**仪器接口程序说明文档**

1. **接口说明**

|  |  |  |  |
| --- | --- | --- | --- |
| 仪器厂商 | 日立 | 适用型号 | **800** |
| 通讯方式 | 双向 | 仪器类型 | 生化 |
| 医院 | 航空总院 | | |
| 程序名称 | MI.MIFHITACHI800BI | | |
| 附件 | 通讯文档（  接口源码（MI.MIFHITACHI800BI.txt） | | |

1. **连接说明**

**连接方式：**串口 ~~串口线接仪器主机/~~串口线接仪器配备电脑

**是否支持其他连接方式**：~~网口，读文本，读数据库~~

**3.串口盒子设定参数**

**1）串口盒子型号及线序**

**MOXA 5410**

RS232 母对母 23交叉5直连

**2）盒子及仪器设定参数**

|  |  |  |  |
| --- | --- | --- | --- |
| 序号 | 选项中文名称 | 选项英文名称 | 设置 |
| 1 | 波特率 | Baud | 9600 |
| 2 | 数据位 | Code | 8 |
| 3 | 停止位 | Stop Bit | 1 |
| 4 | 奇偶校验 | Parity Bit | None |
| 5 | 模式 | Mode | RS232 |
| 6 | 流量控制 | Flow | None |

1. **仪器参数设定说明（保留仪器设置图片存档）**

仪器上设置：分析仪设置-实验室计算机设置

仪器管理设置：

**5.仪器数据传输说明**

1）仪器自动传输结果：支持

2）手工传输结果：支持

**手动传输操作图片**

**6．修改记录**

|  |  |  |  |
| --- | --- | --- | --- |
| 序号 | 日期 | 操作人 | 说明 |
| 1 | 2016-5-25 | 刘彬 | 双向 |

1. **数据格式：**

**H<--M : 2018-08-01 12:54:15 : ENQ**

**H-->M : 2018-08-01 12:54:15 : ACK**

**H<--M : 2018-08-01 12:54:16 : H|\^&|||LST008AS^1|||||HOST|TSREQ^REAL|P|1【13】Q|1|^^1808012067^0^50089^1^^S1^SC^R1||ALL||||||||O【13】L|1|N【13】【3】61**

**H-->M : 2018-08-01 12:54:16 : ACK**

**H<--M : 2018-08-01 12:54:16 : EOT**

**H-->M : 2018-08-01 12:54:16 : ENQ**

**1H<--M : 2018-08-01 12:54:16 : ACK**

**H-->M : 2018-08-01 12:54:16 : 1H|\^&|||host^1|||||LST008AS|TSDWN^REPLY|P|1【13】P|1|||||||M||||||48^Y【13】O|1|1808012067|1^50089^1^^S1^SC|^^^27921^\^^^27922^\^^^27923^\^^^27933^|R||20180801125416||||A||||1||||||||||O【13】C|1|I|comment1^comment2^comment3^comment4^comment5|G【13】L|1|N【13】【3】49**

**H<--M : 2018-08-01 12:54:16 : ACK**

**H-->M : 2018-08-01 12:54:16 : EOT**

**8.接口程序**

**//// MI.MIFHITACHI800BI**

**/// 名称: MI.MIFHITACHI800BI**

**/// 描述: HITACHI800 仪器接口**

**/// 通讯方式：双向,半双工**

**/// 编写者:BLiu**

**/// 编写日期: 20180801**

**MIFHITACHI800BI(mi) ; 3/17/04 ; ASTM protocol - H7600**

**s mi=$g(mi)**

**S ^TMPMACH10(mi,104)=$H**

**i '$l(mi) q**

**s ItemDeli=$li(^dbo.BTMIMachineParameterD(mi),12) //项目分隔符**

**s ResultDeli=$li(^dbo.BTMIMachineParameterD(mi),13) //结果分隔符**

**s AntDeli=$li(^dbo.BTMIMachineParameterD(mi),14) //抗生素分隔符**

**s SenDeli=$li(^dbo.BTMIMachineParameterD(mi),15) //药敏结果分隔符**

**s Port="|TCP|"\_$li(^dbo.BTMIMachineParameterD(mi),17) //端口号**

**//控制字符**

**SET $ZTRAP="ErrHandler"**

**S iERR=0**

**s stx=$c(2),etx=$c(3),ack=$c(6),enq=$c(5),eot=$c(4)**

**s lf=$c(10),cr=$c(13),nak=$c(21),(result,epis)="",etb=$c(23)**

**S ^TMPMACH10(mi,102)=$H**

**i $$Start^MI.MIF000(mi) q**

**f d Main i $$Stop^MI.MIF000(mi) q**

**c Port**

**q**

**ErrHandler**

**d Trace^MI.MIF000(mi,$TR($ZERROR,"^","--")\_".错误代码:"\_$ECODE,"Runtime Error")**

**s iERR=+$g(iERR)+1**

**i iERR>30 s ret=$$Stop^MI.MIF000(mi)**

**h 10**

**Q**

**Main r \*R:10 e d q**

**.d BUILD**

**.//自动上传**

**.d BUILD2**

**i $c(R)=enq d**

**.s AllRecord=""**

**.d Trace^MI.MIF000(mi,"ENQ","H<--M")**

**.d ACK**

**.f r \*R:10 q:$c(R)=eot d**

**..i $c(R)'=stx q**

**..s record=$$Read^MI.MIF000(mi,"",lf) q:'$l(record)**

**..s record=$e(record,2,$l(record)-1)**

**..d Trace^MI.MIF000(mi,record,"H<--M")**

**..s AllRecord=AllRecord\_$p(record,etb,1)**

**..d ACK**

**.d Trace^MI.MIF000(mi,$s($c(R)=eot:"EOT",1:R),"H<--M")**

**.i $c(R)=eot,$l(AllRecord) d**

**..s (mid,sample,epis,surname,rec,res,result,date,time,QC,Pflag,code)=""**

**..f i=1:1:$l(AllRecord,cr) d**

**...s rec=$p(AllRecord,cr,i)**

**...s type=$tr($p(rec,"|")," ")**

**...i type="H" d q**

**....s (mid,sample,epis,surname,rec,res,result,date,time,QC,racksid,rackno,code)=""**

**...i type="Q" d q**

**....;Q|1|^^0/\*\*\*\*\*\*\*\*\*\*\*\*\*/1/5527/5/R1/R||||||||||A"\_$c(13)\_"**

**....;Q|1|^^1801240031^0^50050^1^^S1^SC^R1||**

**....s temstr=$p($p(rec,"|",3),"^",3)**

**....s temlabno=temstr //$tr($P(temstr,"^",2),"\*")**

**....i '$l(temlabno) q**

**....s racksid=$tr($p(rec,"^",5)," ")**

**....s rackno=$tr($p(rec,"^",6)," ")**

**....S temlabno=$tr(temlabno," ")**

**....i '$l(temlabno) q**

**....s ^TMP($zn,$j,"ENQ",temlabno)=racksid\_"^"\_rackno**

**...//------------------------------------**

**...i type="O" d q**

**....s epis=$tr($p($p(rec,"|",3),"^",2)," ")**

**....s epis=$tr($p(rec,"|",3)," ")**

**....if epis="" s epis=$tr($p($p(rec,"|",3),"^",1)," ")**

**....s qcid=$tr($p($p(rec,"|",3),"^",2)," ")**

**....s qcid=$tr(qcid,"-")**

**....s QCStat=$tr($p(rec,"|",4)," ")**

**....s SpecStat=$tr($p(rec,"|",6)," ")**

**....i SpecStat="S" s epis=epis //s epis="E"\_epis**

**....i QCStat="Q" s QC="\"\_qcid,epis=qcid**

**....;s QC=$$findQC^MIF000(mi,epis)**

**....s datex=$p(rec,"|",23)**

**....//s date=$e(datex,5,6)\_"/"\_$e(datex,7,8)\_"/"\_$e(datex,1,4) ;,date=$$intdate^SSUTIL4(date)**

**....//s time=$e(datex,9,10)\_":"\_$e(datex,11,12)\_":"\_$e(datex,13,14) ;,time=$$inttime^SSUTIL4(time1)**

**...//--------------------**

**...i type="R" d q**

**....s code=$tr($p($p($p(rec,"|",3),"^",4),"/",1)," ")**

**....s mid1=$p(rec,"|",14)**

**....If mid1="ISE1" Set mid1=""**

**....If mid1'="" s mid=mid1**

**....s res=$p(rec,"|",4)**

**...i type="C" d q**

**....//-----FLAG---DaiYi 2010-07-12**

**....s resFlag=$p(rec,"|",4)**

**....If resFlag=0 Set resFlag=""**

**....If resFlag=26 Set resFlag="$"**

**....If resFlag=5 Set resFlag="Z"**

**....If resFlag=43 Set resFlag="!"**

**....If resFlag=1 Set resFlag="A"**

**....If resFlag=2 Set resFlag="Q"**

**....If resFlag=3 Set resFlag="V"**

**....If resFlag=4 Set resFlag="T"**

**....If resFlag=6 Set resFlag="P"**

**....If resFlag=7 Set resFlag="I"**

**....If resFlag=8 Set resFlag="J"**

**....If resFlag=9 Set resFlag="K"**

**....If resFlag=10 Set resFlag="W"**

**....If resFlag=11 Set resFlag="F"**

**....If resFlag=12 Set resFlag="H"**

**....If resFlag=13 Set resFlag="U"**

**....If resFlag=14 Set resFlag="S"**

**....If resFlag=15 Set resFlag="Y"**

**....If resFlag=16 Set resFlag="G"**

**....If resFlag=17 Set resFlag="B"**

**....If resFlag=18 Set resFlag="N"**

**....If resFlag=19 Set resFlag="L"**

**....If resFlag=20 Set resFlag="E"**

**....If resFlag=21 Set resFlag="R"**

**....If resFlag=22 Set resFlag="D"**

**....If resFlag=23 Set resFlag="&"**

**....If resFlag=24 Set resFlag="Z"**

**....If resFlag=25 Set resFlag="M"**

**....If resFlag=27 Set resFlag="$"**

**....If resFlag=28 Set resFlag="@"**

**....If resFlag=29 Set resFlag="#"**

**....If resFlag=30 Set resFlag="#"**

**....If resFlag=31 Set resFlag="#"**

**....If resFlag=32 Set resFlag="#"**

**....If resFlag=33 Set resFlag="#"**

**....If resFlag=34 Set resFlag="#"**

**....If resFlag=35 Set resFlag="+"**

**....If resFlag=36 Set resFlag="+"**

**....If resFlag=37 Set resFlag="%"**

**....If resFlag=38 Set resFlag="O"**

**....If resFlag=39 Set resFlag="X"**

**....If resFlag=42 Set resFlag="'"**

**....If resFlag=43 Set resFlag="!"**

**....If resFlag=44 Set resFlag="="**

**....If resFlag=45 Set resFlag="="**

**....If resFlag=46 Set resFlag=">"**

**....If resFlag=51 Set resFlag=":"**

**....If resFlag=52 Set resFlag=";"**

**....If resFlag=53 Set resFlag="/"**

**....If resFlag=55 Set resFlag="r"**

**....If resFlag=62 Set resFlag="g"**

**....If resFlag=63 Set resFlag="a"**

**....If resFlag=64 Set resFlag="b"**

**....If resFlag=65 Set resFlag="p"**

**....If resFlag=66 Set resFlag="q"**

**....If resFlag=67 Set resFlag="h"**

**....If resFlag=68 Set resFlag="k"**

**....If resFlag=69 Set resFlag="m"**

**....If resFlag=70 Set resFlag="f"**

**....If resFlag=71 Set resFlag="d"**

**....If resFlag=72 Set resFlag="e"**

**....If resFlag=74 Set resFlag="y"**

**....If resFlag=75 Set resFlag="t"**

**....If resFlag=76 Set resFlag="s"**

**....If resFlag=77 Set resFlag="c"**

**....If resFlag=86 Set resFlag="u"**

**....If resFlag=87 Set resFlag="n"**

**....If resFlag=93 Set resFlag="z"**

**....If resFlag=94 Set resFlag="]"**

**....If resFlag=95 Set resFlag="["**

**....If resFlag=96 Set resFlag="["**

**....If resFlag=97 Set resFlag="}"**

**....If resFlag=98 Set resFlag="v"**

**....If resFlag=99 Set resFlag="w"**

**....If resFlag=100 Set resFlag="<"**

**....If resFlag=101 Set resFlag="￥"**

**....;s result=result\_code\_ResultDeli\_res\_$c(92,92,92)\_resFlag\_$c(44)**

**....I $l(code),$L(res) s result=result\_code\_ResultDeli\_res\_ItemDeli**

**....//------------------------------------------------**

**...i type="L" d Last q**

**q**

**Last ; file result if exist**

**s AllRecord=""**

**d BUILD**

**d Trace^MI.MIF000(mi,mi,"1H<--M")**

**d Trace^MI.MIF000(mi,result,"1H<--M")**

**//s epis=9775**

**i $l(epis),$l(result) d Save^MI.MIF000(mi,epis,result,date,time,QC)**

**s (epis,result,date,time,QC)=""**

**q**

**BUILD**

**i '$d(^TMP($zn)) q**

**i '$d(^TMP($zn,$j)) q**

**s labno="" f s labno=$o(^TMP($zn,$j,"ENQ",labno)) q:labno="" d**

**.;根据预置条码号取得检验条码号**

**.;s ^aai200(763,labno)=""**

**.//s labno1=$$GetLabNo^CHDhcLabDoEpis(labno)**

**.//s ^aai200(764,labno)=labno1\_","\_labno\_","\_mi**

**.//----判断日志条码和系统条码是否一样----**

**.//If labno=labno1 Quit**

**.//--------------------------------------**

**.d ScanOne^MI.MIF000(mi,labno)**

**.s tcx=""**

**.s chl="" f s chl=$o(^TMP("MIFTESTCODE",$j,mi,labno,chl)) q:chl="" d**

**..s tcx=tcx\_"^^^"\_$p(chl,"\_",1)\_"^\"**

**.s tcx=$e(tcx,1,$l(tcx)-1)**

**.;s xx=$$extdate2^SSUTIL4($h),date=$p(xx,"/",3)\_$p(xx,"/",2)\_$p(xx,"/",1)**

**.;s xx=$$exttime^SSUTIL4($p($h,",",2)),time=$p(xx,":",1)\_$p(xx,":",2)\_"00"**

**.s date=$tr($zd($h,3),"-")**

**.s time=$tr($zt($p($h,",",2)),":")**

**.s temepis=""**

**.s str="H|\^&|||host^1|||||LST008AS|TSDWN^REPLY|P|1"\_cr**

**.s str=str\_"P|1|||||||M||||||48^Y"\_cr**

**.s samtype="1"**

**.s racksid=$p(^TMP($zn,$j,"ENQ",labno),"^",1)**

**.s rackno=$p(^TMP($zn,$j,"ENQ",labno),"^",2)**

**.i labno="N" s labno=""**

**.;d SetTSMachine(mi,labno,racksid,rackno)**

**.s str=str\_"O|1|"\_labno\_"|"\_samtype\_"^"\_racksid\_"^"\_rackno\_"^^S1^SC|"**

**.s str=str\_tcx\_"|R||"\_date\_time\_"||||A||||1||||||||||O"\_cr**

**.s str=str\_"C|1|I|comment1^comment2^comment3^comment4^comment5|G"\_cr**

**.s str=str\_"L|1|N"\_cr**

**.d Send(labno,str)**

**.k ^TMP($zn,$j,"ENQ")**

**q**

**//读取自动上传的标本**

**BUILD2**

**K ^TMP($zn,$j)**

**s LabnoList=""**

**S AddDate=$tr($zd(+$h,3),"-")**

**s ^TMP("MI",1)=AddDate**

**s AddTime="" f s AddTime=$o(^dbo.RPMachineUploadI("IndexSendStatus",mi," C",AddDate,AddTime)) q:AddTime="" d**

**.s MiUploadDR=$o(^dbo.RPMachineUploadI("IndexSendStatus",mi," C",AddDate,AddTime,""))**

**.s Labno=$lg(^dbo.RPMachineUploadD(MiUploadDR),3)**

**.//H 1 //每隔2S处理一个标本上传**

**.S SIMAck=$$BUILD3()**

**.I SIMAck=0 D**

**..s err=##Class(MI.MachineUpload).SetSendFlag(mi,Labno,"S","") //成功**

**.E D**

**..s err=##Class(MI.MachineUpload).SetSendFlag(mi,Labno,"F","") //失败**

**q**

**BUILD3() ;**

**S episx=Labno,Labno=$P(Labno,"-",1),suffix="",RetAck=1**

**s VisitNumberDR=$o(^dbo.RPVisitNumberI("IndexVisitNumber",$c(32)\_Labno,""))**

**i '$l(VisitNumberDR) q 1**

**s WorkGPMiDR=$o(^dbo.RPVisitNumberReportI("IndexReportID",VisitNumberDR, ""))**

**i WorkGPMiDR="" q 1**

**s RptOrder=$o(^dbo.RPVisitNumberReportI("IndexReportID",VisitNumberDR, WorkGPMiDR,""))**

**i RptOrder="" q 1**

**s ReportDR=$o(^dbo.RPVisitNumberReportI("IndexReportID",VisitNumberDR, WorkGPMiDR,RptOrder,""))**

**i ReportDR="" q 1**

**s EpisodeNo=$lg($g(^dbo.RPVisitNumberReportD(ReportDR)),8)**

**i EpisodeNo="" q 1**

**s epis=EpisodeNo**

**d ScanOne^MI.MIF000(mi,Labno) ;创建上传化验项目列表**

**i '$D(^TMP("MIFTESTCODE",$j,mi,Labno)) q 1**

**s tcx=""**

**s chl="" f s chl=$o(^TMP("MIFTESTCODE",$j,mi,Labno,chl)) q:chl="" d**

**..s tcx=tcx\_"^^^"\_$p(chl,"\_",1)\_"/\"**

**s tcx=$e(tcx,1,$l(tcx)-1)**

**s date=$tr($zd(+$h,3),"-")**

**s time=$tr($zt($p($h,",",2)),":")**

**s str="1H|\^&|||H7600^1|||||host|TSDWN^REPLY|P|1"\_cr**

**s str=str\_"P|1"\_cr**

**s str=str\_"O|1|"\_epis\_"^ ^1^^|R1|"**

**s str=str\_tcx\_"|R||"\_date\_time\_"||||N||||||||^^^^||||||O"\_cr**

**s str=str\_"L|1|N"\_cr**

**d Send(epis,str)**

**Q 0**

**//给检验号赋仪器和位置号**

**SetTSMachine(mi,labno,rack,pos) n (mi,labno,rack,pos)**

**s mi=$g(mi),labno=$g(labno),rack=$g(rack),pos=$g(pos)**

**If $Data(^DHCSndLabNo(labno)) Set ^DHCSndLabNo(labno)=labno\_"\"\_rack\_"-"\_pos\_"\"**

**q**

**ORDER ; create list of orders if exists ; ^DHCMIFLoadList(mi,"PEND",flowno) 暂时存储上传医嘱列表**

**s ord="" f s ord=$o(^DHCMIFLoadList(mi,"PEND",ord)) q:ord="" d**

**.s rectemp=$g(^DHCMIFLoadList(mi,"PEND",ord))**

**.s epis=ord**

**.s (str,tcs,date,time)=""**

**.;化验项目列表**

**.f i=1:1:$l(rectemp,",") d**

**..s tc=$p(rectemp,",",i)**

**..q:tc=""**

**..s tcs=tcs\_"^^^"\_tc\_"/\"**

**.s tcs=$e(tcs,1,$l(tcs)-1)**

**.;日期时间**

**.s date=$p($h,"/",3)\_$p($h,"/",2)\_$p($h,"/",1)**

**.s xx=$p($h,",",2),time=$p(xx,":",1)\_$p(xx,":",2)\_"00"**

**.;s xx=$$extdate2^SSUTIL4($h),date=$p(xx,"/",3)\_$p(xx,"/",2)\_$p(xx,"/",1)**

**.;s xx=$$exttime^SSUTIL4($p($h,",",2)),time=$p(xx,":",1)\_$p(xx,":",2)\_"00"**

**.s str="H|\^&|||HOST^1|||||1-99999|TSDWN^REPLY|P|1"\_cr**

**.s str=str\_"P|1"\_cr**

**.s str=str\_"O|1|"\_epis\_"^ ^1^^|R1|"**

**.s str=str\_tcs\_"|R||"\_date\_time\_"||||N||||||||^^^^||||||O"\_cr**

**.s str=str\_"L|1|N"\_cr**

**.d Send(epis,str)**

**.s ^DHCMIFLoadList(mi,"TRAN",epis)=$g(^DHCMIFLoadList(mi,"PEND",epis)) ;保存已传输数据**

**.k ^DHCMIFLoadList(mi,"PEND",epis) ;删除待传输数据**

**q**

**Send(epis,str) ; send list of orders if exists**

**w enq,\*-3 d Trace^MI.MIF000(mi,"ENQ","H-->M")**

**f j=1:1:10 r \*R:1 i $c(R)=ack!($c(R)=enq) q**

**d Trace^MI.MIF000(mi,$s($c(R)=ack:"ACK",$c(R)=enq:"ENQ",$c(R)=nak:"NAK",1:R),"1H<--M")**

**i $c(R)=enq q**

**i $c(R)'=ack w eot,\*-3 d Trace^MI.MIF000(mi,"EOT","H-->M") q**

**/\*i $l(str)>241 d**

**.s str1=$e(str,1,241)**

**.s ret=$$SEND(str1,1)**

**.s str2="2"\_$e(str,242,$l(str))**

**.s ret=$$SEND(str2,0)**

**e d**

**.s ret=$$SEND(str,0)**

**\*/**

**f len=1:1:5 d**

**.s str1=$e(str,(len-1)\*(220)+len,220\*len+len)**

**.s str2=$e(str,(len)\*(220)+len+1,220\*(len+1)+len+1)**

**.i '$l(str1) q**

**.i $l(str2) d**

**..s str1=len\_str1**

**..s ret=$$SEND(str1,1)**

**.e d**

**..s str1=len\_str1**

**..s ret=$$SEND(str1,0)**

**w eot,\*-3 d Trace^MI.MIF000(mi,"EOT","H-->M")**

**q**

**SEND(str,flag) ; send string to instrument**

**i flag=1 d**

**.s str=str\_etb**

**.s chsum=$$CHSUM(str)**

**e d**

**.s str=str\_etx**

**.s chsum=$$CHSUM(str)**

**w stx,str,chsum,cr,lf,\*-3 d Trace^MI.MIF000(mi,str\_chsum,"H-->M")**

**f j=1:1:6 r \*R:1 i ($c(R)=ack)!($c(R)=eot) q**

**i $c(R)=ack d Trace^MI.MIF000(mi,"ACK","H<--M") q 0**

**i $c(R)=eot d Trace^MI.MIF000(mi,"EOT","H<--M") q 0**

**i $c(R)=-1 w nak,\*-3**

**d Trace^MI.MIF000(mi,R,"H<--M")**

**q 1**

**CHSUM(x) ; calculate check sum**

**n (x) s z=0 f y=1:1:$l(x) s z=z+$a(x,y)**

**s z=$e("0123456789ABCDEF",z#256\16+1)\_$e("0123456789ABCDEF",z#16+1)**

**q z**

**ACK ; send 'ack' to instrument**

**w ack,\*-3**

**d Trace^MI.MIF000(mi,"ACK","H-->M")**

**q**

**NEXTTRAY(tray)**

**q tray**