



# 701 Server TCP/IP Communication

## Installers Manual



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Version 1.0

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# INTRODUCTION



701 Server acts as the communication software allowing controllers to communicate via RS485 and/or TCP/IP. RS485 setup is covered in detail within the “701 Client/Server Installers Manual”

This manual will identify how to setup TCP/IP devices either in a hybrid RS485 TCP/IP network or solely as TCP/IP networked devices.

Prior to setting up the network, consider the topology of the devices. Are they going to communicate via a direct TCP/IP connection to each device, are they going to communicate over RS485 and then via a TCP/IP interface. Are there going to be mixed communication methods? See pages 13 to 15 for examples of combinations of communication methods. Please pay particular attention to the distances identified between Equipment for the different types of communication.

Once the overall communication strategy is determined refer to the essential steps identified below.

## **Essential steps for a new TCP/IP installation**

### **Prior to configuring devices**

Confirm the type of communication at each device, this will either be RS485 via a USB adaptor, RS485 via a TCP/IP adaptor or TCP/IP direct connection. Fill out the Node ID and IP address sheet on page 17

### **In 701 Server**

Set the controller Node ID's at the controllers (Node ID 2 onwards) or via the web interface if applicable -Pages 6 to 9

Set the controller IP address at the controller or via the web interface if applicable—Pages 6 to 9

Select the correct controller identities in 701 Server LAN settings-Page 10

Check all of the connected controllers are on line-Page 11

Download the date and time to all controllers on line-Page 11

Each device supplied by Soyal that can be addressed via TCP/IP has it's own web page accessible via a web browser. Each device can have its main parameters set via its web interface.

See page 16 for Node ID and IP address examples.

We would recommend noting the Node ID's and IP addresses on the commissioning sheet on page 17

# CONTROLLER COMMUNICATION OPTIONS

Below is a table of controllers supplied by Raytel with their communication options identified.

Reference	Series	Description	Communication
K50	Raytel H	Controller with Keypad - PIN and/or Card Access (Reader required)	RS-485 Only
AR-888H	H	Controller with Keypad/Reader - PIN and/or Card Access	RS-485 Only
AR-727H	H	Controller—Card Access only	RS-485 Only
AR-727HB-RAY	H	2 Door Controller—Card Access only	RS-485 Only
AR-829EV5	E	Controller—Card Access	RS-485 or TCP/IP
AR-716Ei	N/A	Networking controller	RS-485 or TCP/IP
AR-331EFS	E	Controller—Fingerprint and/or card and/or PIN	RS-485 or TCP/IP

All of the above controllers can communicate via RS485. Where identified controllers can also be specified with a TCP/IP connection for alternative configurations.

RS-485 only controllers can use an AR-727CM TCP/IP to RS485 adaptor, this device can provide 2 x RS485 communication ports. All devices connected to the AR-727CM will still require unique Node ID's.

The AR-716E is a Networking controller with 2 x RS485 output ports, this can be used to control up to 16 doors OR it can be used to manage controllers on it's outputs. For Further information on this controller contact Raytel Security Technical department.

See drawings on pages 13, 14 and 15 for typical connection / communication options.

# HARDWARE SPECIFICATION

Below is a table of controllers supplied by Raytel Security Systems with basic functionality identified.

Reference	Series	Description	Keypad	Display	Internal Reader	External Reader	No of Users
K50	Raytel H	PIN and /or Card Access (Reader required)	Y	N	N	Y (WG)	1,024
AR-888H	H	PIN and/or Card Access	Y	N	Y	Y (WG)	3,000
AR-727H	H	Card Access Only	Y	Y	Y	Y (WG)	1,024
AR-727HB-RAY	Raytel H	2 Door Controller Card Access only	Y	Y	N**	Y (RS485 x 2)	1,024
AR-829EV5	E	Card Access Only	Y	Y	Y	Y (WG)	15,000
AR-716Ei	N/A	Networking Controller	N	N	N	Y (RS485 x 14, WG x 2)	15,000
AR-331EFS	E	Fingerprint and /or PIN and/or Card Access	Y N	N N	Y Y	Y (WG) Y (WG)	16,000 16,000

**N\*\* Controller has a built in reader But only for adding tokens.**

**All of the above controllers can communicate via TCP/IP either via a direct connection OR via a AR-727CM TCP/IP to RS485 adaptor.**

This manual assumes all hardware has been installed as per our installation manuals, is physically connected to the network and is functional. The critical checks are as listed below:

All controllers in the network **MUST** have unique node ID's (Node ID 2 onwards) if TCP/IP is being used all controllers in the network **MUST** have a unique node ID AND a unique IP address.

All readers must have their dip switches set correctly as per the individual controller installation instructions. If readers are connected to multi door controllers each reader must also have a unique node ID.

Controllers connected to an RS485 network must be daisy chained, star wiring is not acceptable.

In TCP/IP networks the maximum distance between the controller and Network switch or other repeater device must not exceed 100m.

In RS485 networks it is recommended that an RS485 repeater is inserted after 30 controllers OR 300m

WG readers must not exceed 30M from their controller, WG repeaters can be used if greater distance is required.

# SETTING CONTROLLER NODE ID, IP ADDRESS & DOOR NUMBERING AT CONTROLLERS

Node ID's are used within 701 Server to identify controllers. Door Numbers are used to identify specific doors within 701 Client. Both must be set at the controller(s) to enable the correct operation of the software.

ALL CONTROLLERS MUST HAVE A UNIQUE NODE ID—If the controller has a direct TCP/IP connection it will also require a unique IP address.

## Setting Node ID and door numbers on controllers with LCD displays

### **H SERIES CONTROLLERS—(AR-727H)**

We would recommend for all H series controllers with Wiegand readers that

**Door Num H = Node ID and Door Num L is set to 1**

EG if the Node ID of the controller is 16 set Door Num H to 16 and Door Num L to 1

### **E SERIES CONTROLLERS—(AR-829Ev5, AR-881EF, AR331EF)**

We would recommend for all E series controllers with Wiegand readers that

**Main Door Number = Node ID, WG Door Number = Node ID**

If connected via TCP/IP port then a unique IP address will also be required, see the user manual for setting IP address.

### **Raytel AR-727HB-RAY, AR-716E-RAY, EAR-727HB-RAY CONTROLLERS**

For two Door controllers (AR-727HB-RAY, AR-716E-RAY) we would recommend that

**Door Num H = Node ID, Door Num 0 is set to 1 and Door Num 1 set to 2**

Refer to the specific controller manual for setting reader node ID's if required.

For AR-716E multi door controllers refer to Raytel Technical

## Setting Node ID and door numbers on non LCD display controllers.

### **Raytel K50 Keypad and AR-888H Controller / Reader**

Enter  or Master code  to access programming mode

Then enter 00\*NNN\*VVV\*nnn# = 00\*Node ID\*Virtual node\*door no#

We would recommend that

**Node ID (NNN) = Virtual node ID(VVV) and the Door number (nnn) is set to 1**

Where: NNN = 3 digit node ID i.e. Node ID=1 enter 001

VVV = 3 digit virtual node i.e for 3 enter 003

nnn = Door no i.e. for Door no 6 enter 006

Each code must be 3 digits in length.

**Devices supplied with TCP/IP communication capability can have the above details set via their own webpage. See page 7 for details.**

# SETTING CONTROLLER NODE ID AND IP ADDRESS VIA WEBPAGE

All TCP/IP controllers supplied will have a default IP address of 192.168.1.127

To access the webpage for these devices the Local Area Network settings for the PC must be compatible. Initially we would suggest the following process:

## Windows XP

Select "Network Connections" on desktop (or in Control Panels).

Control Panels -> Network Connections -> Select "LAN" Icon.

General Tab, select properties.

Select internet protocol (TCP/IP)

Select Properties.

Tick box marked "use the following IP address"

Set IP to: 192.168.1.1

Set Subnet to: 255.255.255.0

Set Default Gateway to: 192.168.1.254

OK and close

OK and close

## Windows 7

Use search box with IP as search criteria

Select Local area connection

Select change settings (top bar)

Select internet protocol Version 4(TCP/IP Ver IPv4)

Select "Properties" and set as below:

Tick box marked "use the following IP address"

Set IP to: 192.168.1.1

Set Subnet to: 255.255.255.0

Set Default Gateway to: 192.168.1.254

OK and close

OK and close

## Windows 8 and Windows 10

Search for "settings" in the search/ask me anything box

Select "Network and Internet"

Select "Change adapter options"

Select Ethernet option

Highlight Internet protocol Version 4(TCP/ipv4)

Select "Properties" and set as below:

Tick box marked "use the following IP address"

Set IP to: 192.168.1.1

Set Subnet to: 255.255.255.0

Set Default Gateway to: 192.168.1.254

OK and close

OK and close

After setting any of the above: Connect an Ethernet lead directly from the PC to the device to be accessed (connect any external power supply required for the device)

Open a web browser and type in 192.168.1.127 which is the default IP address of New controllers.

You should get access to the device web interface.

When the web page for the device appears use the following details if any changes are required: User Name: admin Password: ###leave it blank###

At this point the interface for the device should open. See the next pages for a typical web interface.

# SETTING CONTROLLER NODE ID AND IP ADDRESS VIA WEBPAGE

Shown below is a typical initial webpage for a Soyol TCP/IP addressable device. To set the Node ID and IP address via this webpage select “Network Setting” shown below.

The screenshot shows the SOYAL ACCESS CONTROLLER web interface. The top left features the SOYAL logo. The top right displays the device model AR331EF and firmware version F/W: 4.0. A navigation menu on the left includes links for Current State, Network Setting (highlighted with a red box), Event Logs, User List, Controller Parameters, User Add / Change, Time Zone, Login Password, and Clock. The main content area is titled 'Current IP Addresses' and contains a table with the following data:

Device Name	Type	IP address	Subnet mask	Gateway	DHCP
CONTROLLER	Ethernet	192.168.1.127	255.255.255.0	192.168.1.254	<input type="checkbox"/>

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When the password window shown below opens enter “admin” as the user name and leave the password blank, then select “OK” We would not recommend ticking the box “Remember my credentials”

The screenshot shows the SOYAL ACCESS CONTROLLER web interface with a '401 Unauthorized - User authentication is required.' message. The navigation menu on the left is visible, with 'Network Setting' highlighted. A Windows Security dialog box is open, prompting for user name and password. The user name field contains 'admin' and the password field is empty. The 'Remember my credentials' checkbox is checked. The dialog box has 'OK' and 'Cancel' buttons at the bottom.

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# SETTING CONTROLLER NODE ID AND IP ADDRESS VIA WEBPAGE

Once the Network Setting page has opened you can set the “LAN IP Address” and Node ID to suit your particular system configuration. Please note that other settings such as “LAN Net Mask” and “Default Gateway” may require setting as advised by the IT support staff at the installation site.

Once the IP address has been changed the device will only be accessible using it’s new IP address.



AR331EF  
F/W: 4.0

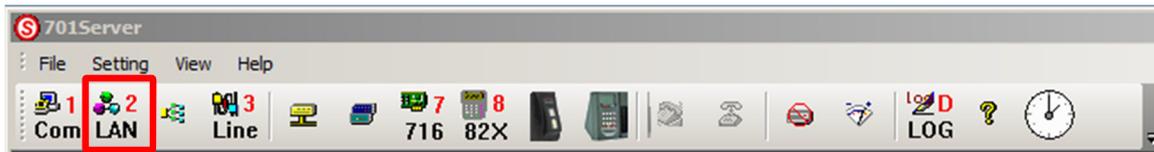
- [Current State](#)
- [Network Setting](#)
- [Event Logs](#)
- [User List](#)
- [Controller Parameters](#)
- [User Add / Change](#)
- [Time Zone](#)
- [Login Password](#)
- [Clock](#)

### Network Setting

After you have changed the IP address, the device will **restart** (hardware reset). Please update the IP address in the browser after any changed.

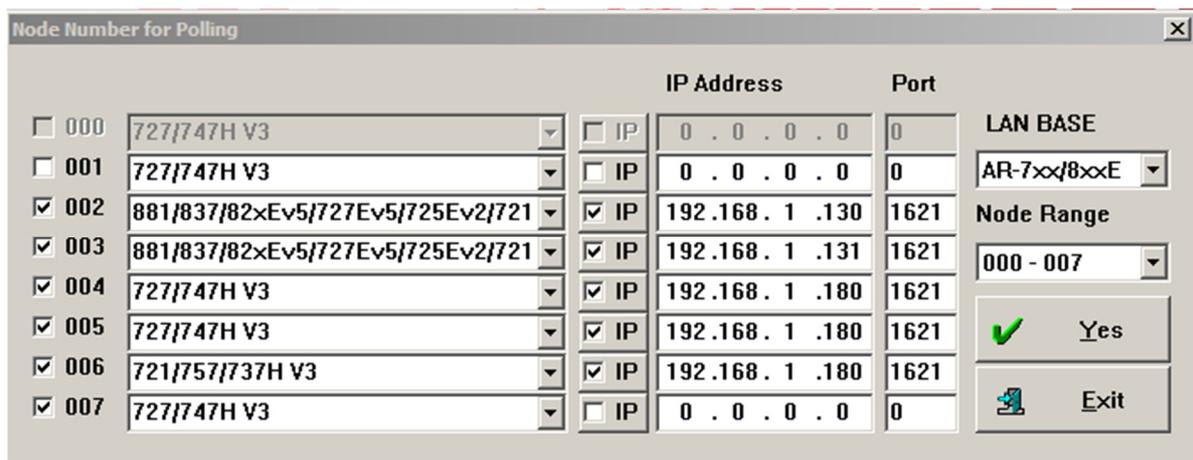
Item	Setting
Device Name	CONTROLLER (Can be any unique identifier)
LAN IP Address	192.168.1.127
LAN Net Mask	255.255.255.0
Default Gateway	192.168.1.254
Primary DNS Server	168.95.1.1
Secondary DNS Server	168.95.192.1
MAC Address	00-13-57-02-B3-B5
DHCP Client	<input type="checkbox"/>
TCP Listen Port	1621 (1024-65530)
HTTP Server Port	80 (80-65530)
Node ID (Device ID)	1
Message Server IP 1st	0.0.0.0
Message Port 1st	0 (1024-65530, 0:disable, 8031:Text Mode)
Message Server IP 2nd	0.0.0.0
Message Port 2nd	0 (1024-65530, 0:disable or 8031:Text Mode)

# 701 SERVER CONTROLLER NODE ID & TYPE



Each controller on a network must have a unique Node ID. We would recommend setting controller Node ID's from ID=2 upwards (This will enable a USB desktop reader to be used if required) Select 2 LAN as shown above from the 701 Server header strip to access Node ID setting.

When setting up controllers in 701 Server LAN base use the following selections for the controllers as identified below.



**727/747H V3** For AR-727H single door controller.

**727/747H V3** For AR-727HB-RAY, AR-716E-RAY and EAR-727HB-RAY 2 door controllers

**721/757/737H V3** For Raytel K50 Keypad and AR-888H/U Keypad

**881/837/82xEv5/727Ev5/725Ev2/721...** For AR-829EV5 single door controller

For other controllers refer to the relevant installation manual or contact Raytel Technical.

Please Note in the example above:

Node ID's 2 and 3 have unique IP addresses these devices are communicating directly over TCP/IP.

Node ID's 4, 5 and 6 have the same IP address these devices are communicating on RS485 but via a AR-727CM TCP/IP to RS485 converter.

Node ID 7 has no IP address this device is communicating over RS485.

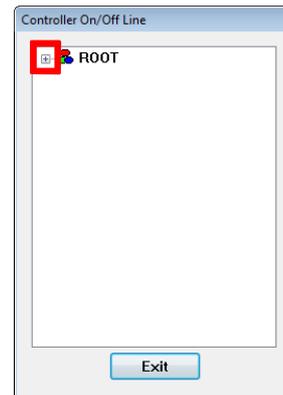
See diagrams on pages 13,14 and 15 for typical communication and connection options. Select "Yes" to save changes and close the window or Exit which will not save changes.

# 701 SERVER CONTROLLERS ON LINE

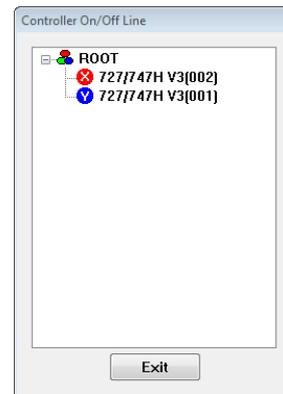


Select **3 Line** from the 701 Server header strip as shown above to access the Controller On/Off Line screen.

Once the Controller On/Off Line screen opens, left click on the **+** to the left of the icon.



This will then show a display of all controllers selected in the Node Number for Polling screen. If the device is selected but NOT on line it will have a RED X ❌ to the left of the description. If the device is selected and is on line it will have a BLUE Y ✔️ to the left of the description, as shown to the right.



Once controller node ID's have been selected, the correct device descriptions have been selected and the devices are confirmed as ON line Exit the Controllers On/Off Line window.

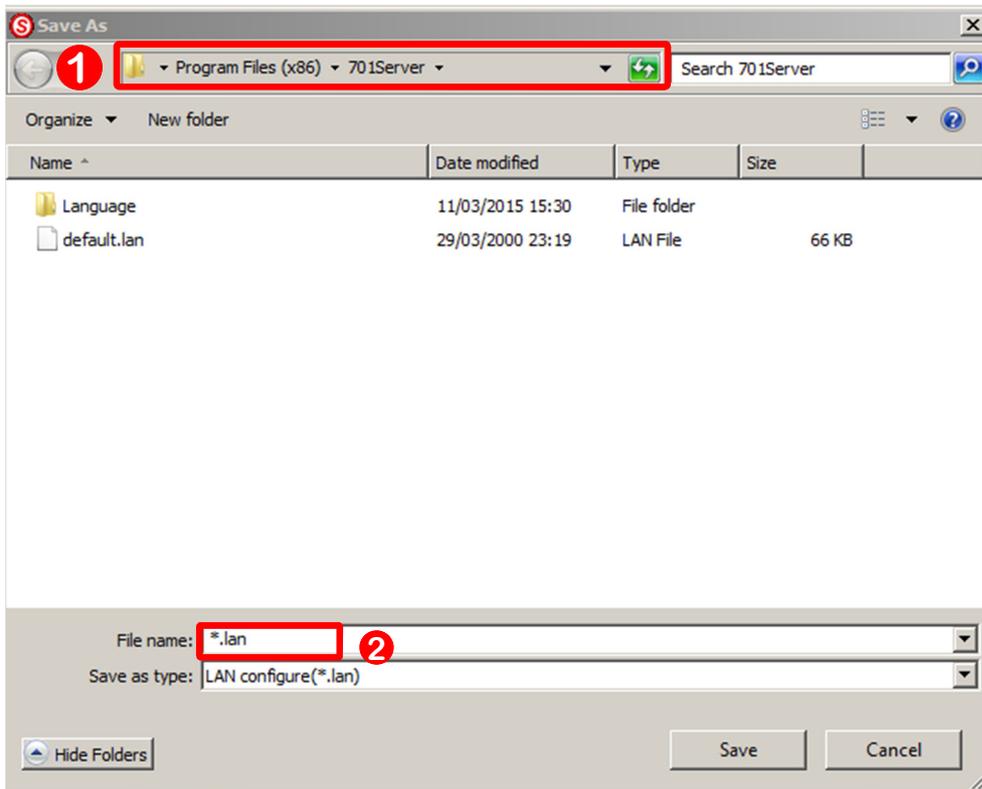
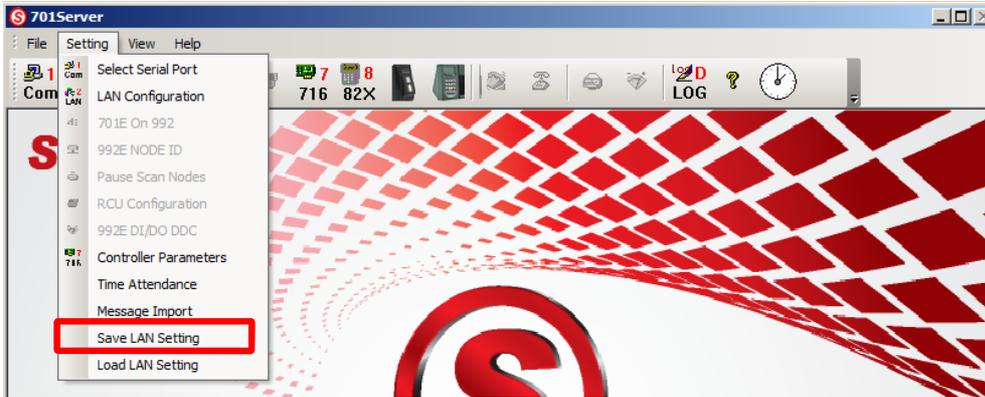
From the main menu click on "Time and Date" as shown below. This will download the current Date and Time to all connected controllers.



701 Server can now be minimised to the tool bar.

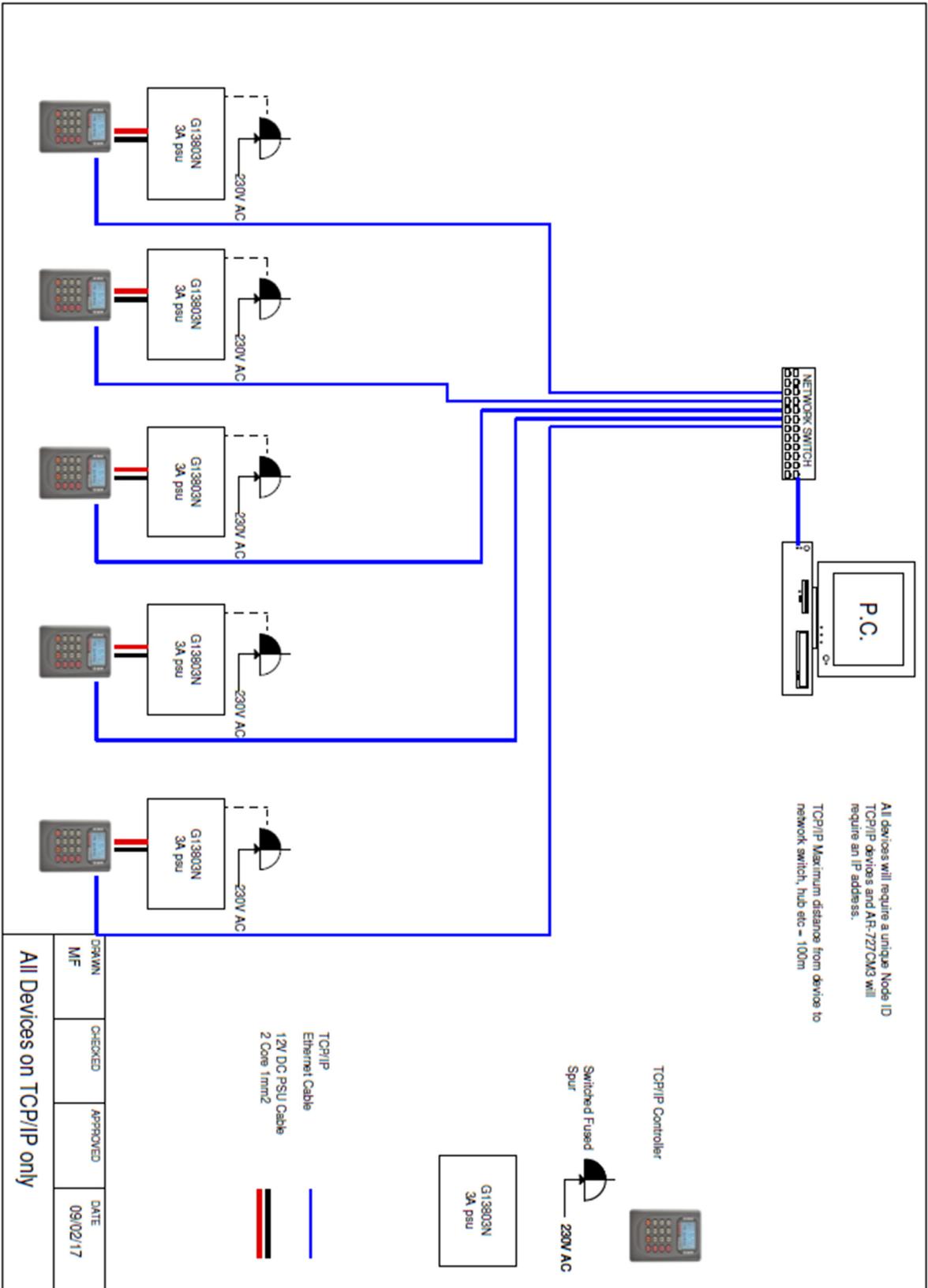
# 701 SERVER BACKING UP LAN CONFIGURATION

We would recommend making a copy of the LAN configuration once it is set up and functioning correctly. To do this initially create a folder on the desktop called “LAN settings” select “Save LAN Setting” from the 701 Server Setting drop down menu.

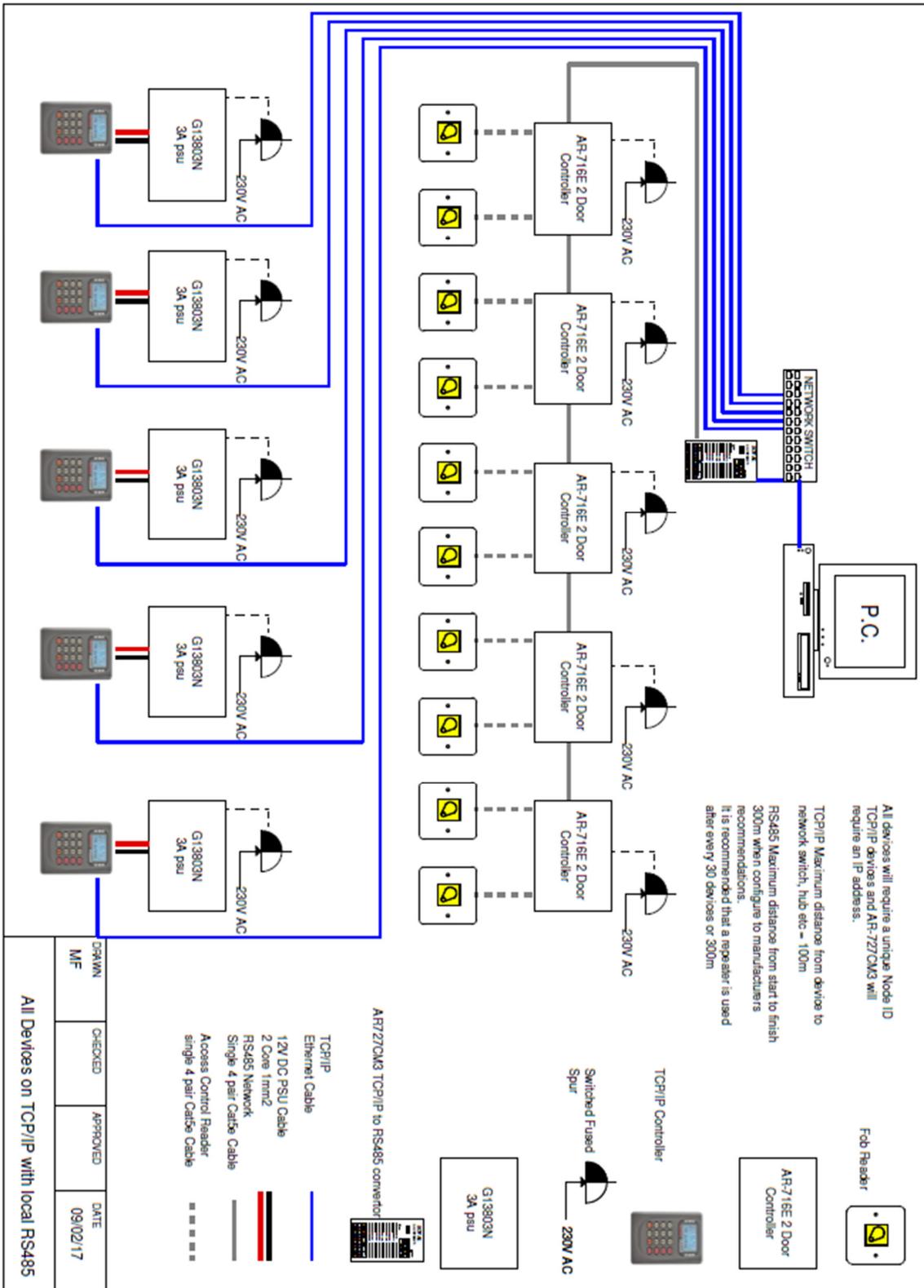


When the Save As window opens Navigate to the folder created earlier in the selection window identified above at 1, save the file as \*\*\*\*\*.lan where \*\*\*\*\* is a title of your choosing selected by over writing \* in the file name 2. Click on save, the window will close.

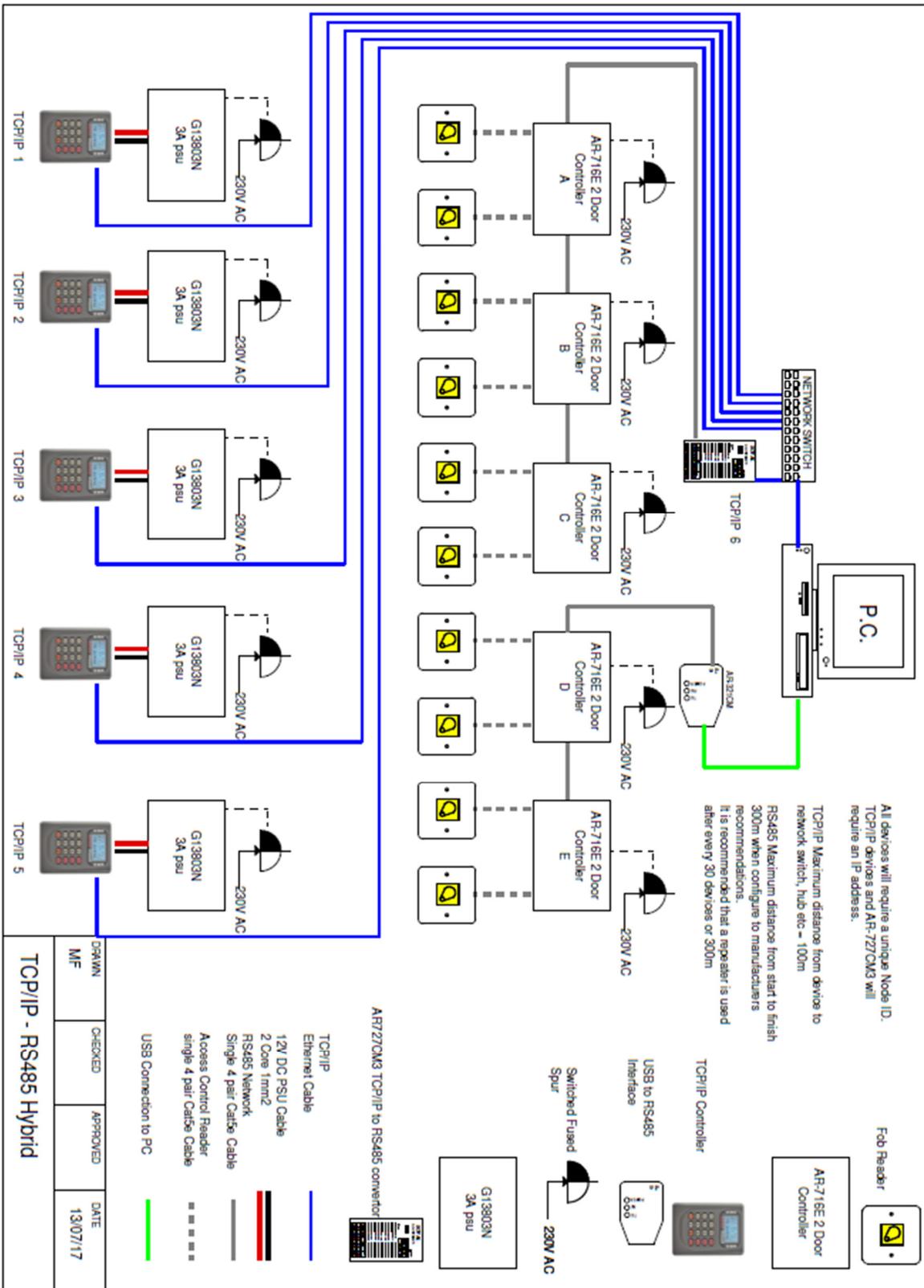
# TCP/IP ONLY



# TCP/IP AND RS485 VIA AR727CM3



# TCP/IP WITH RS485 VIA AR727CM AND AR-321CM



## NODE ID AND IP ADDRESS EXAMPLES

In the example table below devices 2, 3 and 7 have unique Node ID's and direct unique IP addresses. Devices 4,5,6 and 8 have unique Node ID's but a common IP address. This is because devices 4,5,6 and 8 are communicating via RS485 on the output of the AR321CM which has a single IP address.

Device Type	Node ID	Direct IP Address	Indirect IP Address Via AR321CM
AR-829EV5	2	192:168:1:127	
AR-829EV5	3	192:168:1:128	
AR-727HB-RAY	4		192:168:1:230
AR-727HB-RAY	5		192:168:1:230
AR-727H	6		192:168:1:230
AR-331EFS	7	192:168:1:129	
K50P	8		192:168:1:230

