AlcoMeasure®

Server

Server Software Manual

Rev 0.03, 20/09/2019

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2 Introduction

AlcoMeasure Server (AMS) is a set of software components designed to streamline the remote management of AlcoMeasure devices. It is designed to be used in parallel with the AlcoMeasure Utility (AMU) desktop program. Where AMU connects to individual devices for configuration and data retrieval, AMS remotely monitors any number of connected devices at once.

AMS automatically downloads the test log and device status from all connected devices, storing them in a database for access by the client. It can also be configured to email alerts when a test result on any connected device is recorded above a configurable threshold.

AMS is designed to be deployed on a client's private network. The client can specify their own Microsoft SQL Server database or use the built in SQLite database.

AMS provides a basic interface to the database in the form of a local website. This interface is useful for seeing the state of connected devices and troubleshooting the server. It does not provide advanced data analysis tools. It is expected that the client will provide their own interface to browse the data.

To connect, AlcoMeasure devices must be configured to connect to the IP address and Port of the AMS installation. Once configured, they will automatically connect to the server.

Every effort has been made to ensure the accuracy of this manual. All-Systems Electronics (ASE) reserves the right to make modifications to this manual, as well as the hardware and software referred to in this manual.

3 Product Information

3.1 Manufacturer

Postal Address	Contact	
All-Systems Electronics Pty. Ltd.	Telephone:	+61 2 9624 4644
16 Hope Street	Fax:	+61 2 9838 8562
Seven Hills, NSW 2147	E-mail:	sales@all-systems.com.au
Australia	Website:	www.all-systems.com.au

3.2 Distributor

Postal Address	Contact	
Breathalyser Sales & Service	Telephone:	+61 2 8338 1555
128 O'Riordan Street	Fax:	+61 2 8338 1688
Mascot, NSW 2020	E-mail:	nsw@breathalyser.com.au
Australia	Website:	www.breathalyser.com.au

3.3 Specifications

Operating Systems	Microsoft Server 2012, 2016 Microsoft Windows 7, 8, 10
Databases	SQLite3 Microsoft SQL Server 2012 or newer, including Express versions
Web Browser	Google Chrome, Firefox, Microsoft Edge (Required for the web interface)
Connectivity	TCP/IP
Email functionality	Requires a separate SMTP server
Default Webpage Port	80
Default Device Port	26001
Licensing	Licensed per device connection Test mode (unlicensed) allows 2 device connections
Compatible Device Firmware	1.0800 and newer

4 System Overview

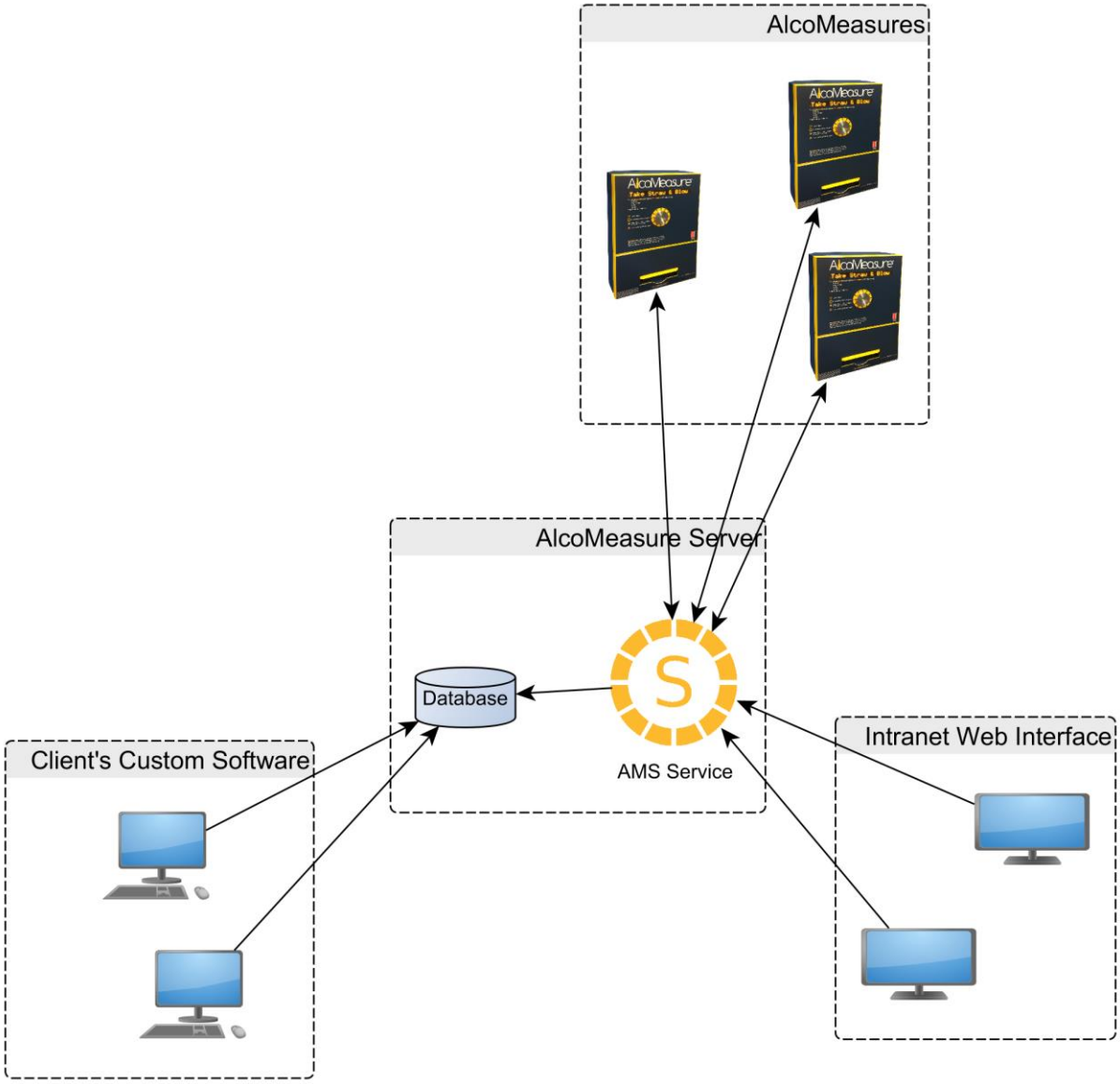

Figure 1 - Basic System Overview

As shown in Figure 1, the Server system is made up of several components.

The core components of the system are the server software, here labelled as “AMS Service”, and the Database.

The AMS Service is responsible for collecting data from the AlcoMeasures and updating the database. It also provides the “Intranet Web Interface”. The AMS Service is proprietary, and it is not expected that the client would need to interface with this software.

However, once the Database has been updated with information from the connected AlcoMeasures, this data is available for the client to use freely. It is expected that the client will interface their own software into the system by connecting to the database. Further information on the database can be found in the Database Design section.

5 AlcoMeasure Server Installation

The AMS software is provided as a Windows Setup executable. It must be run at administration level since it will register and start a windows service, as well as adding a system tray icon to the auto-start list.

If the server is already installed, the setup program will warn that it must close the existing programs. Select the "Automatically close the applications" option and press Next. Once completed, the service should be running and there should be an AMS icon in the System Tray.

5.1 Configuring Ethernet Ports

The Windows firewall needs to be configured to allow traffic on 2 separate ports.

AlcoMeasure devices will connect to the server by default on port 26001. This needs to be opened to allow incoming connections from over the network.

The web interface is available on port 80 by default. AMS will function properly without external access to this port, however it may be useful to open this port for troubleshooting and diagnostics purposes.

6 Software Architecture

The Server software consists of a Windows Service called AlcoMeasureServer.exe, and a System Tray application that can control the service called AlcoMeasureServerController.exe. Upon installation, the service is registered in Windows to auto start.

The System Tray application auto-starts with Windows or can alternatively be started from the Start Menu where it is simply named “AlcoMeasure Server”.

The service is configured using a file named AlcoMeasureServer.ini. Any time this file is changed the service must be restarted for the change to take effect.

A licence file named AMSLicence.ini is required for the product to allow devices to connect. Without a valid licence file AMS will run in “Test Mode” which allows for a maximum of 2 devices to connect at any one time. The licence is validated by emailing it to All-Systems Electronics.

AMS requires access to a database. By default, it will create an SQLite database called “ams.db”, although alternative databases can be configured.

6.1.1 File Locations

The following paths assume a Windows installation on C drive.

- C:\Program Files (x86)\All-Systems Electronics\AlcoMeasure Server
    - AlcoMeasureServer.exe
    - AlcoMeasureServerController.exe
- C:\ProgramData\AlcoMeasureServer:
    - AlcoMeasureServer.ini
    - ams.db
    - AMSLicence.ini

6.2 Windows Service

The AlcoMeasureServer.exe service is a normal windows service, and can be controlled in one of three ways:

- System Tray Application, as described in section 6.3.
- Windows Task Manager Services tab.
- Windows Services tool.

When the service is run for the first time it will configure itself with the following recovery options:

- First crash, restart service in 60 seconds.
- Second crash, restart service in 120 seconds.
- Third crash, and every after, restart service in 10 minutes.
- The crash counter will be reset after 1 day.

The recovery settings can be manually configured using the Windows Services tool.

6.3 System Tray Application

The system tray icon gives a clue as to the current state of the service:

 - Service is uninstalled.

 - Service is stopped.

 - Service is starting.

 - Service is running.

Right clicking the system tray icon provides the following menu:

- AM Server Localhost
  - Opens the web interface.
- Start Service
  - Starts the Windows service.
- Stop Service
  - Stops the Windows service.
- Quit
  - Closes the system tray application. The service will continue running in the background if installed.

6.4 Event Log

By default, the windows service will post events into the Windows Event Log that can be retrieved by the system administrator for troubleshooting purposes. These events are posted under “Windows Logs\Application” in the Event Viewer and have “AlcoMeasureServer” as the Source.

These events are also posted to the “EventLog” table in the database once the database is configured.

Finally, if email notifications are enabled then events can be automatically emailed to the administrator when they occur.

7 Server Configuration

The service component of AMS is configured using the AlcoMeasureServer.ini configuration file. This file gets created when the service first runs. Because this file is in C:\ProgramData it must be opened with administrator privileges to save changes.

Anytime a setting is changed in the configuration file the service must be stopped and restarted before the change will take effect.

If a setting within the file has become corrupt, then the default value for that key can be restored by deleting the key and its value and restarting the service.

It must be noted that all file paths within the configuration file must use forward slashes instead of Windows standard backslashes.

7.1 Database Configuration

The database settings are found in the [db] section of the configuration file. The default configuration uses an SQLite database which will be created when the service is first started.

7.1.1 SQLite Configuration

The following settings are used to tell AMS to connect to an SQLite database:

- type=SQLite
- address=LOCALHOST
- databaseName=C:/ProgramData/AlcoMeasureServer/ams.db

All other database settings are ignored.

When AMS runs it will create a new database, or open the existing database, at the file path specified in databaseName.

The SQLite database can be easily browsed and edited using several freely available tools. We recommend using SQLite Studio which can be found at https://sqlitestudio.pl. Because the default location of the SQLite database is in C:\ProgramData, SQLite Studio must be run with administrator privileges to edit the database.

Visit https://www.sqlite.org for information on SQLite.

7.1.2 Microsoft SQL Server Configuration

For AMS to connect to a Microsoft SQL Server database, the database must already be created along with a user that has full permissions on the database.

AMS will work with both Express and professional versions of SQL Server.

The following settings are used to tell AMS to connect to an existing MS SQL Server database:

- type=MSSqlServer

- address=\\ServerName\\SQL_INSTANCE
- databaseName=AMS_Data
- userName=AMS_Data_User
- password=AMS_Data_User_Password
- port=1433

These settings will attempt to connect to an existing instance of Microsoft SQL Server called “SQL_INSTANCE” on the server with the name “ServerName”, connecting over port 1433.

Administration of a Microsoft SQL Server database is beyond the scope of this document.

7.2 Email SMTP Configuration

AMS provides the ability to send out email notifications. It can do this to alert an administrator of an event that has occurred with the server. It can also be configured to alert personnel if a user has recorded a positive test result.

For email to work it must be configured to connect to an existing SMTP service. This configuration is done in the AlcoMeasureServer.ini file in the [email] section.

The server administration alerts are also configured in the configuration file. All other email configuration is done in the database and is explained in section 10.

The following settings show how to use an existing Gmail account and Gmail’s SMTP to send email alerts. Note that the Gmail account must be configured to “Allow less secure apps” for an external program to access its SMTP.

- smtpAddress=smtp.gmail.com
- smtpPort=465
- smtpUsername=username@gmail.com
- smtpPassword=password
- smtpAuthenticate=1
    - enable checking of the username and password. Most SMTP’s require this to be enabled.
- smtpEncryption=1
- enabled=1
    - Enables/disables email functionality.
- eventLevel=3
- errorFromAddress= username@gmail.com
    - All administration alerts will be sent from this address.
- errorToAddresses= username@gmail.com,username2@gmail.com,username3@outlook.com
    - A comma separated list of email addresses that specify who the administration alerts will be sent to.

The “smtpEncryption” setting is used to configure the type of encryption used for the connection. Options are:

- 0
    - Disable encryption for this connection (not recommended).
- 1
    - SSL/TLS. This is the most common setting.
- 2
    - STARTTLS.

The “eventLevel” configures the type of log events that will be emailed to the administrator. Options are:

- 0
    - Disable event log emails.
- 1
    - Email all “Error” level emails only.
- 2
    - Email all “Error” and “Warning” level emails.
- 3
    - Email all event log notifications.

Once configured, the email functionality can be tested by temporarily setting the “eventLevel” to 3 and then restarting the service. AMS posts a “Server Started” event to the event log, which will also be emailed out if “eventLevel” is set to 3. If the email is not received, check the event log for a failure message to help diagnose the problem.

7.3 General Configuration

Other items that can be configured in the [General] section:

- devicePort=26001
    - The ethernet port for incoming device connections.
- webServerPort=80
    - The ethernet port for the built-in web interface.
- settingsPath=C:/ProgramData/AlcoMeasureServer/
    - The location of this configuration directory. NEVER change this.
- createdDefaultRecoveryOptions=true
    - Set to true once the default recovery options are set on the Windows service. Remove this entry and restart the service to reset them to their defaults again.

8 Device Configuration

For an AlcoMeasure WM1 to connect to AMS it must be configured as follows:

1. The “AM Server” feature must be unlocked.
    a. Navigate to “Advanced->Diagnostics->Extra Features” and check that the “AM Server” feature says “On”.
    b. Contact your distributor if your device does not already have this feature unlocked.
2. The “AM Server” connectivity must be enabled.
    a. Navigate to “Advanced->Settings->Ethernet” and check that the “AM Server” setting says “On”.
3. Configure network settings.
    a. Navigate to the “Advanced->Settings->Ethernet” menu.
    b. Set the IP address of the device.
    c. Set the subnet mask of the device (“SN”).
    d. Set the default gateway IP Address (“GW”).
    e. Set the IP address of the server software (“SV”).
    f. Set the port to the devicePort of the server software (“AM Port”).
4. Restart the device for the settings to take effect.

After these steps have been followed the AlcoMeasure WM1 should automatically establish a connection to AMS. AMS’s web interface can be used to determine what devices have successfully connected to the server. If the device is not listed at all then it has never connected to the server. If the device appears in the list but says disconnected, then it has connected at some point but is not currently connected.

9 Database Design

The AMS database is automatically populated when the service first runs and successfully connects to a database.

Many tables in the database help AMS run in a stable and consistent manner, and therefore editing by an outside program or administrator is not recommended. These are listed in section 9.1.

Tables that can be edited by the system administrator or by client software are listed in section 9.2.

A database browser can be used to show the exact structure of each table as well as the relationship between tables.

In most cases the primary key is the first column of the table, ends with the suffix “ID”, and is auto-incrementing.

9.1 Read Only Tables

- Info
    - Contains a single row holding the current state of the database.
    - dbVersion
        - The current version of the database.
    - heartbeat
        - A timestamp automatically updated by the server software a few times every minute.
        - Can be used to determine if the AMS service is still running.
- EventLog
    - A log of all events generated by the windows service. These should also be available in the Windows Event Log.
- Devices
    - A list of all devices that are/have been connected to the server.
    - serial
        - Serial number of device.
    - connected
        - Flag indicating whether device is currently connected or not.
    - lastUpdated
        - A timestamp indicating when the device was last successfully polled.
- Status
    - A list of the most recent status information from each device.
- Diagnostics
    - A list of the most recent diagnostic information from each device.
    - This is like status but contains more information from the device.
- DeviceLogs
    - All logs downloaded from each device.
    - Column names are appropriate for a “test” type log but may not make sense for other log types.

    - Tests can be found by searching for all logs for a device where the “type” column contains the word “test”, case insensitive.
- DeviceImages
    - All images downloaded from each device.
    - Each row relates to a single DeviceLog.
    - The “data” column contains a binary blob which is the image data in jpg format.

9.2 Editable Tables

- Location
    - A list of locations that will be used to group AlcoMeasure devices together.
    - name
        - The name assigned to the location.
- DeviceLocations
    - Links Devices to Locations.
- LocationConfigs
    - Links different configurations to Locations.
- EmailConfig
    - Email configurations for creating email notifications.
    - This is described in section 10.

9.3 Setting Device Locations and Configurations

Once a device has successfully connected to AMS it will appear in the Devices table. Devices then need to be grouped into locations. This can be done by adding one or more locations into the “Location” table.

Once a location has been added to the Location table, devices are linked to that location by adding the “DevicesID” and “LocationID” to the “DeviceLocations” table.

Email configurations are then assigned to a location, not to a specific device.

To setup a location to use a specific email configuration, first create the configuration as described in section 10. Configs are then linked to a specific location by adding the “LocationID” and “EmailConfigID” to the “LocationConfigs” table.

This means that if there are 3 devices in location A, and 2 devices in location B, then all the devices in location A can be setup to email alerts to manager A, and all the devices in location B can send alerts to manager B. Alternatively, both locations could link to the same email configuration.

If two devices are in a single location but need to use separate email configurations, they just need to be assigned to two different locations in the system.

10 Email Configuration

For AMS to generate email alerts for the connected devices, the SMTP must first be configured by a system administrator as described in section 7.2.

AMS can be configured to send an email notification whenever a user blows over a pre-defined threshold on any connected device. This is done by specifying an email configuration row in the "EmailConfig" table in the database. Multiple configurations can be specified, one for each location.

By default, the email will be formatted in HTML and laid out like a basic report, with the AlcoMeasure logo at the top. Any photos that were taken during the test will be laid out in the report.

There is also the option to send an email that is meant for an SMS-to-Email service. This sends a plain-text email limited to 160 characters.

If the "toAddresses" field is configured, then the HTML report will be emailed. If the "SMSAddress" field is configured, then the plain-text email will be sent. If both fields are configured then both email types will be sent, one after the other.

The database table fields are as follows:

- fromAddress
    - The address the email will be sent from.
- toAddresses
    - The addresses the HTML email will be sent to, separated by commas.
- SMSAddress
    - The address the plain-text email will be sent to.
- subject
    - The subject assigned to the HTML email.
- message
    - If specified this text will appear on the HTML email immediately below the AlcoMeasure logo.
- resultLimit
    - Any tests downloaded from the device that are equal-to-or-greater than this value will generate an email alert.
    - For example, the road limit for drivers in NSW is under 0.05 g/100ml of blood. Therefore, to set an email alert for anyone over this limit this value would be set to '0.05'.
    - Setting this value to '0.000' will cause all tests to be emailed. Use this for testing only.

If a device is first connected there may be many older log records that are over this limit. Therefore, email alerts will only be sent for log records that have occurred in the 24 hours preceding the device being connected.