Description of AVE2.0 LIS Communication

Content

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1. Introduction

These instructions provide the necessary information to interface the AVE Analyzer system (Instrument) to a Laboratory Information System (LIS). The interface between AVE2.0 system and the LIS could be a standard network port (RJ45). Via standard network port, unidirectional communication accessed instrument database by LIS host and bidirectional communication by configuring database (Microsoft SQL Server or Oracle) mapping between instrument and LIS host are available.

The user can choose any one of those interface to achieve communication between instrument and LIS host.

2. RJ45 Interface

Via standard network port (RJ45), unidirectional and bidirectional communication are available between AVE Analyzer and LIS host. By accessing the database (Microsoft SQL server) of AVE Analyzer, LIS host could unidirectional communicated with AVE Analyzer. By configuring database (Microsoft SQL Server or Oracle) mapping between AVE Analyzer and LIS host, bidirectional communication are available.

- ***Interface standard***

  The communication between AVE Analyzer and the LIS host is a standard network (RS232) communication.
- ***Hardware Interface***

  Cable

  The Analyzer connects to the LIS via a standard network port

  Cable Length

  Theoretically, the cable length is unlimited.

2.1 Protocol based on accessing database

2.1.1 Overview

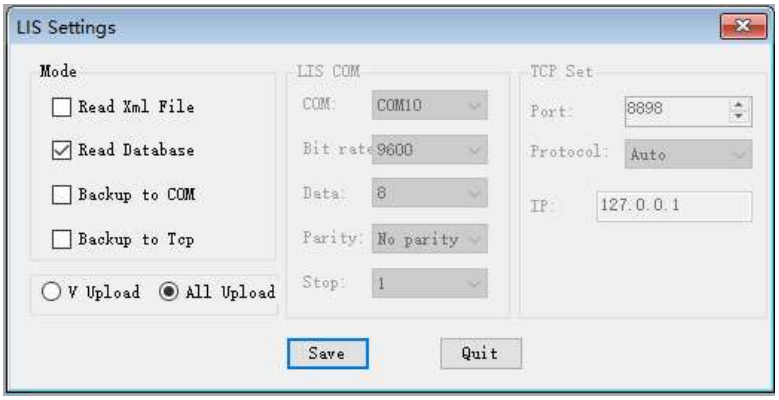
Ave2.0 system bases on Microsoft SQL Server for data or result processing, and define table named **StoolToLis** as the data source for LIS host accessing. The LIS host can define and pick the corresponding items requested by the laboratory or LIS host.

- ***Definitions***

  AVE2—Database name of AVE2.0 system

  StoolToLis—Database table for accessing
- ***Enable protocol***

  The user can go to Management-LIS Setting-Data out Setting, and in the **LIS setting** screen choose **Read Database** to enable.



- ***Transmission Mode***

  Off

  No communication between the instrument and LIS.

  Unidirectional communication

  LIS host access the data string from the instrument. The message, which includes patient information, urine sediment and chemistry results, will be written into **StoolToLis** table automatically when the measurement is finished.

2.1.2 Message

One single string in StoolToLis table is a message of one single patient. The string includes patient information, urine sediment and chemistry results. If there is no record, the corresponding field will record as Null.

Description of the fields name in StoolToLis:

Field name	Description
SickSampleID	Sample ID indentified in AVE system (internal use*)
SickDate	Measurement Date
UpdateFlag	Update flag, set to 1 after update, and set to 0 after LIS reading
SickExamineID	Sample ID (internal use)
StoolSeqID	Microscopy result ID (internal use)
OBSeqID	Chemistry result ID (internal use)
BarCode	Barcode ID
ExtendType	Extend exam item(no use)
State	Sample status (V, NV, R…)
InpatientNum	Inpatient ID
SickName	Patient’s Name
Sex	Patient’s gender
Age	Patient’s age
AgeUnit	Age unit (0:year; 1:mouth; 2:day; 3:hour)
SectionNum	Department the patient belongs to
SickbedNum	Inpatient’s bed ID
MedicalNum	Medical record ID

CheckDist	Measurement purpose
Result	clinical diagnosis of the sample
SwatchState	Sample's status
Sender	Clinician's name
Verifier	Operator who performs the measurement
Assessor	Auditor who verifies the measurement result
SampleDate	Sampling time when the sample is intake to the instrument
CheckDate	Verified time when the measurement result is verified
ReportDate	Reporting time when the verified result is printed out
LastAuditTime	Last modify time
Remark	Standby(no use)
ColorSet	Sample's color
Characters	Sample's Characters
Conduct	Sample's conductivity value
IsCondense	The sample is centrifuged or not (no use)
IsDilute	The sample is diluted or not (no use)
UserID	Operator ID (internal use)
StoolSampleID	Sample ID (displayed on the screen*)
StoolDate	The date when sample is measured
StoolExamineID	Microscopy ID (displayed on the screen)
StoolExamType	Standby(no use)
StoolTubeRackNo	Sample rack No.(internal use)
StoolTubeNo	Sample tube No. (internal use)
StoolBarCode	Barcode of sample result
StoolExperType	Examine type(no use)
StoolPrintPath	Image path to access
PrintImage	Which exactly image to access
Rbc	RBC cell/ul result
RbcRef	RBC reference value
RbcPF	RBC per field result
RbcPFRef	RBC per field result reference value
Wbc	WBC cell/ul result
WbcRef	WBC reference value
WbcPF	WBC per field result
WbcPFRef	WBC per field result reference value
Phag	Phagocyte cell/ul result
PhagRef	Phagocyte reference value
PhagPF	Phagocyte per field result
PhagPFRef	Phagocyte per field result reference value
Fat	Fat globule cell/ul result
FatRef	Fat globule reference value

FatPF	Fat globule per field result
FatPFRef	Fat globule per field result reference value
Fung	Yeast cell/ul result
FungRef	Yeast reference value
FungPF	Yeast per field result
FungPFRef	Yeast per field result reference value
Eggs	Parasite egg cell/ul result
EggsRef	Parasite egg reference value
EggsPF	Parasite egg per field result
EggsPFRef	Parasite egg per field result reference value
Prot	Parasite cell/ul result
ProtRef	Parasite reference value
ProtPF	Parasite per field result
ProtPFRef	Parasite per field result reference value
Crys	Crystal cell/ul result
CrysRef	Crystal reference value
CrysPF	Crystal per field result
CrysPFRef	Crystal per field result reference value
Bact	Bacteria cell/ul result
BactRef	Bacteria reference value
BactPF	Bacteria per field result
BactPFRef	Bacteria per field result reference value
Tric	Infusorian cell/ul result
TricRef	Infusorian reference value
TricPF	Infusorian per field result
TricPFRef	Infusorian per field result reference value
Epit	Epithelium cell/ul result
EpitRef	Epithelium reference value
EpitPF	Epithelium per field result
EpitPFRef	Epithelium per field result reference value
EggsH	Ascaris egg cell/ul result
EggsHRef	Ascaris egg reference value
EggsHPF	Ascaris egg per field result
EggsHPFRef	Ascaris egg per field result reference value
EggsGou	Hookworm egg cell/ul result
EggsGouRef	Hookworm egg reference value
EggsGouPF	Hookworm egg per field result
EggsGouPFRef	Hookworm egg per field result reference value
EggsB	Whipworm egg cell/ul result
EggsBRef	Whipworm egg reference value
EggsBPF	Whipworm egg per field result

EggsBPFRef	Whipworm egg per field result reference value
EggsN	Pinworm egg cell/ul result
EggsNRef	Pinworm egg reference value
EggsNPF	Pinworm egg per field result
EggsNPFRef	Pinworm egg per field result reference value
EggsX	Schistosome egg cell/ul result
EggsXRef	Schistosome egg reference value
EggsXPF	Schistosome egg per field result
EggsXPFRef	Schistosome egg per field result reference value
EggsF	Paragonimus egg cell/ul result
EggsFRef	Paragonimus egg reference value
EggsFPF	Paragonimus egg per field result
EggsFPFRef	Paragonimus egg per field result reference value
EggsGan	Liver fluke egg cell/ul result
EggsGanRef	Liver fluke egg reference value
EggsGanPF	Liver fluke egg per field result
EggsGanPFRef	Liver fluke egg per field result reference value
EggsJ	Fasciolopsis egg cell/ul result
EggsJRef	Fasciolopsis egg reference value
EggsJPF	Fasciolopsis egg per field result
EggsJPFRef	Fasciolopsis egg per field result reference value
EggsZ	Taenia solium egg cell/ul result
EggsZRef	Taenia solium egg reference value
EggsZPF	Taenia solium egg per field result
EggsZPFRef	Taenia solium egg per field result reference value
EggsNiu	Beef tapeworm egg cell/ul result
EggsNiuRef	Beef tapeworm egg reference value
EggsNiuPF	Beef tapeworm egg per field result
EggsNiuPFRef	Beef tapeworm egg per field result reference value
EggsQ	Other eggs cell/ul result
EggsQRef	Other eggs reference value
EggsQPF	Other eggs per field result
EggsQPFRef	Other eggs per field result reference value
ProtA	Amoeba trophozoite cell/ul result
ProtARef	Amoeba trophozoite reference value
ProtAPF	Amoeba trophozoite per field result
ProtAPFRef	Amoeba trophozoite per field result reference value
ProtAn	Acanthamoeba cell/ul result
ProtAnRef	Acanthamoeba reference value
ProtAnPF	Acanthamoeba per field result
ProtAnPFRef	Acanthamoeba per field result reference value

ProtL	Giardia lamblia trophozoite cell/ul result
ProtLRef	Giardia lamblia trophozoite reference value
ProtLPF	Giardia lamblia trophozoite per field result
ProtLPFRef	Giardia lamblia trophozoite per field result reference value
ProtLn	Giardia lamblia encyst cell/ul result
ProtLnRef	Giardia lamblia encyst reference value
ProtLnPF	Giardia lamblia encyst per field result
ProtLnPFRef	Giardia lamblia encyst per field result reference value
ProtFy	Anguillula intestinalis cell/ul result
ProtFyRef	Anguillula intestinalis reference value
ProtFyPF	Anguillula intestinalis per field result
ProtFyPFRef	Anguillula intestinalis per field result reference value
ProtTao	Pinworm cell/ul result
ProtTaoRef	Pinworm reference value
ProtTaoPF	Pinworm per field result
ProtTaoPFRef	Pinworm per field result reference value
ProtXi	Fluke cell/ul result
ProtXiRef	Fluke reference value
ProtXiPF	Fluke per field result
ProtXiPFRef	Fluke per field result reference value
Pollen	Pollen cell/ul result
PollenRef	Pollen reference value
PollenPF	Pollen per field result
PollenPFRef	Pollen per field result reference value
FoodD	Starch grain cell/ul result
FoodDRef	Starch grain reference value
FoodDPF	Starch grain per field result
FoodDPFRef	Starch grain per field result reference value
CrysXia	Charcot-Leyden crystal cell/ul result
CrysXiaRef	Charcot-Leyden crystal reference value
CrysXiaPF	Charcot-Leyden crystal per field result
CrysXiaPFRef	Charcot-Leyden crystal per field result reference value
CrysXue	Hemin crystal cell/ul result
CrysXueRef	Hemin crystal reference value
CrysXuePF	Hemin crystal per field result
CrysXuePFRef	Hemin crystal per field result reference value
CrysZhi	Fatty acid crystal cell/ul result
CrysZhiRef	Fatty acid crystal reference value
CrysZhiPF	Fatty acid crystal per field result
CrysZhiPFRef	Fatty acid crystal per field result reference value
CrysCao	Oxalate Crystal cell/ul result

CrysCaoRef	Oxalate Crystal reference value
CrysCaoPF	Oxalate Crystal per field result
CrysCaoPFRef	Oxalate Crystal per field result reference value
CrysLin	Phosphate Crystal cell/ul result
CrysLinRef	Phosphate Crystal reference value
CrysLinPF	Phosphate Crystal per field result
CrysLinPFRef	Phosphate Crystal per field result reference value
CrysTan	Calcium carbonate crystal cell/ul result
CrysTanRef	Calcium carbonate crystal reference value
CrysTanPF	Calcium carbonate crystal per field result
CrysTanPFRef	Calcium carbonate crystal per field result reference value
CrysDan	Cholesterol cell/ul result
CrysDanRef	Cholesterol reference value
CrysDanPF	Cholesterol per field result
CrysDanPFRef	Cholesterol per field result reference value
Cocci	Cocci cell/ul result
CocciRef	Cocci reference value
CocciPF	Cocci per field result
CocciPFRef	Cocci per field result reference value
Bacilli	Bacilli cell/ul result
BacilliRef	Bacilli reference value
BacilliPF	Bacilli per field result
BacilliPFRef	Bacilli per field result reference value
CoBaPer	Proportion of cocci and bacilli cell/ul result
CoBaPerRef	Proportion of cocci and bacilli reference value
CoBaPerPF	Proportion of cocci and bacilli per field result
CoBaPerPFRef	Proportion of cocci and bacilli per field result reference value
Question	Suspicious
QuestionRef	Suspicious reference value
QuestionPF	Suspicious per field result
QuestionPFRef	Suspicious per field result reference value
CBRatio	Compatible with old software string
Food	Compatible with old software string
FoodRef	Compatible with old software string
FoodPF	Compatible with old software string
ProtRongZi	Compatible with old software string
ProtRongZiRef	Compatible with old software string
ProtRongZiPF	Compatible with old software string
ProtRongBao	Compatible with old software string
ProtRongBaoRef	Compatible with old software string
ProtRongBaoPF	Compatible with old software string

ProtY	Compatible with old software string
ProtYRef	Compatible with old software string
ProtYPF	Compatible with old software string
ProtRen	Compatible with old software string
ProtRenRef	Compatible with old software string
ProtRenPF	Compatible with old software string
FoodJ	Compatible with old software string
FoodJRef	Compatible with old software string
FoodJPF	Compatible with old software string
FoodZ	Compatible with old software string
FoodZRef	Compatible with old software string
FoodZPF	Compatible with old software string
FoodJie	Compatible with old software string
FoodJieRef	Compatible with old software string
FoodJiePF	Compatible with old software string
Tumour	Compatible with old software string
TumourRef	Compatible with old software string
TumourPF	Compatible with old software string
OBSampleID	Chemistry Sample ID (internal use)
OBDate	Chemistry Sample Date
OBExamineID	Chemistry ID (internal use)
OBExamType	Standby(no use)
OBTubeRackNo	Sample rack No.(internal use)
OBTubeNo	Sample tube No. (internal use)
OBBarCode	Barcode of sample result
OBExperType	Examine type((internal use)
OB	FOB(Immuno)
OBRef	FOB(Immuno) reference value
OBUnit	FOB(Immuno) Unit
OB2	FOB(Chemical)
OB2Ref	FOB(Chemical) reference value
OB2Unit	FOB(Chemical) Unit
TF	Transferrin
TFRef	Transferrin reference value
TFUnit	Transferrin Unit
RV	Rotavirus
RVRef	Rotavirus reference value
RVUnit	Rotavirus Unit
AD	Adenovirus
ADRef	Adenovirus reference value
ADUnit	Adenovirus Unit

COX	Coxsackie virus
COXRef	Coxsackie virus reference value
COXUnit	Coxsackie virus Unit
HPSA	Helicobacter pylori
HPSARef	Helicobacter pylori reference value
HPSAUnit	Helicobacter pylori Unit
ZFDL	Fat
ZFDLRef	Fat reference value
ZFDLUnit	Fat Unit
SDRS	Sudan III
SDRSRef	Sudan III reference value
SDRSUnit	Sudan III Unit
FDHS	Stercobilirubin
FDHSRef	Stercobilirubin reference value
FDHSUnit	Stercobilirubin Unit
FDS	Stercobilin
FDSRef	Stercobilin reference value
FDSUnit	Stercobilin Unit
FDY	Stercobilirubinogen
FDYRef	Stercobilirubinogen reference value
FDYUnit	Stercobilirubinogen Unit
Item1	Patient info extend string 1
Item2	Patient info extend string 2
Item3	Patient info extend string 3
Item4	Patient info extend string 4
Item5	Patient info extend string 5
Item6	Micro info extend string 1
Item6Ref	Micro info extend string 1 reference value
Item6PF	Micro info extend string 1 per field result
Item6PFRef	Micro info extend string 1 per field result reference value
Item7	Micro info extend string 2
Item7Ref	Micro info extend string 2 reference value
Item7PF	Micro info extend string 2 per field result
Item7PFRef	Micro info extend string 2 per field result reference value
Item8	Micro info extend string 3
Item8Ref	Micro info extend string 3 reference value
Item8PF	Micro info extend string 3 per field result
Item8PFRef	Micro info extend string 3 per field result reference value
Item9	Micro info extend string 4
Item9Ref	Micro info extend string 4 reference value
Item9PF	Micro info extend string 4 per field result

Item9PFRef	Micro info extend string 4 per field result reference value
Item10	Micro info extend string 5
Item10Ref	Micro info extend string 5 reference value
Item10PF	Micro info extend string 5 per field result
Item10PFRef	Micro info extend string 5 per field result reference value
Item11	Chem info extend string 1
Item12	Chem info extend string 2
Item13	Chem info extend string 3
Item14	Chem info extend string 4
Item15	Chem info extend string 5
Item16	Analyzer serial number
Item17	Standby(no use)
Item18	Standby(no use)
Item19	Image name: X0001-Character image; T0001-Strip image；
Item20	Standby(no use)

Tips

*** Internal use**: these items only are used in system internal, no meaning to access.

***No use:** these items are only kept for future design, no meaning to access.

2.2 Bidirectional communication

2.2.1 Overview

This section provides the necessary information for communication between the AVE2.0 system and LIS. The data synchronism will realize when you configure the LIS DB address, DB name, DB account and DB password on instrument, and meanwhile, configure tables, such as patient information, urine sediment results, urine chemistry results, mapping relationship between instrument and LIS host.

- ***Definitions***

  AVE2—The database name of AVE2.0 system in the instrument

  StoolSickInfo—The name of patient information table in Ave2.0 database.

  StoolResult—The name of microscopy results table in Ave2.0 database.

  OBResult—The name of chemistry results table in Ave2.0 database.

- ***Enable***

To enable bidirectional communication, it's necessary to pre-set the configuration items below in section **[LisDbSet]** of **IniConfig.ini** file.

DbReadFromLisFlag： Configure to access data from LIS database to write into instrument. Settable counts and their meanings are as shown below.

0: No data accessed from LIS database (default);

1: All data (patient information, urine sediment results, and urine chemistry results) accessed from LIS

database;

2: Only patient information accessed from LIS database;

3: Only sediment results accessed from LIS database;

DbWriteToLisFlag: Configure to access data from instrument to write into LIS database. Settable counts and their meanings are as shown below.

0: No data written into LIS database;

1: All data (patient information, urine sediment results, urine chemistry results) written into LIS database;

2: Only patient information written into LIS database;

3: Only sediment results written into LIS database;

LisSelDoTypeFlag: A setting option for whether LIS can determine which samples will be tested. Settable counts and their meanings are as shown below.

0: LIS can't determine which samples will be tested.

1: set as LIS can decide which samples will be tested.

LisDecideFactorFlag: Judgment condition for options. Settable counts and their meanings are as shown below.

0: Barcode is used as a judgment condition for whether testing on the AVE-562.

1: Micro ID is used as a judgment condition for whether testing on the AVE-562.

LisSelInfoSourceFlag: Optional information source. Settable counts and their meanings are as shown below.

0: From AVE database;

1: From LIS side database.

LisNoSelInfoDoFlag: Action to be performed when there is no matching option. Settable counts and their meanings are as shown below.

0: Pop up a prompt box;

1: testing the sample directly;

2: Skip without testing.

- ***Prerequisite***

There are two prerequisites to realize this bidirectional communication.

-Currently, only database Microsoft SQL Server 2000 and Oracle 8i are available for communication.

-There should be tables or string, which are corresponded with tables or string in instrument database, to store data such as patient information, urine sediment results or urine chemistry results in LIS database.

- ***Transmission mode***

Off

No communication between the instrument and the LIS.

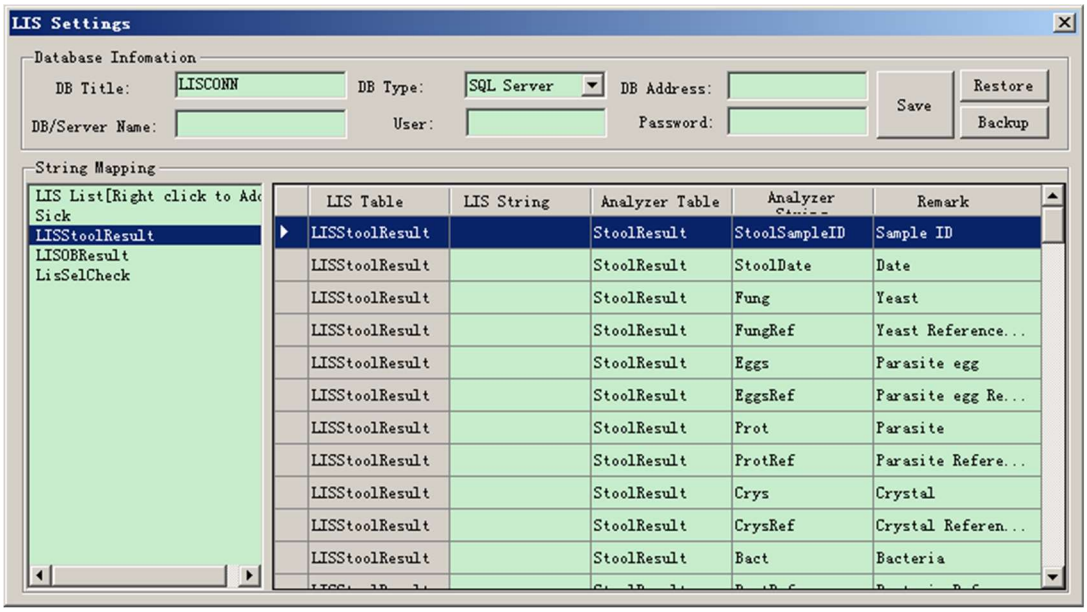
Bidirectional communication

Set **DbReadFromLisFlag** unequal to 0, it will realize accessing data from LIS database and write it into instrument database. It can bidirectional communication while urine sediment and chemistry measuring are finished, or during the [Micro verification] [patient information] [barcode number] carriage return.

Set **DbWriteToLisFlag** unequal to 0, it will realize accessing data from instrument database and writing it into LIS database. It can bidirectional communication while urine sediment and chemistry measuring are finished, or during the [Micro verification] [patient information] [barcode number] carriage return.

2.2.2 Description of configuration

To configure mapping relationship between instrument and LIS host, the settings should be done in the LIS Connection Settings interface, which is opened from Management-LIS Setting-Data In Setting.



DB Connection String: Set DB connection string;

DB type: Select the type of LIS DB to be input. The default DB is SQL Server and Oracle;

DB address: the IP address of LIS DB;

DB /Server Name: for SQL Server is the name of LIS DB; for Oracle is the server name of Oracle DB

Username: Set the name of LIS to be input;

Password: Set the password of LIS to be input;

Save: save all information of LIS DB;

Export: export existing connection information and patient information of LIS DB into XML file;

Import: import XML file;

LIS list: as above shown, LIS engineer can add/edit/delete LIS table;

Analyzer Table: Set Mapping Analyzer name.

Analyzer String: Set Mapping Analyzer String.

Remark: Set notes.

Tips:

Currently, data match between LIS and Analyzer are base on barcode, so configuring mapping relation of barcode is necessary.