Instruction and installation manual for SippLink

Introduction

Supplement to REF 8320 Instructions for use for the Sippi urine measuring system to explain how the software REF 1405 SippLink, as an accessory to REF 1104 Sippi Base Unit BLE (Sippi), enables communication with external systems.

Product description

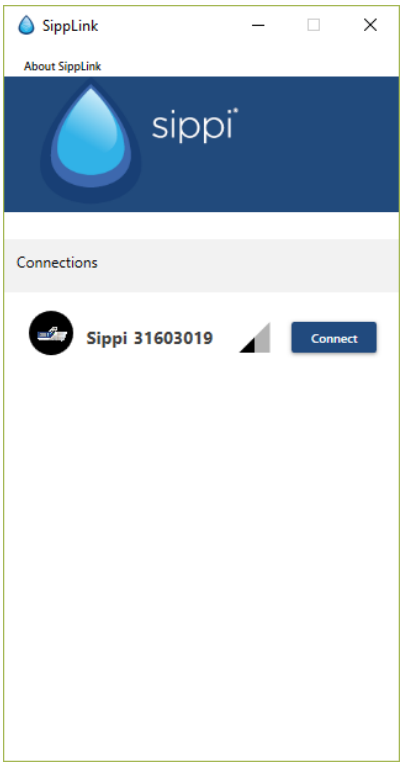
The SippLink software enables information transfer between Sippi and an external system, e.g. a patient data management system (PDMS). The software sends measurement data as HL7 messages from the Sippi through TCP/IP. SippLink is run on a computer using Windows operating system. For detailed information, see installation requirements below.

Instruction for wireless connection

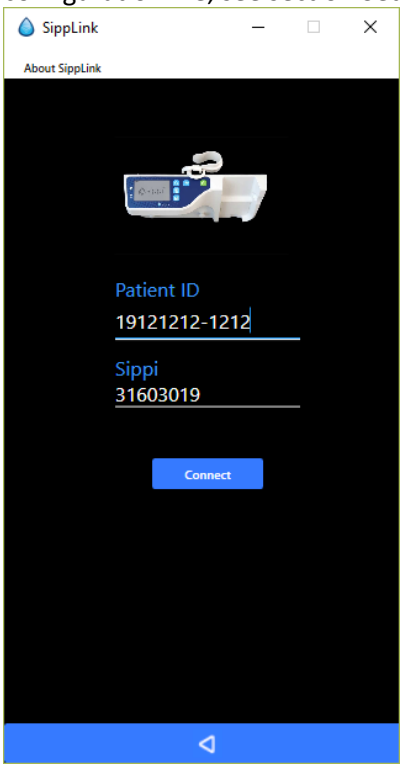
1. Start the SippLink application

2. Start Sippi and press the communication button .
3. Choose the correct Sippi device (Sippi serial number), compare it with the serial number of the Sippi to connect to. It will be active during 30 seconds after pressing the

communication button.

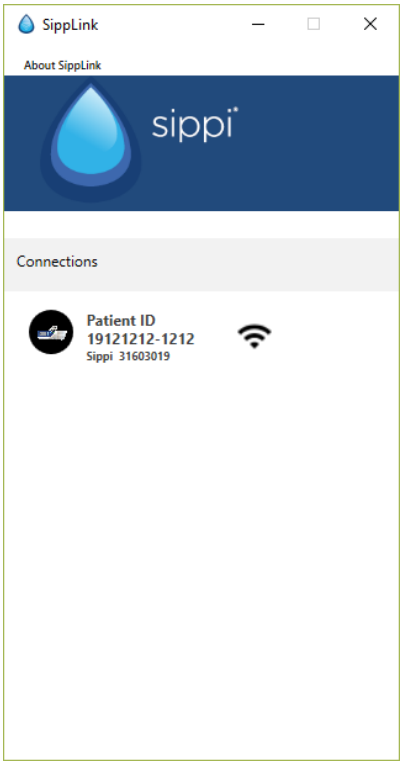


4. Enter an ID (either a patient ID or a bed ID, depending on the setting in the configuration file, see section Settings below).



5. Accept connection (confirm the ID) by pressing the button for synchronization on the Sippi when asked for it.

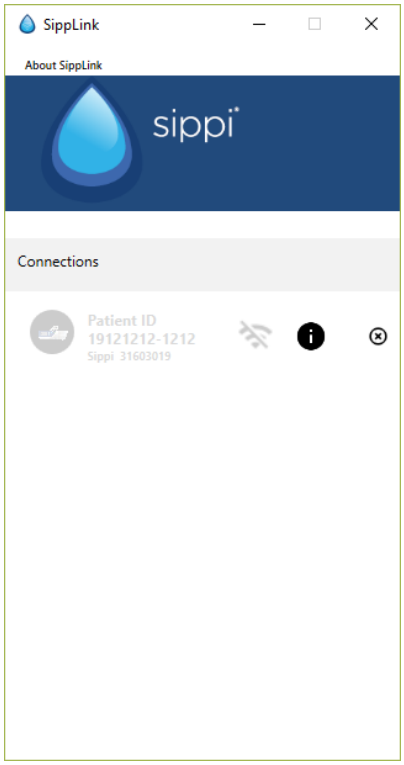
SippLink will continue connecting. The wireless symbol will be visible when the connection is established.



Disconnection

To manually disconnect, press and hold the communication button on Sippi.

When SippLink has noticed the disconnection, the wireless symbol will change to a crossed-out wireless symbol .



The wireless connection can be lost due to an interruption in signal. This will be shown on the Sippi display by a crossed-out wireless symbol . The HL7 messages from SippLink will then stop. The last HL7 message will contain 71341-2^BLE link status^OBSMED Disconnect.

An interruption could also be due to a re-start of the computer from where SippLink is run. An interruption due to an unexpected exit by the SippLink program will not yield a disconnection message in PDMS.

After an interruption, Sippi can be re-connected using the instructions above. Missing hourly diuresis will then be transmitted by SippLink as historical data.

Version and manufacturer

Click on About SippLink to see product version and manufacturer contact information.

Note

- When connected to a PDMS, the functions for synchronization to a full hour and resetting of last 24 h urine production are automated
- The time for resetting the last 24 h urine production (fluid day time) is controlled by the configuration files (see section Settings below)

Settings

There are two configuration files controlling the SippLink configuration; SippiConfig.txt and ClientConfig.txt. The reason for using two configuration files is the possibility to install the program as a service, where the service is run independently of the client. SippiConfig is used to control how the program handles system and PDMS related information, while ClientConfig controls settings more related to the user interface and user environment.

Both files are in JSON format, meaning data is collected in groups of comma-separated curly brackets, with the parameter (or group) name before a colon followed by its value. Names and values may be prefixed and suffixed by quotation marks (which is needed if space or other control characters are used within names or values). A list comprises one or more comma-separated groups within square brackets.

SippiConfig.txt

Parameter	Description
`Serialport`	The port the BLE dongle is connected to. Default set to “Auto“ to let the application automatically identify the port. E.g. Auto, COM7
`Server`	Comprises a group, address and port, that define the PDMS TCP/IP port. Required to connect with a server receiving HL7 messages from SippLink.
`Address`	Server address, either four numbers separated by decimal point or a server address as text. E.g. 127.0.0.1, PDMSSERVER, srv.data.sp
`Port`	The TCP/IP port. E.g. 8888
`FluidDayTime`	Time to reset the fluid day. Format HH. E.g. 09

Example:

```
{
  "Serialport": "Auto",
  "Server": {
    "Address": "127.0.0.1",
    "Port": 8888
  },
  "FluidDayTime": 07

}
```

ClientConfig.txt

Parameter	Description
UsePID	Set to true if patient ID is to be used as identification. Otherwise set to false.
UseBid	Set to true if bed ID is to be used as identification. Otherwise set to false.
RegexString	A .NET regular expression controlling allowed Patient ID format. E.g. "" , "[12][90][0-9][0-9][01][0-9][0-3][0-9]-[0-9]{4}|[0-9A-Z]{6}" Needs either ID in format as YYYYMMDD-NNNN using 1 or 2 as first digit and 9 or 0 as second digit in the year, OR six symbols, number or capital character between A-Z. "" (an empty string) implies no limitation
Language	Language code DE German EN English FI Finnish FR French IT Italian NL Dutch NO Norwegian SV Swedish E.g. EN

Example

```
{
 "UsePID": true,
 "UseBID": false,
 "RegexString": "",
 "Language": "EN"
}
```

HL7 message

SippLink receives proprietary measurement data from the Sippi once every minute through BLE hardware when it is connected. From that data and the settings in the configuration file HL7 ORU^R01 (Unsolicited Observation Message) messages are then created and sent through TCP/IP delimited by Minimal Lower Layer Protocol (MLLP) that uses the ASCII character for vertical tab (<VT>, 0x0B) as header and uses the character for file separator (<FS>, 0x1C) followed by carriage return (<CR>, 0x1D) as tails.

Construction

Unsolicited Observation Message (Event R01)			[HL7 v2.7 CH07]
<VT>	Starting block		[MLLP]
MSH	Message Header	<CR><LF>	[HL7 v2.7 CH02]
PID	Patient Identification	<CR><LF>	[HL7 v2.7 CH03]
OBR	Observations request	<CR><LF>	[HL7 v2.7 CH07]
OBX	Observation result	<CR><LF>	[HL7 v2.7 CH07]
OBX	Observation result	<CR><LF>	[HL7 v2.7 CH07]
:	:		
:	:		
<FS><CR>	Ending block (MLLP)		[MLLP]

Every section (MSH/PID/etc) is internally separated by defined separators. SippLink uses the default separators defined by the HL7 standard, | ^ ~ \ &, even though SippLink only uses the field separator | and part separator ^ in its messages.

The following data fields are defined with a name within chevrons, while constant text is written in plain language. Several symbols are defined as XXXX and numbers NNNN.

The parts of ORU^R01 as implemented by SippLink:

Message header (MSH):

MSH|^~\&|PAT_DEVICE_OBSMEDSIPPI^*<SippiSN>*|OBSMEDSIPPI|||*<DateTimeMsg>*||ORU^R01^ORU_R01|*<MsgCtrlID>*|P|2.7|*<SeqNum>*<CR><LN>

Data field	Description	Format
<SippiSN>	Sippi serial number	NNNNNNNN
<DateTimeMsg>	Date and time of message	YYYYMMDDHHMMSS
< MsgCtrlID>	Running ID. Sippi serial + <SeqNum>	<SippiSN><SeqNum>
<SeqNum>	Running number. Four digits	NNNN

Patient ID (PID):

PID|1||*<PatientID>*^^^^^||^^^^^^U<CR><LN >

Data field	Description	Format
<PatientID>	Patient ID as recorded by SippLink. Max 15 characters	XXXXX…X, or user defined

Patient Location (PV1):

PV1|1|U|< PatientLocation>^^^^^ <CR><LN >

Data field	Description	Format
<PatientLocation>	Bed ID as recorded by SippLink. Max 15 characters	XXXXX…X, or user defined

Observation Request (OBR):

OBR|1|||71342^MDC_DEV_DIURESIS|||*<ObservationDateTime>*|||*<SippiSN>*<CR><LN>

Data field	Description	Format
<ObservationDateTime>	Date and time for the observation.	YYYYMMDDHHMMSS
<SippiSN>	Sippi serial number	NNNNNNNN

Observation/result (OBX):

OBX|<SetID>|<ValueType>|<ID>|1|<Value>|<Units>|||||R<CR><LN>

Data field	Description	Format
<SetID>	Running number for the observation. Starting at 1.	1..NN
<ValueType>	Type of value. NM = Numerical, ST = String, TM = Time	XX
<ID>	Identifier/type of value. A number followed by a description followed by origin of definition. LOINC (LN) or internal (OBSMED)	NNNN-N^XXXXX…XX^XXX
<Value>	Value of the result.	In <Units> according to <ValueType>
<Units>	Unit followed by origin of definition. UCUM or FHIR.	XXXXX^^XXXX

The defined identifiers <ID> **are:**

Indentifier	Description
9195-9^Fluid output urine in and out urethral catheter [Volume]^LN	Total accumulated diuresis since start of measurement.
9188-4^Fluid output urine 1 hour^LN	Previous hour's diuresis.

9192-6^Fluid output urine 24 hour^LN	Accumulated diuresis since Fluid day time
71340-0^Fluid output urine last 15 minutes^OBSMED	Mean flow in ml/h during the last 15 minutes
71343-6^Fluid output urine this hour^OBSMED	Accumulated diuresis current hour
71341-2^BLE link status^OBSMED	Connected as long as a Sippi is connected. Sends Disconnected at disconnection.
71342-4^Fluid day time^OBSMED	Fluid day time. Time when daily diuresis is reset. Controlled by the configuration file.

Historical data

When connected to Sippi, the historical data for hourly diuresis is transferred to SippLink. For every hourly diuresis that has come up since last connection, a separate ORU R01 HL7 message is created, containing 71343-6 Fluid output urine this hour (time HH:59:59) which is followed by a null value (time HH+1:00:00), with a zero to guarantee that accumulated values are added up.

Example:

MSH|^~\&|PAT_DEVICE_OBSMEDSIPPI^41601032|OBSMEDSIPPI|||20170427111913||ORU^R01^ORU_R01|416010320001|P|2.7|0001

PID|1||19121212-1212^^^^^||^^^^^^U

OBR|1|||71342^MDC_DEV_DIURESIS|||20170427095955|||41601032

OBX|1|NM|71343-6^Fluid output urine this hour^OBSMED|1|131|mL^^UCUM|||||R

MSH|^~\&|PAT_DEVICE_OBSMEDSIPPI^41601032|OBSMEDSIPPI|||20170427111913||ORU^R01^ORU_R01|416010320002|P|2.7|0002

PID|1||19121212-1212||^^^^^^U

OBR|1|||71342^MDC_DEV_DIURESIS|||20170427100000

OBX|1|NM|71343-6^Fluid output urine this hour^OBSMED|1|0|mL^^UCUM|||||R

MSH|^~\&|PAT_DEVICE_OBSMEDSIPPI^41601032|OBSMEDSIPPI|||20170427111913||ORU^R01^ORU_R01|416010320003|P|2.7|0003

PID|1||19121212-1212||^^^^^^U

OBR|1|||71342^MDC_DEV_DIURESIS|||20170427105955

OBX|1|NM|71343-6^Fluid output urine this hour^OBSMED|1|327|mL^^UCUM|||||R

MSH|^~\&|PAT_DEVICE_OBSMEDSIPPI^41601032|OBSMEDSIPPI|||20170427111913||ORU^R01^ORU_R01|416010320004|P|2.7|0004

PID|1||19121212-1212||^^^^^^U

OBR|1|||71342^MDC_DEV_DIURESIS|||20170427110000

OBX|1|NM|71343-6^Fluid output urine this hour^OBSMED|1|0|mL^^UCUM|||||R

Periodical data

As long as Sippi is connected, ORU R01 HL7 messages are sent periodically with an interval of 1 minute.

Installation requirements

Computer with Windows 7 or Windows 10

A free USB port

Installation media (SippLink USB memory)

Laird BT900-US Bluetooth Low Energy USB dongle

Verify with your IT-provider whether any driver needs to be installed manually before receiving data from SippLink.

Installation

To install and run the SippLink software it is important to make sure that the configuration files contain the correct data for the environment where the software is to run. Normally, administrator rights are needed to install the software.

Since the data is sent to the server through TCP/IP, if a firewall is used, this address and port need to be open. Note that antivirus software may conflict with the installation of SippLink.

Standalone executable file

No installation is needed, but the executable file and its help files (the content in the directory SippLink_StandAlone on the USB memory) are copied to a directory accessible by the user. The user also needs writing rights for this directory for the log to work. To let clients share the same configuration files and not need to copy the files to local terminals, it is possible to place the directory onto a web drive, where the log files are created in sub-directories named using the relevant computer name.

1. Copy the files from the directory SippLink_StandAlone to a suitable directory
2. Create a shortcut to the executable file in a suitable place
3. Install the drivers for the BLE dongle. See the following installation of drivers for information and troubleshooting.

Installation of drivers for Laird BT900-US dongle

The drivers for the dongle are found on the USB memory in the directory Dongle_Driver. Install the drivers by running the file CDM21228_Setup.exe.

Installation of BLE dongle

Insert the BLE dongle in a free USB port on the computer.

Troubleshooting

Error message	Description/handling
SippLink has lost connection to the background service	Is the Installation performed correctly? If the software was installed to be run as a standalone executable file, all the files in the directory need to be copied.
Sipplink has lost connection to the BLE dongle	SippLink could not connect to the BLE dongle. Check that the dongle is inserted in the computer and check the driver in the Device manager (devmgmt.msc). If needed, specify the COM port manually. See Installation/Configuration above.
SippLink cannot connect to the TCP/IP port	SippLink can not open the TCP/IP port on the server. Check the configuration files and the firewall. Try to ping the server.
The configuration file contains errors	Check the configuration files. See Settings above.

Customer support

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