# 串口通信

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实验程序：

TestSerialPort.pro

QT += core gui widgets serialport

TARGET = TestSerialPort

TEMPLATE = app

SOURCES += main.cpp\

MainWidget.cpp

HEADERS += MainWidget.h \

ui\_MainWidget.h

FORMS += MainWidget.ui

MainWidget.h

#ifndef MAINWIDGET\_H

#define MAINWIDGET\_H

#include <QWidget>

class QSerialPort;

namespace Ui {

class MainWidget;

}

class MainWidget : public QWidget

{

Q\_OBJECT

public:

explicit MainWidget(QWidget \*parent = 0);

~MainWidget();

void initSerial();

void initMainUi();

void openSerial();

void closeSerial();

void refreshSerial();

private:

QStringList getSerialPortNames();

void setSerialEnable(bool enabled);

void sendData();

void recvData();

private:

Ui::MainWidget \*ui;

QSerialPort \*serialIo;

};

#endif // MAINWIDGET\_H

Ui\_MainWidget.h

#ifndef UI\_MAINWIDGET\_H

#define UI\_MAINWIDGET\_H

#include <QtCore/QVariant>

#include <QtWidgets/QAction>

#include <QtWidgets/QApplication>

#include <QtWidgets/QButtonGroup>

#include <QtWidgets/QComboBox>

#include <QtWidgets/QHBoxLayout>

#include <QtWidgets/QHeaderView>

#include <QtWidgets/QLabel>

#include <QtWidgets/QPushButton>

#include <QtWidgets/QSpacerItem>

#include <QtWidgets/QTextEdit>

#include <QtWidgets/QVBoxLayout>

#include <QtWidgets/QWidget>

QT\_BEGIN\_NAMESPACE

class Ui\_MainWidget

{

public:

QHBoxLayout \*horizontalLayout\_16;

QVBoxLayout \*verticalLayout\_2;

QHBoxLayout \*horizontalLayout\_9;

QLabel \*labPortName;

QComboBox \*boxPortName;

QHBoxLayout \*horizontalLayout\_10;

QLabel \*labBaudRate;

QComboBox \*boxBaudRate;

QHBoxLayout \*horizontalLayout\_11;

QLabel \*labDataBits;

QComboBox \*boxDataBits;

QHBoxLayout \*horizontalLayout\_12;

QLabel \*labParity;

QComboBox \*boxParity;

QHBoxLayout \*horizontalLayout\_13;

QLabel \*labStopBits;

QComboBox \*boxStopBits;

QHBoxLayout \*horizontalLayout\_14;

QLabel \*labFlowControl;

QComboBox \*boxFlowControl;

QHBoxLayout \*horizontalLayout\_15;

QPushButton \*btnRefresh;

QSpacerItem \*horizontalSpacer\_3;

QPushButton \*btnOpen;

QSpacerItem \*verticalSpacer;

QVBoxLayout \*verticalLayout;

QLabel \*labRecv;

QTextEdit \*textRecv;

QLabel \*labSend;

QTextEdit \*textSend;

QHBoxLayout \*horizontalLayout;

QSpacerItem \*horizontalSpacer;

QPushButton \*btnSend;

void setupUi(QWidget \*MainWidget)

{

if (MainWidget->objectName().isEmpty())

MainWidget->setObjectName(QStringLiteral("MainWidget"));

MainWidget->resize(671, 433);

horizontalLayout\_16 = new QHBoxLayout(MainWidget);

horizontalLayout\_16->setSpacing(6);

horizontalLayout\_16->setContentsMargins(11, 11, 11, 11);

horizontalLayout\_16->setObjectName(QStringLiteral("horizontalLayout\_16"));

verticalLayout\_2 = new QVBoxLayout();

verticalLayout\_2->setSpacing(6);

verticalLayout\_2->setObjectName(QStringLiteral("verticalLayout\_2"));

horizontalLayout\_9 = new QHBoxLayout();

horizontalLayout\_9->setSpacing(6);

horizontalLayout\_9->setObjectName(QStringLiteral("horizontalLayout\_9"));

labPortName = new QLabel(MainWidget);

labPortName->setObjectName(QStringLiteral("labPortName"));

labPortName->setAlignment(Qt::AlignCenter);

horizontalLayout\_9->addWidget(labPortName);

boxPortName = new QComboBox(MainWidget);

boxPortName->setObjectName(QStringLiteral("boxPortName"));

horizontalLayout\_9->addWidget(boxPortName);

verticalLayout\_2->addLayout(horizontalLayout\_9);

horizontalLayout\_10 = new QHBoxLayout();

horizontalLayout\_10->setSpacing(6);

horizontalLayout\_10->setObjectName(QStringLiteral("horizontalLayout\_10"));

labBaudRate = new QLabel(MainWidget);

labBaudRate->setObjectName(QStringLiteral("labBaudRate"));

labBaudRate->setAlignment(Qt::AlignCenter);

horizontalLayout\_10->addWidget(labBaudRate);

boxBaudRate = new QComboBox(MainWidget);

boxBaudRate->setObjectName(QStringLiteral("boxBaudRate"));

horizontalLayout\_10->addWidget(boxBaudRate);

verticalLayout\_2->addLayout(horizontalLayout\_10);

horizontalLayout\_11 = new QHBoxLayout();

horizontalLayout\_11->setSpacing(6);

horizontalLayout\_11->setObjectName(QStringLiteral("horizontalLayout\_11"));

labDataBits = new QLabel(MainWidget);

labDataBits->setObjectName(QStringLiteral("labDataBits"));

labDataBits->setAlignment(Qt::AlignCenter);

horizontalLayout\_11->addWidget(labDataBits);

boxDataBits = new QComboBox(MainWidget);

boxDataBits->setObjectName(QStringLiteral("boxDataBits"));

horizontalLayout\_11->addWidget(boxDataBits);

verticalLayout\_2->addLayout(horizontalLayout\_11);

horizontalLayout\_12 = new QHBoxLayout();

horizontalLayout\_12->setSpacing(6);

horizontalLayout\_12->setObjectName(QStringLiteral("horizontalLayout\_12"));

labParity = new QLabel(MainWidget);

labParity->setObjectName(QStringLiteral("labParity"));

labParity->setAlignment(Qt::AlignCenter);

horizontalLayout\_12->addWidget(labParity);

boxParity = new QComboBox(MainWidget);

boxParity->setObjectName(QStringLiteral("boxParity"));

horizontalLayout\_12->addWidget(boxParity);

verticalLayout\_2->addLayout(horizontalLayout\_12);

horizontalLayout\_13 = new QHBoxLayout();

horizontalLayout\_13->setSpacing(6);

horizontalLayout\_13->setObjectName(QStringLiteral("horizontalLayout\_13"));

labStopBits = new QLabel(MainWidget);

labStopBits->setObjectName(QStringLiteral("labStopBits"));

labStopBits->setAlignment(Qt::AlignCenter);

horizontalLayout\_13->addWidget(labStopBits);

boxStopBits = new QComboBox(MainWidget);

boxStopBits->setObjectName(QStringLiteral("boxStopBits"));

horizontalLayout\_13->addWidget(boxStopBits);

verticalLayout\_2->addLayout(horizontalLayout\_13);

horizontalLayout\_14 = new QHBoxLayout();

horizontalLayout\_14->setSpacing(6);

horizontalLayout\_14->setObjectName(QStringLiteral("horizontalLayout\_14"));

labFlowControl = new QLabel(MainWidget);

labFlowControl->setObjectName(QStringLiteral("labFlowControl"));

labFlowControl->setAlignment(Qt::AlignCenter);

horizontalLayout\_14->addWidget(labFlowControl);

boxFlowControl = new QComboBox(MainWidget);

boxFlowControl->setObjectName(QStringLiteral("boxFlowControl"));

horizontalLayout\_14->addWidget(boxFlowControl);

verticalLayout\_2->addLayout(horizontalLayout\_14);

horizontalLayout\_15 = new QHBoxLayout();

horizontalLayout\_15->setSpacing(6);

horizontalLayout\_15->setObjectName(QStringLiteral("horizontalLayout\_15"));

btnRefresh = new QPushButton(MainWidget);

btnRefresh->setObjectName(QStringLiteral("btnRefresh"));

horizontalLayout\_15->addWidget(btnRefresh);

horizontalSpacer\_3 = new QSpacerItem(40, 20, QSizePolicy::Expanding, QSizePolicy::Minimum);

horizontalLayout\_15->addItem(horizontalSpacer\_3);

btnOpen = new QPushButton(MainWidget);

btnOpen->setObjectName(QStringLiteral("btnOpen"));

horizontalLayout\_15->addWidget(btnOpen);

verticalLayout\_2->addLayout(horizontalLayout\_15);

verticalSpacer = new QSpacerItem(20, 40, QSizePolicy::Minimum, QSizePolicy::Expanding);

verticalLayout\_2->addItem(verticalSpacer);

horizontalLayout\_16->addLayout(verticalLayout\_2);

verticalLayout = new QVBoxLayout();

verticalLayout->setSpacing(6);

verticalLayout->setObjectName(QStringLiteral("verticalLayout"));

labRecv = new QLabel(MainWidget);

labRecv->setObjectName(QStringLiteral("labRecv"));

verticalLayout->addWidget(labRecv);

textRecv = new QTextEdit(MainWidget);

textRecv->setObjectName(QStringLiteral("textRecv"));

verticalLayout->addWidget(textRecv);

labSend = new QLabel(MainWidget);

labSend->setObjectName(QStringLiteral("labSend"));

verticalLayout->addWidget(labSend);

textSend = new QTextEdit(MainWidget);

textSend->setObjectName(QStringLiteral("textSend"));

verticalLayout->addWidget(textSend);

horizontalLayout = new QHBoxLayout();

horizontalLayout->setSpacing(6);

horizontalLayout->setObjectName(QStringLiteral("horizontalLayout"));

horizontalSpacer = new QSpacerItem(40, 20, QSizePolicy::Expanding, QSizePolicy::Minimum);

horizontalLayout->addItem(horizontalSpacer);

btnSend = new QPushButton(MainWidget);

btnSend->setObjectName(QStringLiteral("btnSend"));

horizontalLayout->addWidget(btnSend);

verticalLayout->addLayout(horizontalLayout);

horizontalLayout\_16->addLayout(verticalLayout);

horizontalLayout\_16->setStretch(1, 1);

retranslateUi(MainWidget);

QMetaObject::connectSlotsByName(MainWidget);

} // setupUi

void retranslateUi(QWidget \*MainWidget)

{

MainWidget->setWindowTitle(QApplication::translate("MainWidget", "MainWidget", Q\_NULLPTR));

labPortName->setText(QApplication::translate("MainWidget", "\344\270\262\345\217\243\345\220\215\357\274\232", Q\_NULLPTR));

labBaudRate->setText(QApplication::translate("MainWidget", "\346\263\242\347\211\271\347\216\207\357\274\232", Q\_NULLPTR));

labDataBits->setText(QApplication::translate("MainWidget", "\346\225\260\346\215\256\344\275\215\357\274\232", Q\_NULLPTR));

labParity->setText(QApplication::translate("MainWidget", "\346\240\241\351\252\214\344\275\215\357\274\232", Q\_NULLPTR));

labStopBits->setText(QApplication::translate("MainWidget", "\345\201\234\346\255\242\344\275\215\357\274\232", Q\_NULLPTR));

labFlowControl->setText(QApplication::translate("MainWidget", "\346\265\201\346\216\247\345\210\266\357\274\232", Q\_NULLPTR));

btnRefresh->setText(QApplication::translate("MainWidget", "\345\210\267\346\226\260", Q\_NULLPTR));

btnOpen->setText(QApplication::translate("MainWidget", "\346\211\223\345\274\200", Q\_NULLPTR));

labRecv->setText(QApplication::translate("MainWidget", "\346\216\245\346\224\266\357\274\232", Q\_NULLPTR));

labSend->setText(QApplication::translate("MainWidget", "\345\217\221\351\200\201\357\274\232", Q\_NULLPTR));

btnSend->setText(QApplication::translate("MainWidget", "\345\217\221\351\200\201", Q\_NULLPTR));

} // retranslateUi

};

namespace Ui {

class MainWidget: public Ui\_MainWidget {};

} // namespace Ui

QT\_END\_NAMESPACE

#endif // UI\_MAINWIDGET\_H

main.cpp

#include "MainWidget.h"

#include <QApplication>

int main(int argc, char \*argv[])

{

QApplication a(argc, argv);

MainWidget w;

w.show();

return a.exec();

}

MainWidget.cpp

#include "MainWidget.h"

#include "ui\_MainWidget.h"

#include <QSerialPort>

#include <QSerialPortInfo>

#include <QListView>

#include <QDebug>

MainWidget::MainWidget(QWidget \*parent) :

QWidget(parent),

ui(new Ui::MainWidget)

{

ui->setupUi(this);

initSerial();

initMainUi();

}

MainWidget::~MainWidget()

{

delete ui;

}

void MainWidget::initSerial()

{

serialIo=new QSerialPort(this);

connect(serialIo,&QSerialPort::readyRead,this,&MainWidget::recvData);

refreshSerial();

ui->boxPortName->setView(new QListView(this));

//波特率

QStringList baudrateList;

baudrateList<<"1200"<<"2400"<<"4800"<<"9600"<<"19200"<<"38400"<<"57600"<<"115200";

ui->boxBaudRate->addItems(baudrateList);//添加下拉列表选项

ui->boxBaudRate->setEditable(true);//串口波特率可编辑

ui->boxBaudRate->setCurrentText("115200");//界面中初始值

ui->boxBaudRate->setView(new QListView(this));

QStringList databitList;

databitList<<"5"<<"6"<<"7"<<"8";

ui->boxDataBits->addItems(databitList);

ui->boxDataBits->setCurrentText("8");

ui->boxDataBits->setView(new QListView(this));

//校验位

QStringList parityList;

parityList<<"No"<<"Even偶"<<"Odd奇"<<"Space"<<"Mark";

ui->boxParity->addItems(parityList);

ui->boxParity->setCurrentText("No");

ui->boxParity->setView(new QListView(this));

//停止位

QStringList stopbitList;

stopbitList<<"1"<<"1.5"<<"2";

ui->boxStopBits->addItems(stopbitList);

ui->boxStopBits->setCurrentText("1");

ui->boxStopBits->setView(new QListView(this));

//流控制

QStringList flowctrlList;

flowctrlList<<"No"<<"Hardware"<<"Software";

ui->boxFlowControl->addItems(flowctrlList);

ui->boxFlowControl->setCurrentText("No");

ui->boxFlowControl->setView(new QListView(this));

}

void MainWidget::initMainUi()

{

//点击串口[开启]/[关闭]按钮

connect(ui->btnOpen,&QPushButton::clicked,this,[this](){

if(ui->btnOpen->text()=="打开"){

openSerial();

}else{

closeSerial();

}

});

//点击串口[刷新]按钮-刷新串口名列表

connect(ui->btnRefresh,&QPushButton::clicked,this,&MainWidget::refreshSerial);

//点击数据[发送]按钮

connect(ui->btnSend,&QPushButton::clicked,this,&MainWidget::sendData);

}

void MainWidget::openSerial()

{

const QString portnameStr=ui->boxPortName->currentText();

if(!portnameStr.isEmpty()){

QSerialPortInfo info(portnameStr);

if(info.isBusy()){

qDebug()<<"当前串口繁忙,可能已被占用,请确认后再连接"<<portnameStr;

return;

}

//

qint32 baudrate=ui->boxBaudRate->currentText().toInt();

QSerialPort::DataBits databit;

switch (ui->boxDataBits->currentIndex()) {

case 0:databit=QSerialPort::Data5; break;

case 1:databit=QSerialPort::Data6; break;

case 2:databit=QSerialPort::Data7; break;

case 3:databit=QSerialPort::Data8; break;

default:databit=QSerialPort::Data8; break;

}

QSerialPort::Parity parity;

switch (ui->boxParity->currentIndex()) {

case 0:parity=QSerialPort::NoParity; break;

case 1:parity=QSerialPort::EvenParity; break;

case 2:parity=QSerialPort::OddParity; break;

case 3:parity=QSerialPort::SpaceParity; break;

case 4:parity=QSerialPort::MarkParity; break;

default:parity=QSerialPort::NoParity; break;

}

QSerialPort::StopBits stopbit;

switch (ui->boxStopBits->currentIndex()) {

case 0:stopbit=QSerialPort::OneStop; break;

case 1:stopbit=QSerialPort::OneAndHalfStop; break;

case 2:stopbit=QSerialPort::TwoStop; break;

default:stopbit=QSerialPort::OneStop; break;

}

QSerialPort::FlowControl flowcontrol;

switch (ui->boxFlowControl->currentIndex()) {

case 0:flowcontrol=QSerialPort::NoFlowControl; break;

case 1:flowcontrol=QSerialPort::HardwareControl; break;

case 2:flowcontrol=QSerialPort::SoftwareControl; break;

default:flowcontrol=QSerialPort::NoFlowControl; break;

}

//串口配置设置

serialIo->setPortName(portnameStr);

serialIo->setBaudRate(baudrate);

serialIo->setDataBits(databit);

serialIo->setParity(parity);

serialIo->setStopBits(stopbit);

serialIo->setFlowControl(flowcontrol);

if(serialIo->open(QIODevice::ReadWrite)){

qDebug()<<"串口已打开,读写模式";

setSerialEnable(false);//改变ui状态

}else{

qDebug()<<"串口打开异常"<<portnameStr<<serialIo->errorString();

serialIo->clearError();

setSerialEnable(true);

}

}else{

qDebug()<<"未找到可用串口,请确认串口连接正常后点击刷新";

}

}

void MainWidget::closeSerial()

{

serialIo->clear();

serialIo->close();

qDebug()<<"串口已关闭";

setSerialEnable(true);

}

void MainWidget::refreshSerial()

{

ui->boxPortName->clear();

ui->boxPortName->addItems(getSerialPortNames());

}

QStringList MainWidget::getSerialPortNames()

{

QStringList slist;

foreach (const QSerialPortInfo &info, QSerialPortInfo::availablePorts()) {

//检测是否可用

if(!info.isBusy())

slist<<info.portName();

}

if(slist.isEmpty()){

qDebug()<<"未找到可用串口,请确认串口连接正常后点击刷新";

}

return slist;

}

void MainWidget::setSerialEnable(bool enabled)

{

//打开成功就false不能再修改配置，关闭状态true可以进行设置

ui->btnRefresh->setEnabled(enabled);

ui->btnOpen->setText(enabled?QString("打开"):QString("关闭"));

ui->boxPortName->setEnabled(enabled);

ui->boxBaudRate->setEnabled(enabled);

ui->boxDataBits->setEnabled(enabled);

ui->boxParity->setEnabled(enabled);

ui->boxStopBits->setEnabled(enabled);

ui->boxFlowControl->setEnabled(enabled);

}

void MainWidget::sendData()

{

const QByteArray send\_data=ui->textSend->toPlainText().toUtf8();

if(send\_data.size()<=0)

return;

if(serialIo->isOpen()){

serialIo->write(send\_data);

qDebug()<<"已发送："<<QString::fromUtf8(send\_data);

}else{

qDebug()<<"发送失败,串口未打开";

return;

}

if(!serialIo->waitForBytesWritten(30000)){

qDebug()<<"命令发送异常"<<serialIo->errorString();

serialIo->clearError();

}

}

void MainWidget::recvData()

{

if (serialIo->bytesAvailable()) {

const QByteArray recv\_data=serialIo->readAll();

ui->textRecv->append(QString::fromUtf8(recv\_data));

qDebug()<<"已接收："<<QString::fromUtf8(recv\_data);

}

}

MainWidget.ui

<?xml version="1.0" encoding="UTF-8"?>

<ui version="4.0">

<class>MainWidget</class>

<widget class="QWidget" name="MainWidget">

<property name="geometry">

<rect>

<x>0</x>

<y>0</y>

<width>671</width>

<height>433</height>

</rect>

</property>

<property name="windowTitle">

<string>MainWidget</string>

</property>

<layout class="QHBoxLayout" name="horizontalLayout\_16" stretch="0,1">

<item>

<layout class="QVBoxLayout" name="verticalLayout\_2">

<item>

<layout class="QHBoxLayout" name="horizontalLayout\_9">

<item>

<widget class="QLabel" name="labPortName">

<property name="text">

<string>串口名：</string>

</property>

<property name="alignment">

<set>Qt::AlignCenter</set>

</property>

</widget>

</item>

<item>

<widget class="QComboBox" name="boxPortName"/>

</item>

</layout>

</item>

<item>

<layout class="QHBoxLayout" name="horizontalLayout\_10">

<item>

<widget class="QLabel" name="labBaudRate">

<property name="text">

<string>波特率：</string>

</property>

<property name="alignment">

<set>Qt::AlignCenter</set>

</property>

</widget>

</item>

<item>

<widget class="QComboBox" name="boxBaudRate"/>

</item>

</layout>

</item>

<item>

<layout class="QHBoxLayout" name="horizontalLayout\_11">

<item>

<widget class="QLabel" name="labDataBits">

<property name="text">

<string>数据位：</string>

</property>

<property name="alignment">

<set>Qt::AlignCenter</set>

</property>

</widget>

</item>

<item>

<widget class="QComboBox" name="boxDataBits"/>

</item>

</layout>

</item>

<item>

<layout class="QHBoxLayout" name="horizontalLayout\_12">

<item>

<widget class="QLabel" name="labParity">

<property name="text">

<string>校验位：</string>

</property>

<property name="alignment">

<set>Qt::AlignCenter</set>

</property>

</widget>

</item>

<item>

<widget class="QComboBox" name="boxParity"/>

</item>

</layout>

</item>

<item>

<layout class="QHBoxLayout" name="horizontalLayout\_13">

<item>

<widget class="QLabel" name="labStopBits">

<property name="text">

<string>停止位：</string>

</property>

<property name="alignment">

<set>Qt::AlignCenter</set>

</property>

</widget>

</item>

<item>

<widget class="QComboBox" name="boxStopBits"/>

</item>

</layout>

</item>

<item>

<layout class="QHBoxLayout" name="horizontalLayout\_14">

<item>

<widget class="QLabel" name="labFlowControl">

<property name="text">

<string>流控制：</string>

</property>

<property name="alignment">

<set>Qt::AlignCenter</set>

</property>

</widget>

</item>

<item>

<widget class="QComboBox" name="boxFlowControl"/>

</item>

</layout>

</item>

<item>

<layout class="QHBoxLayout" name="horizontalLayout\_15">

<item>

<widget class="QPushButton" name="btnRefresh">

<property name="text">

<string>刷新</string>

</property>

</widget>

</item>

<item>

<spacer name="horizontalSpacer\_3">

<property name="orientation">

<enum>Qt::Horizontal</enum>

</property>

<property name="sizeHint" stdset="0">

<size>

<width>40</width>

<height>20</height>

</size>

</property>

</spacer>

</item>

<item>

<widget class="QPushButton" name="btnOpen">

<property name="text">

<string>打开</string>

</property>

</widget>

</item>

</layout>

</item>

<item>

<spacer name="verticalSpacer">

<property name="orientation">

<enum>Qt::Vertical</enum>

</property>

<property name="sizeHint" stdset="0">

<size>

<width>20</width>

<height>40</height>

</size>

</property>

</spacer>

</item>

</layout>

</item>

<item>

<layout class="QVBoxLayout" name="verticalLayout">

<item>

<widget class="QLabel" name="labRecv">

<property name="text">

<string>接收：</string>

</property>

</widget>

</item>

<item>

<widget class="QTextEdit" name="textRecv"/>

</item>

<item>

<widget class="QLabel" name="labSend">

<property name="text">

<string>发送：</string>

</property>

</widget>

</item>

<item>

<widget class="QTextEdit" name="textSend"/>

</item>

<item>

<layout class="QHBoxLayout" name="horizontalLayout">

<item>

<spacer name="horizontalSpacer">

<property name="orientation">

<enum>Qt::Horizontal</enum>

</property>

<property name="sizeHint" stdset="0">

<size>

<width>40</width>

<height>20</height>

</size>

</property>

</spacer>

</item>

<item>

<widget class="QPushButton" name="btnSend">

<property name="text">

<string>发送</string>

</property>

</widget>

</item>

</layout>

</item>

</layout>

</item>

</layout>

</widget>

<layoutdefault spacing="6" margin="11"/>

<resources/>

<connections/>

</ui>

实验结果：

