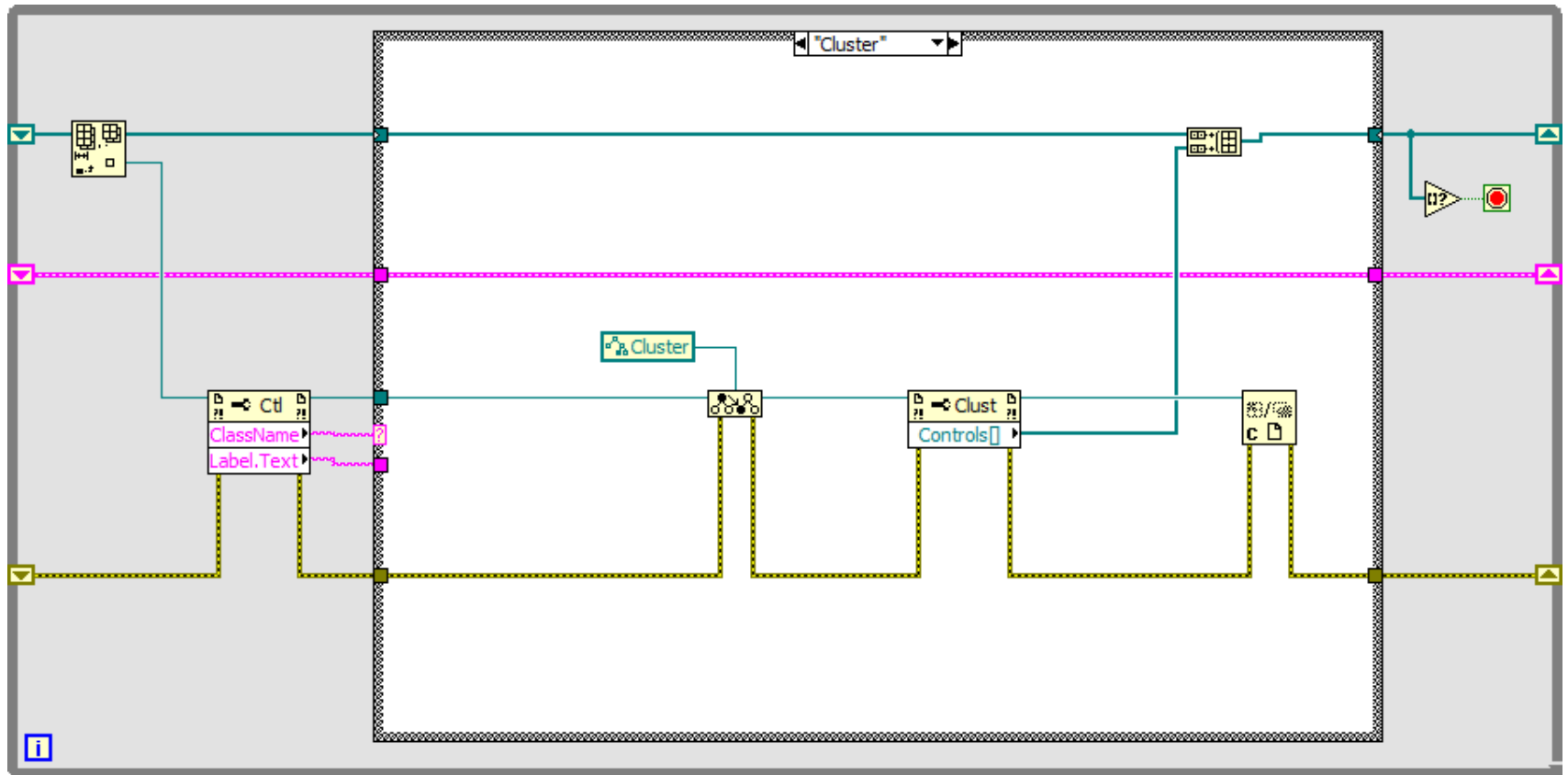
UI reference collector



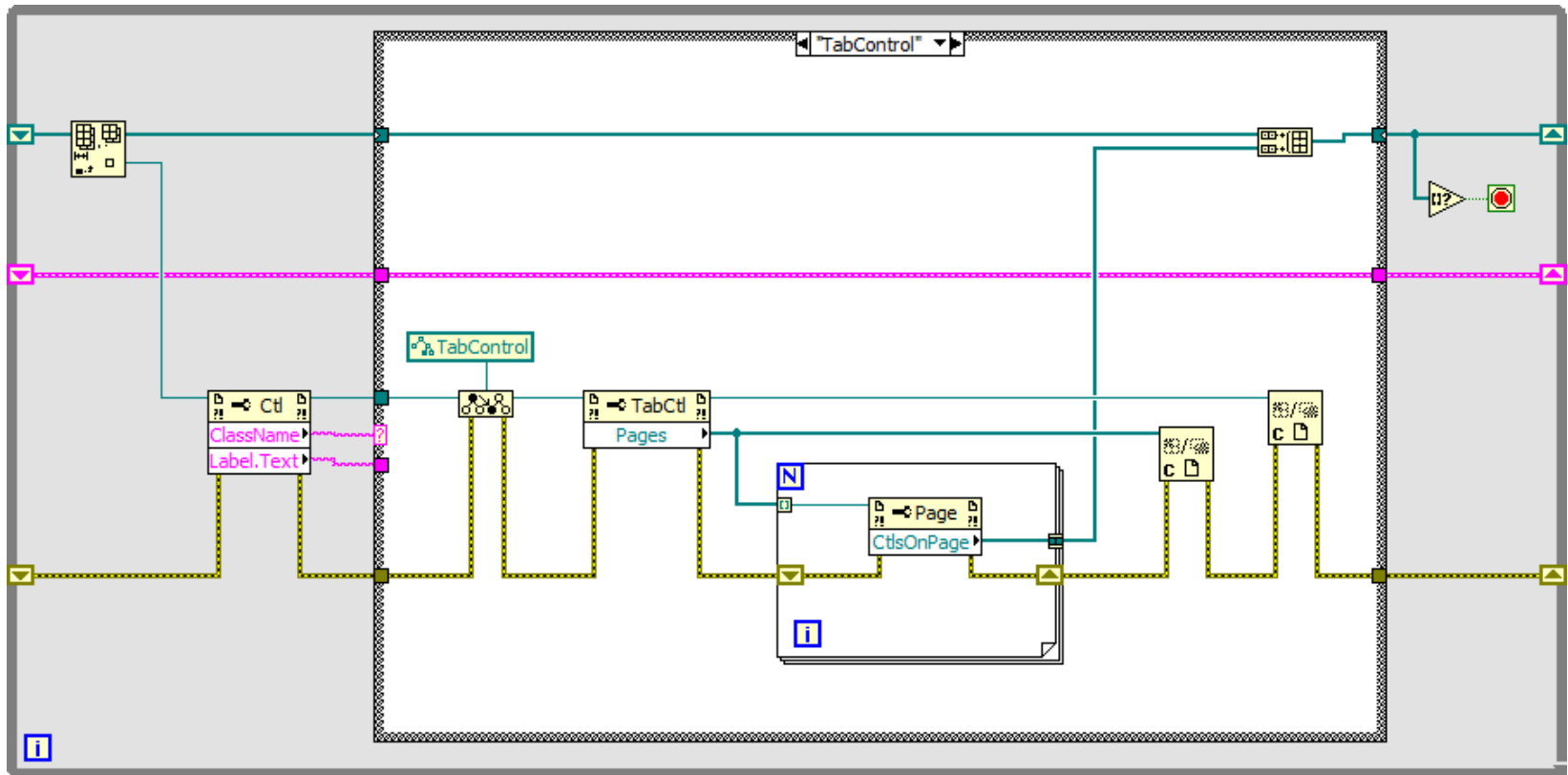
UI reference collector



UI reference collector

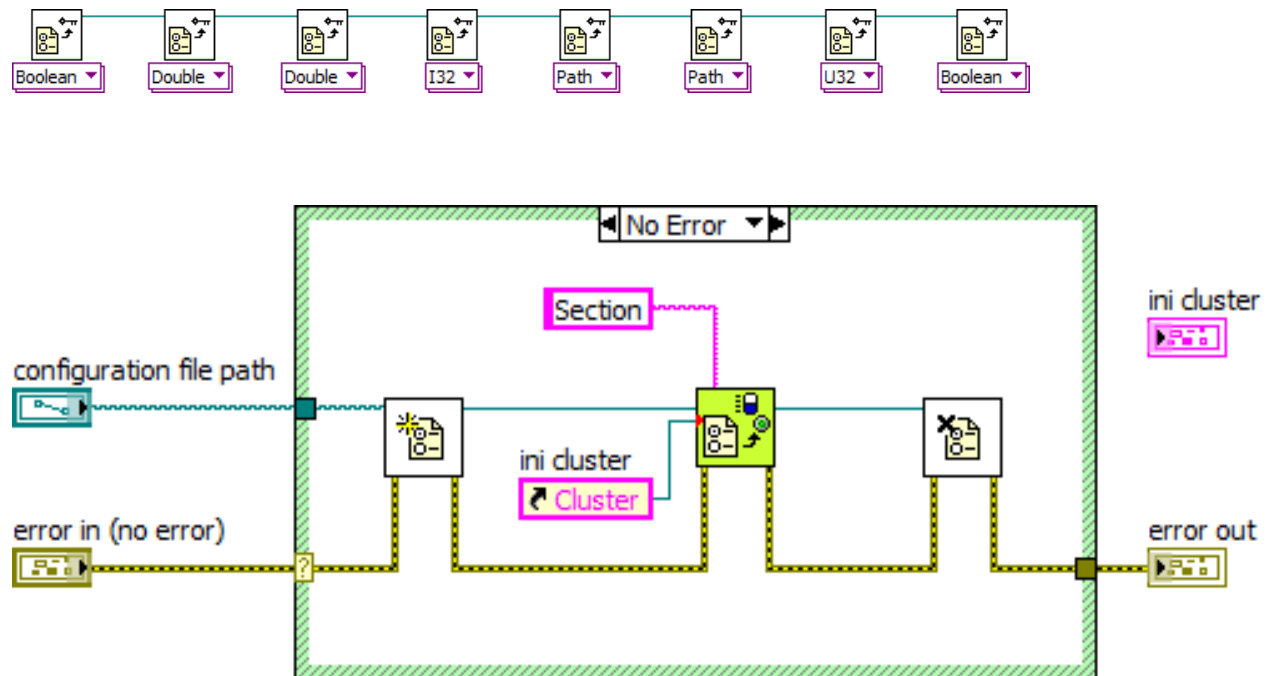


UI reference collector

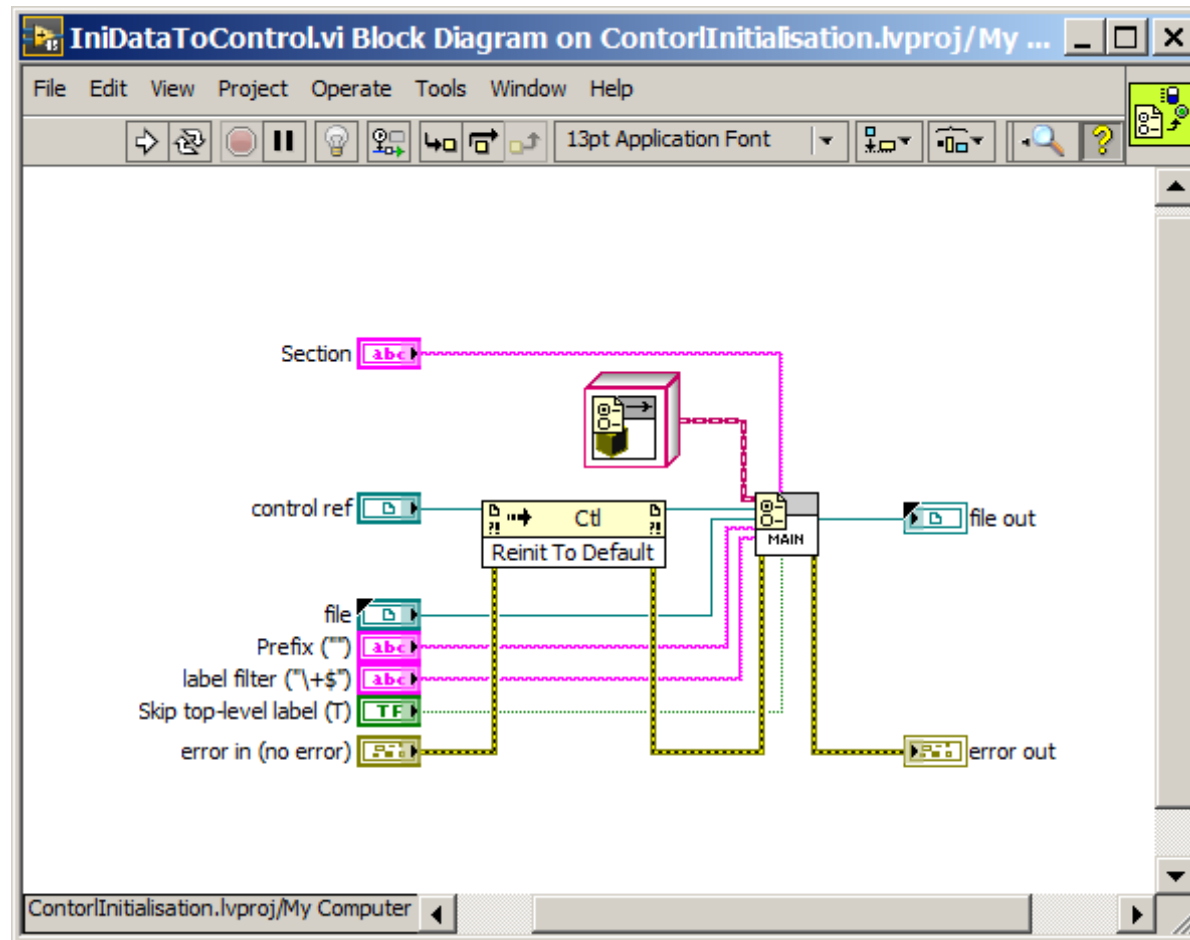


Initialisation

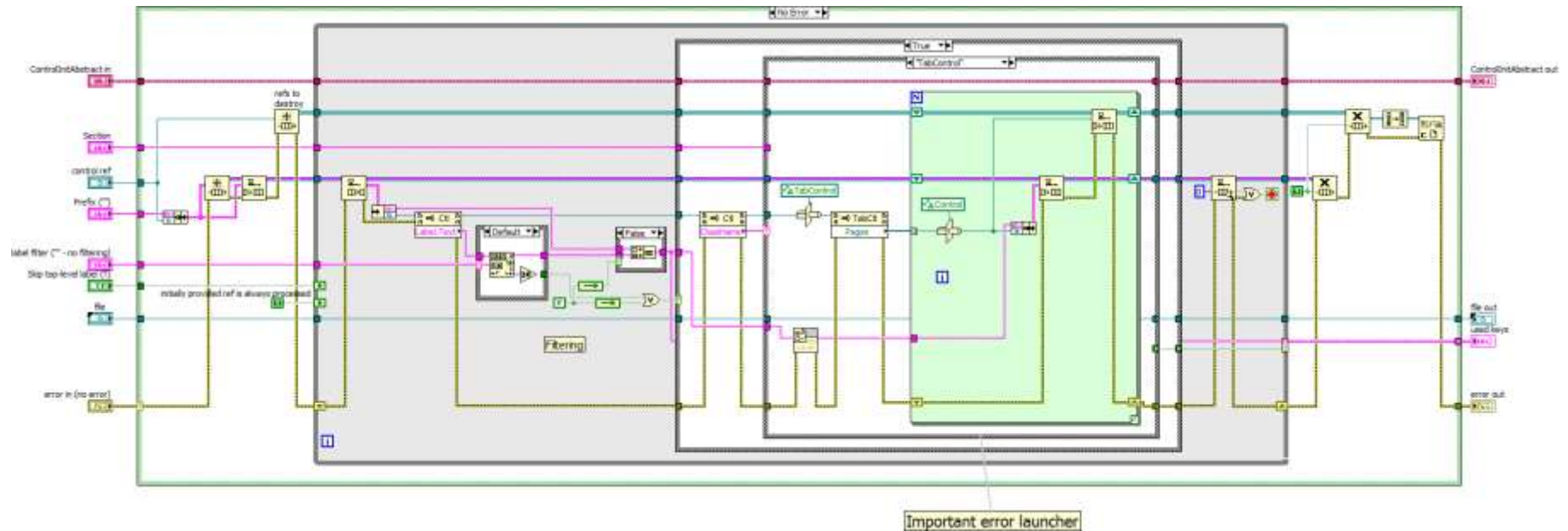
- Problem:
 - Large BD with multiple INI-file readers



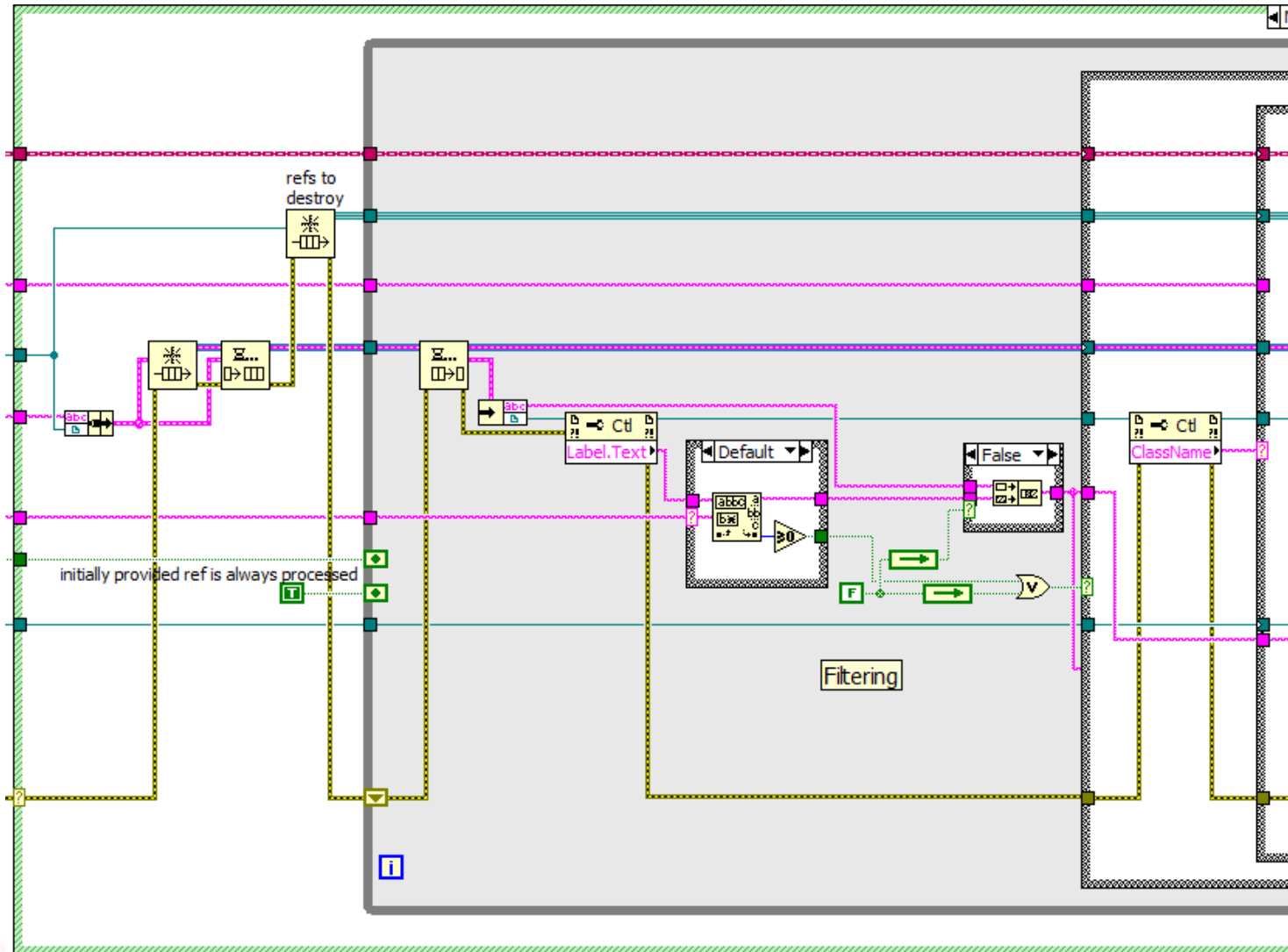
Initialisation



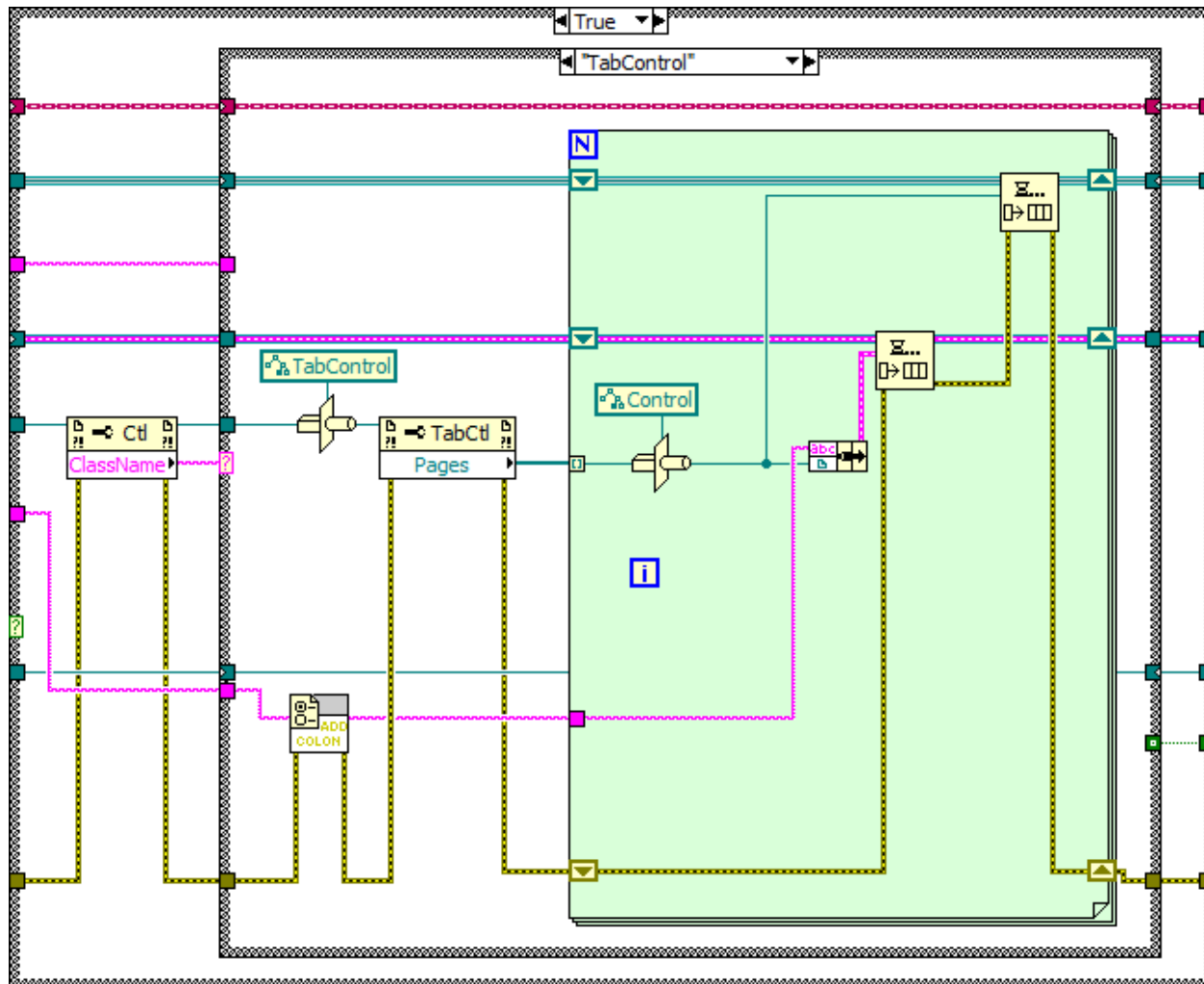
Initialisation



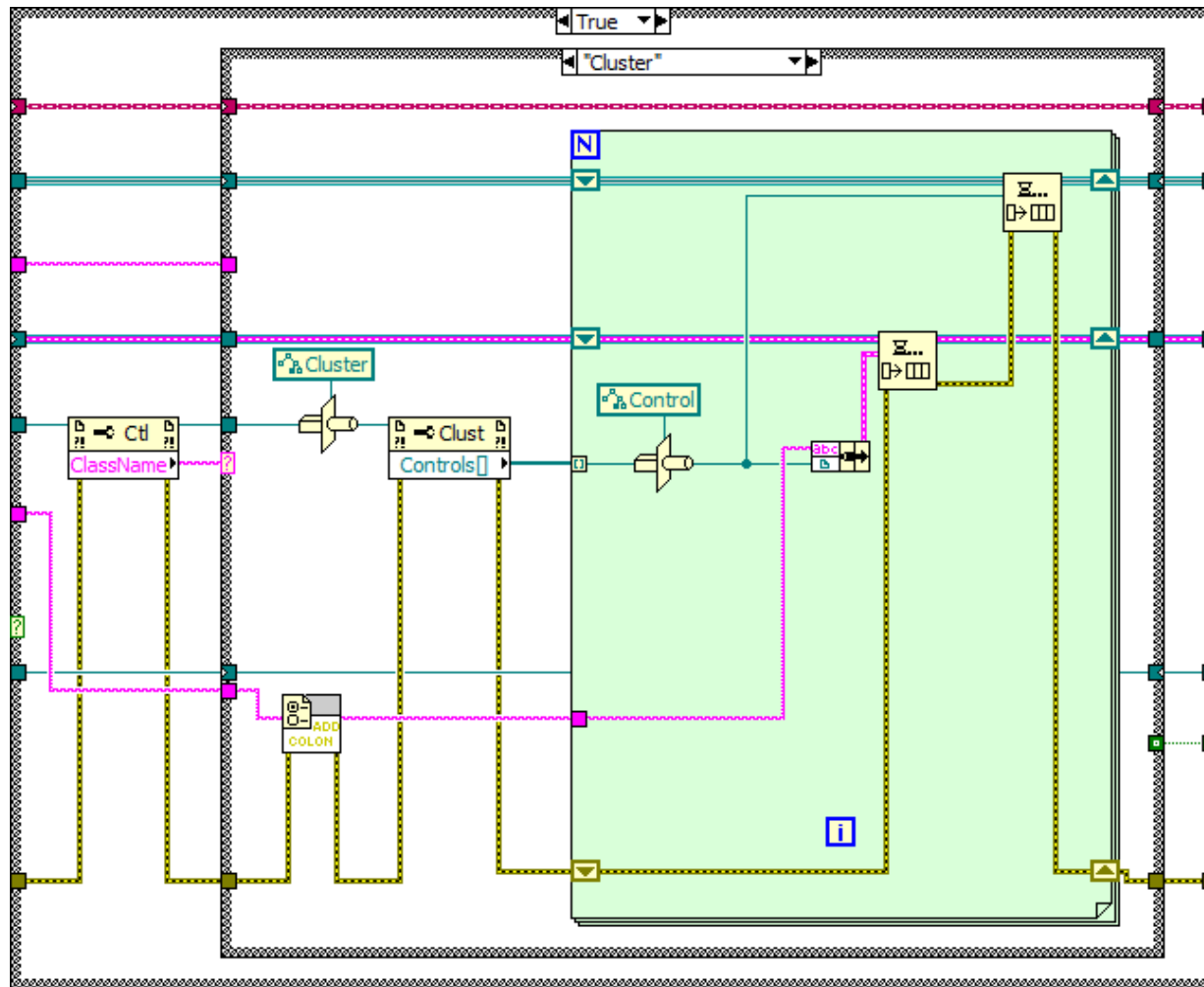
Initialisation



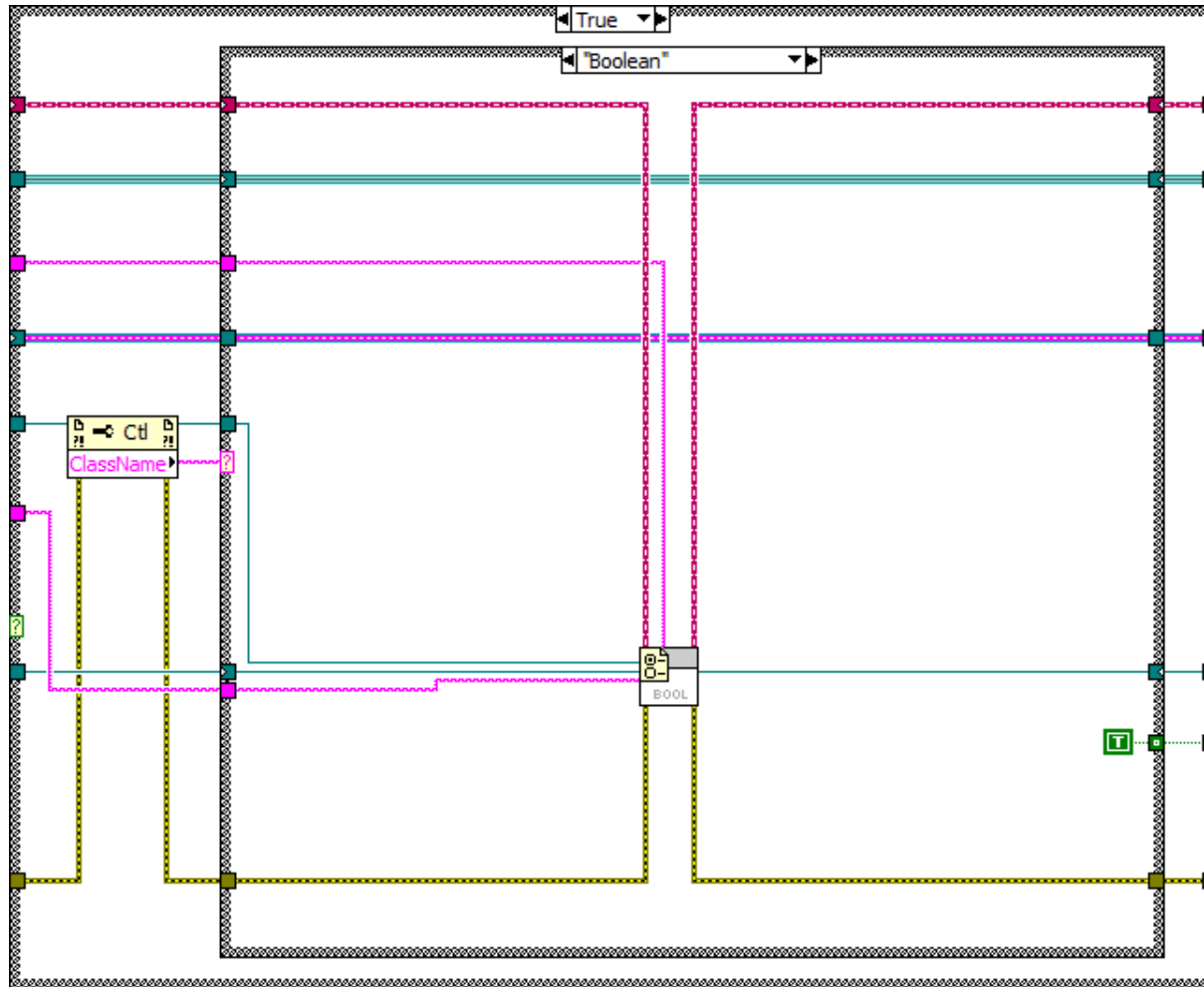
Initialisation



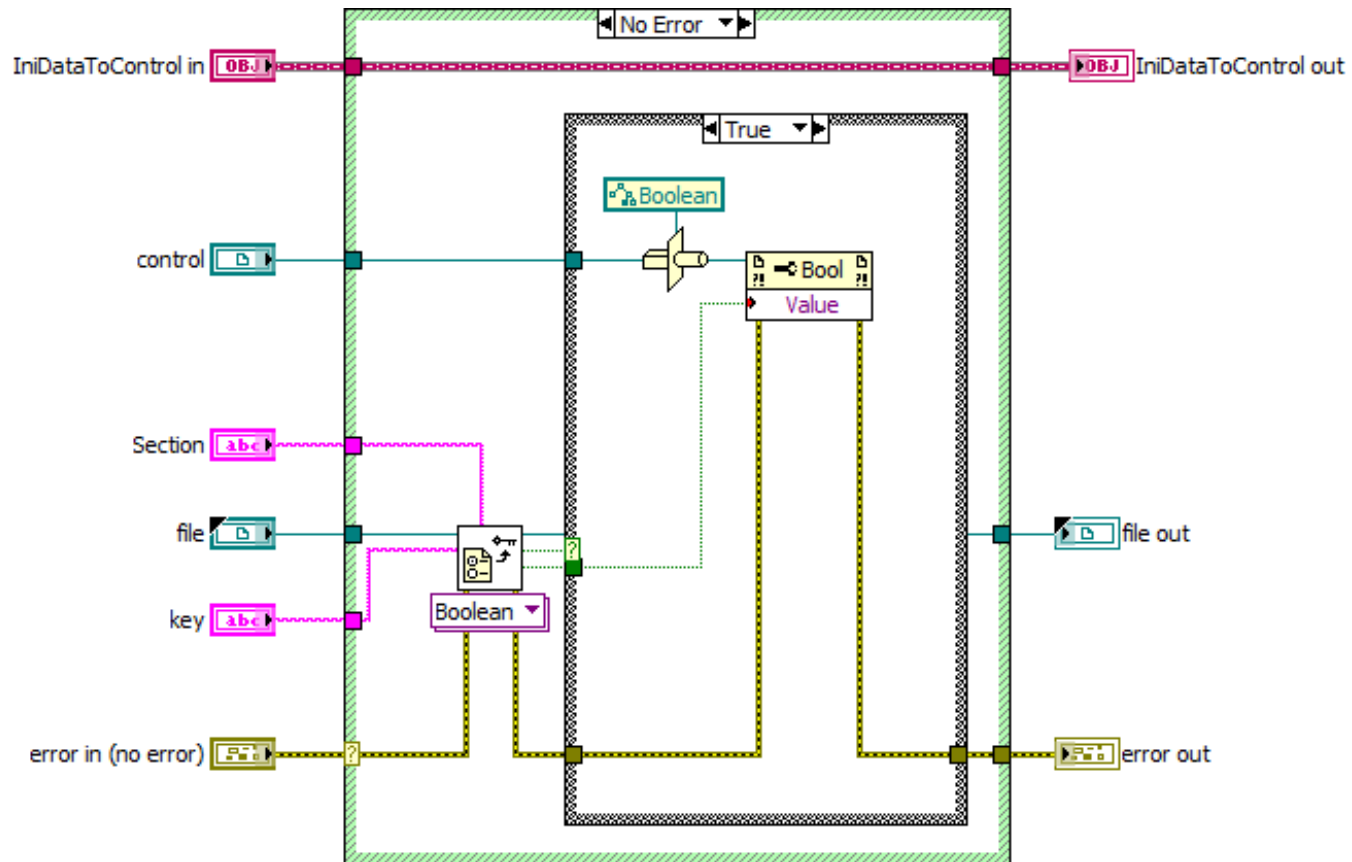
Initialisation



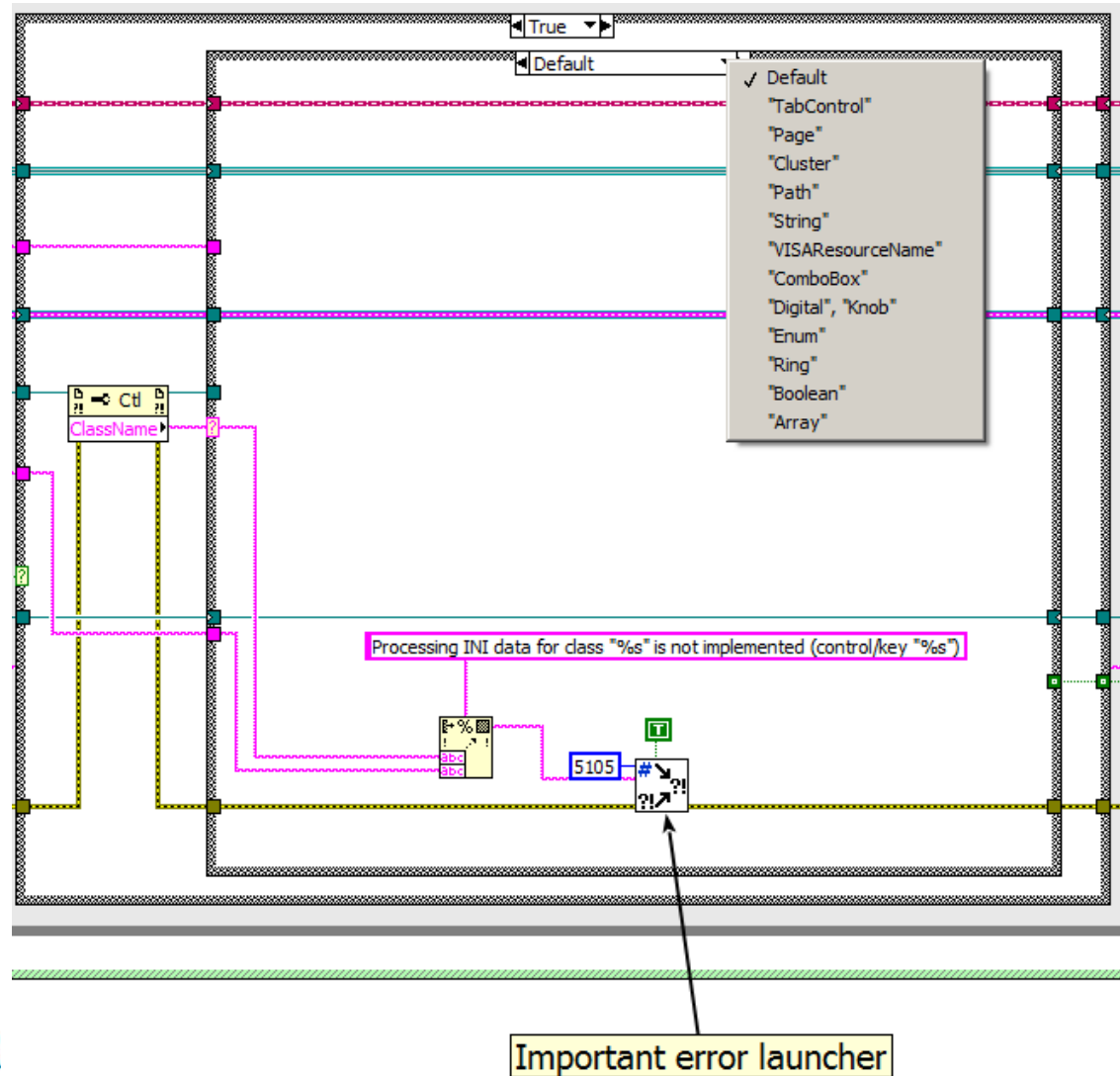
Initialisation



Initialisation

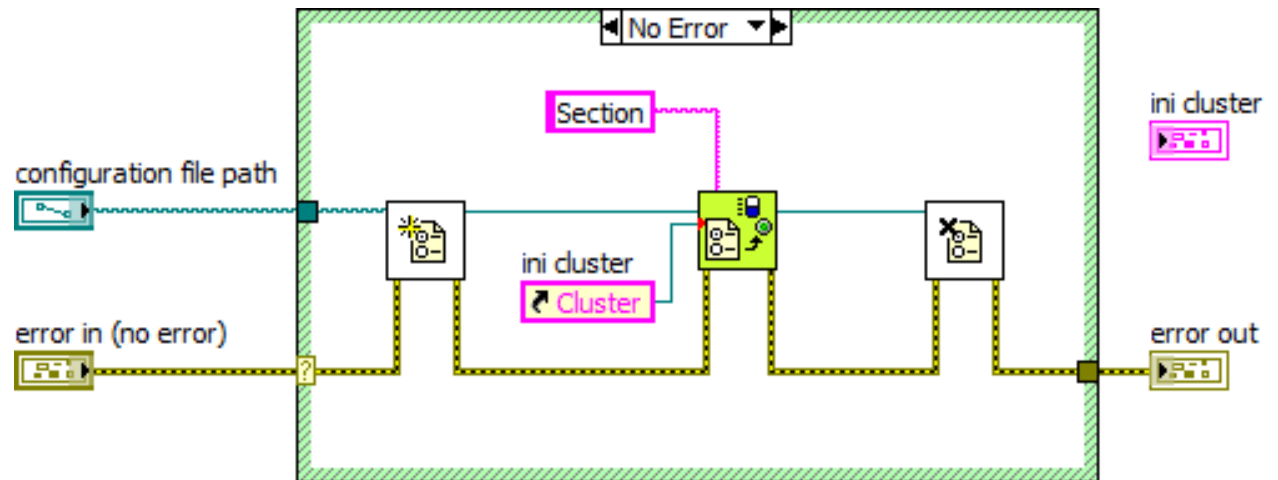


Initialisation



Initialisation

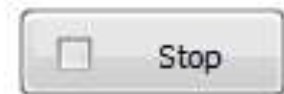
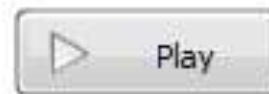
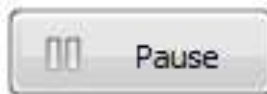
- Writing data structures can be done in the same way



- We can:
 - Initialise output cluster or even type-defined cluster without writing any specific code.
 - Alter data structure without any need to alter the code.

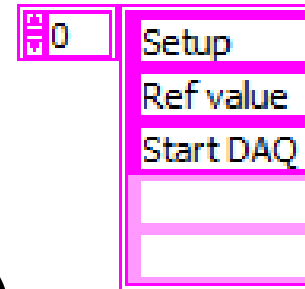
Macros

- Allow user to save and reproduce sequences of steps.
- I.e. save sequence of user-generated events. Then reproduce – “play” – the sequence.

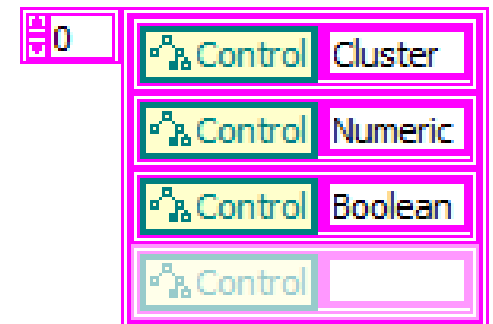
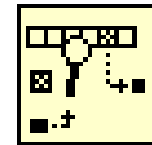


Macros: Collect refs

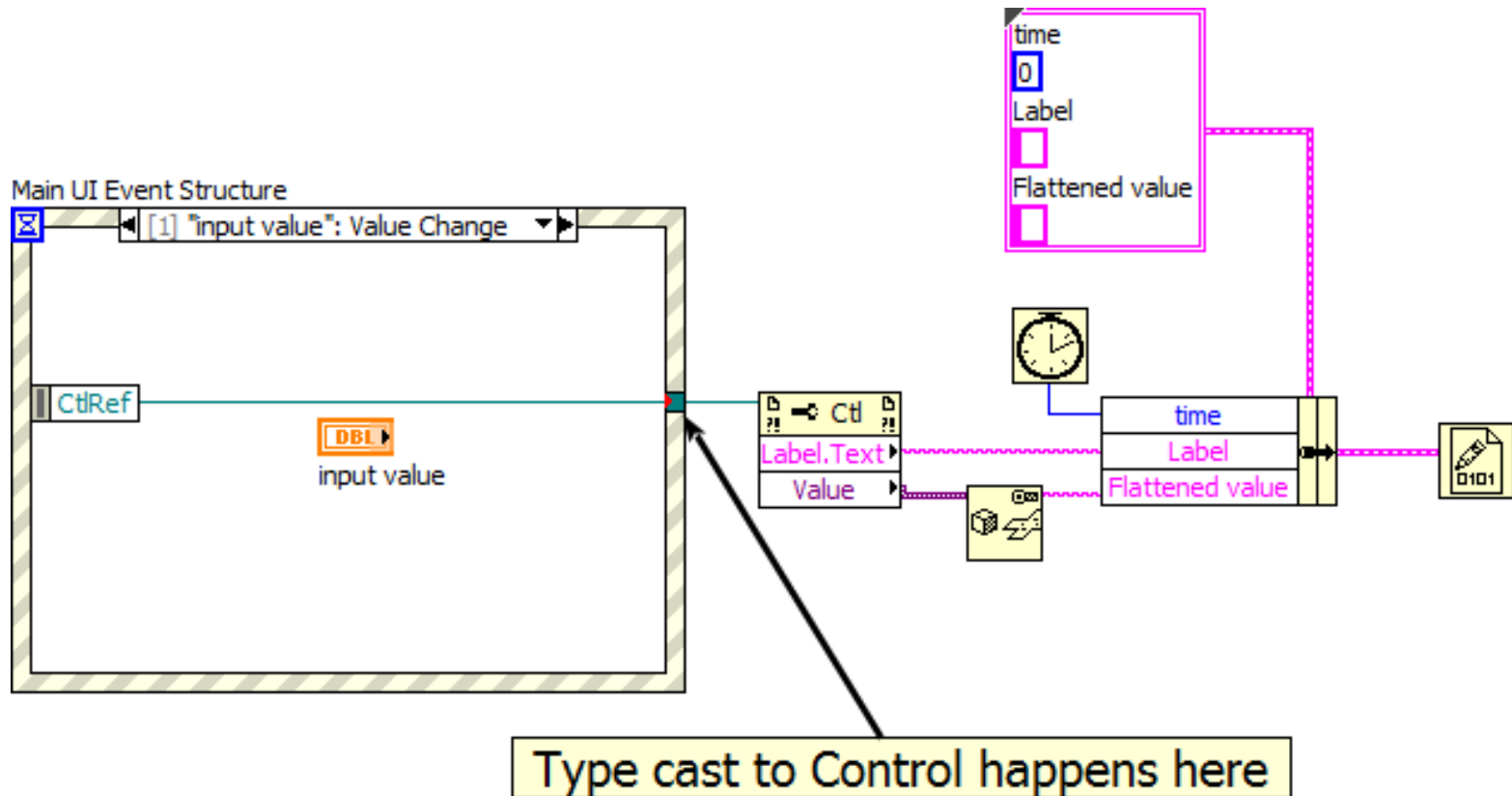
- Keep in two arrays:
 - String: labels
 - Control: refs
 - Class name (if you find it useful)
- Filter:
 - Collect only controls
- Can filter:
 - By label
 - By Class
 - Else?



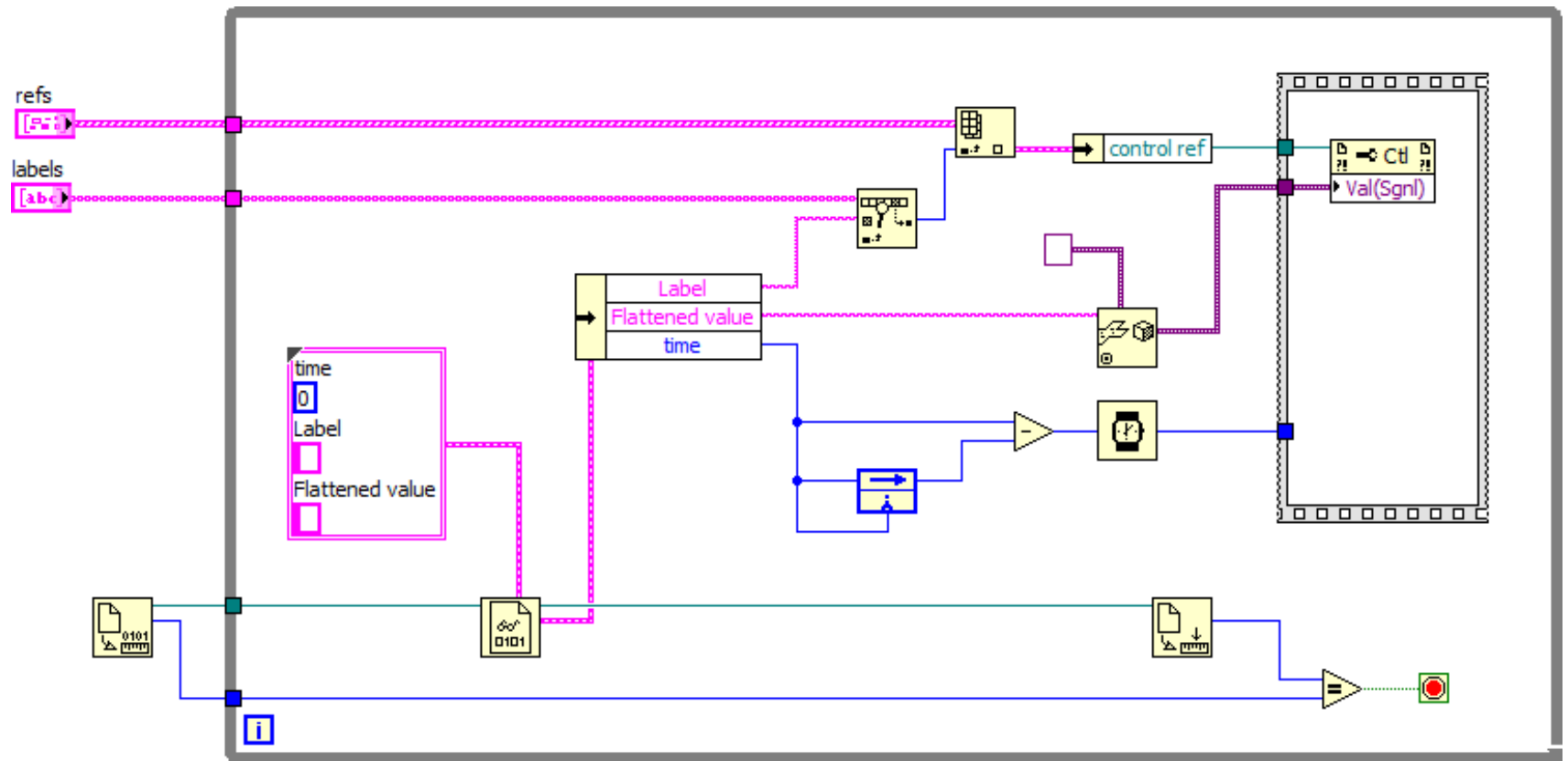
Search 1D Array



Macros step: Record

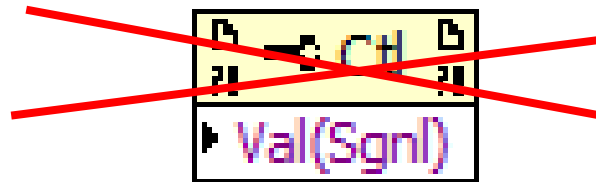


Macros: Play



Macros: Pitfall

- Do not use **Value Signaling** in main program





Thank you!