

GENERAL STRUCTURE:

The program consists of 9 independent programs linked via shm. Each program can be compiled independently in its folder and uses ../Shm.h header for the SHM segments definitions. Programs can be also compiled all at once using ../Compile command. The main interface is the XRF_Scanner program which calls the other programs depending on the needs.

EXTERNAL PROGRAMS (LINKED VIA SHM):

ADCXRF_Optical_Link	-> Optical link digitizer driver
ADCXRF_USB	-> USB digitizer driver
Digitiser_interface	-> interface to set/change Digitiser parameters
OnLineMap	-> displays realtime maps
rate	-> rate meters for DAQ
ScreenDetector	-> detects screen resolution for GUI_Creators
XrayTable	-> Xray energy table
XRF	-> Spectrum viewer

PROGRAMS FOLDERS TREE:

Digitiser_interface	-> contains files for digitiser executable
Digitiser_Optical_link	-> optical link drivers for CAEN 5780 digitiser
Digitiser_Usb	-> usb link drivers for CAEN 5780 digitiser
OnLineMap	-> contains files for real time map
rate	-> contains files for ratemeter
ScreenDetector	-> contains files for screen detection
Spectrum	-> contains files for spectrum viewer
XrayTable	-> contains files for energy element table
XRF_Program	-> destination folder for all programs
XRF_Scanner	-> contains files for the main program

FILES USED TO BUILD THE MAIN PORGRAMS (XRF_SCANNER):

USED FILES: (.CPP)

autofocus.cpp	-> telemeter control and Z automatic positioning
Connectios_Creator.cpp	-> creates connections between GUI obj and
functions	
export.cpp	-> export map images
export_pymca.cpp	-> export data in PYMCA format
external_programs.cpp	-> manages other programs connected to this via
shm	
GUI_Creator.cpp	-> creates GUI
laser.cpp	-> manages lasers for alignment (not implemented)
main.cpp	-> set basic ownership for ports, sets shm
parameters	
mainwindow.cpp	-> manages motors basic, scan basic, daq basic etc.
mainwindow_define_pixel.cpp	-> define pixel dimensions
mainwindow_loadSHM.cpp	-> load data for displaying maps
mainwindow_mouse.cpp	-> controls mouse selection on maps
mainwindow_online.cpp	-> manages real time maps
mainwindow_showMap.cpp	-> manages static maps
menu.cpp	-> creates mainwindow menu
move_motors.cpp	-> moves motors
resouces.qrc	-> graphic resources
ScanYX_XY.cpp	-> drives scans (YX and XY)
SHM_Creator.cpp	-> creates shm
Stage_selection.cpp	-> selects stages for the 3 axes
TTY_motors.cpp	-> Inits serial communications with motors
X_Init.cpp	-> Inits X stage (6 different stage available)
Y_Init.cpp	-> Inits Y stage (6 different stage available)

Z_Init.cpp -> Inits Z stage (6 different stage available)

USED FILES: (.H)

mainwindow.h	-> class definitions
../Header.h	-> common header (used also in external programs)
../variables.h	-> common variables (shared with external programs)
../Shm.h	-> global definition of shm segments

OTHER FILES:

Resolution	-> generated by ScreenDetector and use by programs
calibration.txt	-> used by the spectrum viewer

INSTALL and COMPILE:

Each program can be compiled inside its folder and general compiler (Compile) is present in the root directory. The command "./Compile" enters each of the 8 folders

compiles the program and copies it in the XRF_Program folder; at the end of the loop launches XRF_Scanner.

The cmd "./install" operates in the same way but rebuilds also the environment.

INDEX OF THE FUNCTIONS IN MAIN PROGRAMS:

~MainWindow()	-> mainwindow.cpp
Abort()	-> mainwindow.cpp
AbortZ()	-> mainwindow.cpp
Appartiene(int,int, struct)	-> mainwindow_DefinePixels.cpp
AssignACM()	-> TTY_motors.cpp
AssignX()	-> TTY_motors.cpp
AssignY()	-> TTY_motors.cpp
AssignZ()	-> TTY_motors.cpp
AutoFocusRunning()	-> autofocus.cpp
caenosilloscope()	-> external_programs.cpp
char *read_Kanswer()	-> autofocus.cpp
CheckSegFault()	-> mainwindow.cpp
CheckXOnTarget()	-> mainwindow.cpp
CheckYOnTarget()	-> mainwindow.cpp
CheckZOnTarget()	-> mainwindow.cpp
CONNECTIONS_CREATOR()	-> Connetions_Creator.cpp
CREATE_MENU()	-> Menu.cpp
createActions()	-> Menu.cpp
createStatusBar()	-> mainwindow.cpp
CutB()	-> mainwindow.cpp
Define_Pixels()	-> mainwindow_DefinePixels.cpp
Detector()	-> external_programs.cpp
Digitiser2()	-> external_programs.cpp
displayImage_SHM()	-> mainwindow_showMap.cpp
Enable_TabWidget_3_4_XY()	-> mainwindow.cpp
Enabling_Tabwidget()	-> TTY_motors.cpp
Exit()	-> mainwindow.cpp
exportpymca()	-> export_pymca.cpp
Focustimer()	-> autofocus.cpp
GoOnline()	-> mainwindow_online.cpp
GUI_CREATOR()	-> GUI_creator.cpp
Helium_interface()	-> external_programs.cpp
hideImage()	-> mainwindow.cpp
Image_Export()	-> export.cpp
InizializzazioneKeyence()	-> TTY_motors.cpp
InizializzazioneX()	-> X_Init.cpp

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InizializzazioneY()      -> Y_Init.cpp
InizializzazioneZ()      -> Z_init.cpp
invia_comando_X(int,ch,ch) -> mainwindow.cpp
invia_comando_Y(int,ch,ch) -> mainwindow.cpp
invia_comando_Z(int,ch,ch) -> mainwindow.cpp
Laser_interface()        -> laser.cpp
Laser_switching()        -> laser.cpp
LaserOff()               -> laser.cpp
LaserOn()                -> laser.cpp
LoadNewFile_SHM()         -> mainwindow.cpp
LoadNewFileWithCorrection_SHM() -> mainwindow_loadSHM.cpp
LoadNewFileWithNoCorrection_SHM -> mainwindow_loadSHM.cpp
LoadTxt()                -> mainwindow.cpp
MapCorrection()           -> mainwindow.cpp
MergeTxt()               -> mainwindow.cpp
mousePressEvent(QMouseEvent) -> mainwindow_mouse.cpp
mouseReleaseEvent(QMouseEvent) -> mainwindow_mouse.cpp
Move_backward()           -> move_motors.cpp
Move_down()              -> move_motors.cpp
Move_forward()           -> move_motors.cpp
Move_left()              -> move_motors.cpp
Move_right()             -> move_motors.cpp
Move_up()                -> move_motors.cpp
MoveDoubleClick()         -> move_motors.cpp
MoveX_To()               -> move_motors.cpp
MoveX(double)            -> move_motors.cpp
MoveY(double)            -> move_motors.cpp
MoveZ(double)            -> move_motors.cpp
NameACM(int)             -> TTY_motors.cpp
NameX(int)               -> TTY_motors.cpp
NameY(int)               -> TTY_motors.cpp
NameZ(int)               -> TTY_motors.cpp
open_MAP()               -> mainwindow.cpp
OPTICAL_DAQ()            -> mainwindow.cpp
PassoX_Func(double)       -> mainwindow.cpp
PassoY_Func(double)       -> mainwindow.cpp
PassoZ_Func(double)       -> mainwindow.cpp
Pixel_BIG *Crea_PX(int,int,int) -> mainwindow_DefinePixels.cpp
PixelCrct()              -> mainwindow.cpp
Pixels()                 -> mainwindow.cpp
RateMeter()              -> external_programs.cpp
read_Xanswer() (char *)   -> mainwindow.cpp
read_Xanswer2() (string)  -> mainwindow.cpp
read_Yanswer() (char *)   -> mainwindow.cpp
read_Yanswer2() (string)  -> mainwindow.cpp
read_Zanswer() (char *)   -> mainwindow.cpp
read_Zanswer2() (string)  -> mainwindow.cpp
readKeyence()            -> autofocus.cpp
SaveTxt()                -> mainwindow.cpp
ScanXY()                 -> ScanYX_XY.cpp
ScanYX()                 -> ScanYX_XY.cpp
SelectChannels()          -> mainwindow.cpp
SelMeasTime()            -> mainwindow.cpp
SetCurrentAction(QString) -> mainwindow.cpp
SetSerialXName(int)       -> TTY_motors.cpp
SetSerialYName(int)       -> TTY_motors.cpp
SetSerialZName(int)       -> TTY_motors.cpp
SHM_CREATOR()            -> SHM_Creator.cpp
ShowHistogram()           -> external_programs.cpp
StartVme()               -> external_programs.cpp
StartX()                 -> mainwindow.cpp
StartXYScan()            -> mainwindow.cpp
StartXYScan()            -> mainwindow.cpp
StartY()                 -> mainwindow.cpp
StartZ()                 -> mainwindow.cpp
Stop_Vme()               -> external_programs.cpp
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Stop()                -> mainwindow.cpp
StopZ()               -> mainwindow.cpp
string read_Kanswer2() -> autofocus.cpp
timerEvent()          -> mainwindow.cpp
TrackingON()          -> autofocus.cpp
Treshold()            -> mainwindow.cpp
USB_DAQ()             -> mainwindow.cpp
Velocity(double)       -> mainwindow.cpp
VelocityZ(double)      -> mainwindow.cpp
VLC_interface()        -> external_programs.cpp
WritePositionXY()      -> ScanYX_XY.cpp
WritePositionYX()      -> ScanYX_XY.cpp
X_Motor_selection(int) -> Stage_selection.cpp
X_to(double)           -> mainwindow.cpp
Xmassimo(double)       -> mainwindow.cpp
Xminimo(double)        -> mainwindow.cpp
XrayTable()            -> external_programs.cpp
Y_Motor_selection(int) -> Stage_selection.cpp
Y_to(double)           -> mainwindow.cpp
Ymassimo(double)       -> mainwindow.cpp
Yminimo(double)        -> mainwindow.cpp
Z_Motor_selection(int) -> Stage_selection.cpp
Z_to(double)           -> mainwindow.cpp
Zmassimo(double)       -> mainwindow.cpp
Zminimo(double)        -> mainwindow.cpp

```

THE OTHER PROGRAMS - FILES AND INDEX OF THE FUNCTIONS:

DIGITISER_INTERFACE:

FILES (.CPP): main.cpp, mainwindow.cpp, GuiCreator.cpp

FILES (.H): mainwindow.h

FUNCTIONS:

```

~MainWindow()          -> mainwindow.cpp
Base_Line_Mean(int)    -> mainwindow.cpp
DC_Offset(int)         -> mainwindow.cpp
Digi_range(int)        -> mainwindow.cpp
Digi_treshold(int)     -> mainwindow.cpp
Digitiser_data_download_enable() -> mainwindow.cpp
Exit()                 -> mainwindow.cpp
Fall_Time(int)         -> mainwindow.cpp
Flat_Top(int)          -> mainwindow.cpp
GuiCreator()           -> GuiCreator.cpp
HoldOff(int)           -> mainwindow.cpp
Peak_Holdoff(int)      -> mainwindow.cpp
Peak_Mean(int)         -> mainwindow.cpp
Peaking_Delay(int)     -> mainwindow.cpp
Rise_Time(int)         -> mainwindow.cpp
Smoothing_Factor(int)  -> mainwindow.cpp
Trapezoid_Gain(int)    -> mainwindow.cpp

```

DIGITISER_OPTICAL_LINK: -> (C program)

FILES (.C .CPP): ADCXRF.c, Function.c, keyb.c

FILES (.H): CAENDPPLib.h, CAENDPPLibTypes.h, Functions.h, keyb.h

FUNCTIONS: reimplemented in ADCXRF modifying CAEN source

DIGITISER_USB: -> (C program)

FILES (.C .CPP): ADCXRF.c, Function.c, keyb.c

FILES (.H): CAENDPPLib.h, CAENDPPLibTypes.h, Functions.h, keyb.h

FUNCTIONS: reimplemented in ADCXRF modifying CAEN source

ON_LINE_MAP:

FILES (.CPP): main.cpp, mainwindow.cpp, GUI_CREATOR.cpp

FILES (.H): mainwindow.h

FUNCTIONS:

```

~MainWindow()                -> mainwindow.cpp
displayImageOnLine()         -> mainwindow.cpp
Element_Ag()                 -> mainwindow.cpp
Element_Au()                 -> mainwindow.cpp
Element_Ba()                 -> mainwindow.cpp
Element_Ca()                 -> mainwindow.cpp
Element_Co()                 -> mainwindow.cpp
Element_Cr()                 -> mainwindow.cpp
Element_Cu()                 -> mainwindow.cpp
Element_Fe()                 -> mainwindow.cpp
Element_Hg()                 -> mainwindow.cpp
Element_K()                  -> mainwindow.cpp
Element_Pb()                 -> mainwindow.cpp
Element_Si()                 -> mainwindow.cpp
Element_Sn()                 -> mainwindow.cpp
Element_Ti()                 -> mainwindow.cpp
Element_Zn()                 -> mainwindow.cpp
enableOnLine(bool)           -> mainwindow.cpp
enableOnTop(bool)            -> mainwindow.cpp
Hi_Ch_Value(int)             -> mainwindow.cpp
Lo_Ch_Value(int)             -> mainwindow.cpp
quit()                       -> mainwindow.cpp

```

RATE: -> (QWT_6.1.2 program)

FILES (.CPP): main.cpp, dial.cpp, dialtab.cpp

FILES (.H): dial.h, dialtab.h

FUNCTIONS:

```

~DialBox()                   -> dial.cpp
createDial(int)              -> dial.cpp
DialTab()                    -> dialtab.cpp
EventEnable()                -> dial.cpp
setNeedleValue(int)          -> dial.cpp
setNum(double)               -> dial.cpp
TimerEvent()                 -> dial.cpp

```

SCREENDETECTOR:

FILES (.CPP): main.cpp

FUNCTIONS: No graphic. Basic program to get screen resolution

SPECTRUM:

FILES (.CPP): main.cpp, mainwindow.cpp, plot.cpp

FILES (.H): complexnumber.h, mainwindow.h, pixmaps.h, plot.h

FUNCTIONS:

```

~MainWindow()                -> mainwindow.cpp
on_k4(bool)                  -> mainwindow.cpp
AutoCalibrate()              -> mainwindow.cpp
Calibration(double)          -> plot.cpp
cancClicked()                 -> mainwindow.cpp
ch1(double)                  -> plot.cpp
ch2(double)                  -> plot.cpp
Check_SHM()                  -> plot.cpp
E1(double)                   -> plot.cpp
E2(double)                   -> plot.cpp
enableAutoScale(bool)        -> mainwindow.cpp
enableOnTop(bool)            -> mainwindow.cpp
enableRunMode(bool)          -> plot.cpp
enableZoomMode( )            -> mainwindow.cpp
Energy_Channel_Choice(bool)  -> plot.cpp
exportTxt()                  -> mainwindow.cpp

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howPixelHisto()	-> plot.cpp
logSpace()	-> plot.cpp
mousePressEvent(QMouseEvent)	-> mainwindow.cpp
moved(const QPoint &pos)	-> mainwindow.cpp
Offset(double)	-> plot.cpp
okClicked()	-> mainwindow.cpp
Open()	-> plot.cpp
PreOpen()	-> mainwindow.cpp
print()	-> mainwindow.cpp
Retta_Cal()	-> plot.cpp
selected(const QPolygon)	-> mainwindow.cpp
showData(double,double,int)	-> plot.cpp
showInfo()	-> mainwindow.cpp
showInfo(QString)	-> mainwindow.cpp
timerRefreshEvent()	-> plot.cpp

XRAY TABLE:

FILES (.CPP): main.cpp, mainwindow.cpp, GuiCreator.cpp

FILES (.H): mainwindow.h

FUNCTIONS:

~MainWindow()	-> mainwindow.cpp
Digi_range(int)	-> mainwindow.cpp
Exit()	-> mainwindow.cpp