	0	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16
A	16-A11		15-H14	24-G0	14-H16	25-H15	7-A16	27-H15	9-A14	28-H12	17-A10	29-H12	7-C16		9-E16		17-H6
B	26-G16																18-H13
C	26-E16																19-G16
D	23-H13																20-H13
E	21-H15																22-H13
F	16-F16																17-F16
G	13-H6																14-H13
H	11-H6		10-H6		9-H16		18-A14		18-A10		21-A6		19-A11		15-A12		8-G0

Author: ned		AC junctions	File: House DC wiring
Date:			Folio: 1/29

	0	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16

A row:
- Column 0: 7-H0
- Column 2: 22-H0
- Column 4: 1x 3p — 21-H0
- Column 6: 3x 3p, esp32 — 20-H0
- Column 8: 2x 3p, esp32 — 19-H0
- Column 10: 1x 3p, esp32 — 18-H0
- Column 12: 1x 3p — 17-H0
- Column 14: 16-H0

Right side (column 16):
- B: 9-H0
- C: 10-H0
- D: 14-H0
- E: 12-H0
- F: 11-H0
- G: 13-H0

H row (bottom):
- Column 4: 29-H0 — wifi, esp32
- Column 6: 28-H0 — wifi, esp32
- Column 8: 27-H0 — wifi, esp32
- Column 10: 26-H0 — 1x 3p, esp32
- Column 12: 25-H0 — wifi, esp32
- Column 14: 23-H0

Author: ned

Date:

PoE junctions

File: House DC wiring

Folio: 2/29

	0	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16
A																	
B																	
C																	
D																	
E																	
F																	
G																	
H																	

	0	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16
A	14-A15		20-A15		8-A15		21-A15		10-A15		11-A15		13-A15		24-A15		
B	14-C15		20-D15		8-D15		21-C15		10-C15		11-C15		13-C15		24-C15		
C															25-C15	25-A15	
D															26-C15	26-A15	
E															27-C15	27-A15	
F																	
G																	
H																	

	0	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16
A	17-B15 ↑		7-A0 ↑		8-A0 ↑		9-A0 ↑		10-A0 ↑		11-A0 ↑		12-A0 ↑		13-A0 ↑		
B	17-D15 ▽		7-C0 ▽		8-D0 ▽		9-D0 ▽		10-D0 ▽		11-D0 ▽		12-C0 ▽		13-D0 ▽		
C	27-A0 ◁	▷	27-C0												16-G0 ◁	▷ 16-E0	
D	29-A0 ◁	▷	29-C0												17-C0 ◁	▷ 17-A0	
E															18-C0 ◁	▷ 18-A0	
F															19-C0 ◁	▷ 19-A0	
G			26-C0 △		25-C0 △		21-C0 △		20-D0 △		15-D0 △		14-C0 △		22-C0 △		
H			26-A0 ▽		25-A0 ▽		21-A0 ▽		20-A0 ▽		15-A0 ▽		14-A0 ▽		22-A0 ▽		

	0	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16
A																	
B																	
C																	
D																	
E																	
F																	
G																	
H																	

	0	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16

A

VDC
9v
brown
0.75mm2
5-A2

14   14   14   14   14

AC light ph2

Flood light   Wall switch   1-A6

B

MR16 bulb   MR16 bulb   MR16 bulb   MR16 bulb

Max power = 36w
@ 9v = 4A

14   14   14   14

M   Window blinds

C

Dimmer switch

Right of bed

GND
4A
blue
0.75mm2
5-B2

13   13

AC ring ph 1
1-A12

D

Ventilation
inlet boost fan
(bedroom)

Left of bed

2

E

Outlet Boost fan
(Bathroom)
8-G16

2

out

F

eth   ESP32   i2c

2

Pressure sensor

in

2

G

Left of bed

2

Temperature

H

PoE ethernet

14

1

1

Humidity

2-A0

	0	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16

A

VDC
9v
brown
0.5mm2
5-A4

B

Max power = 18w
@ 9v = 2A

MR16 bulb   MR16 bulb

14   14

14   14

LED strip

24v 3.0A = 72w
Bathroom mirror

24v 1.75A = 42w
Whale
Gulper
water
pump

0.75mm2
red
24v
VDC
4-A4

C

Dimmer switch

5

Wastewater
Heat Recovery

Max power = 108w
@ 24v = 4.75A

D

GND
2A
blue
0.5mm2
5-B4

13

Dimmer switch

Drain water
level activated

0.75mm2
black
5.25A
GND
4-B4

1   1

4   4

E

F

From
Bedroom

G

AC ph2
1-H16

Ventilation
outlet boost fan
(bathroom)

∞

1

7-E15

H

Max toilet seat = 1000w

Author: ned

Date: 07/11/2023

Master bathroom

File: House DC wiring

Folio: 8/29

	0	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16

A

VDC
9v
brown
0.5mm2
5-A6

B

Max power = 18w
@ 9v = 2A

14 14 14

MR16 bulb MR16 bulb

M Window blinds

AC light ph 2   1-A8

Wall switch   Wall switch

3000K flood light   4000K flood light

C

14 14

Dimmer switch

D

GND
2A
blue
0.5mm2
5-B6

13 13

Under stairs

AC ring ph 2

1-A14

E

Wifi   pwr   eth

Pressure sensor

L+

S+

In Storage Room next to hallway

F

G

2

2

Temperature

H

PoE Ethernet

15

2-B16

1

ESP32   out   eth   i2c   in

2

H%

Humidity

2

2

1

Near front door   AC ring ph 1

1-H4

Author: ned			Lobby	File: House DC wiring
Date:				Folio: 9/29

	0	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16

A

VDC
9v
brown
0.5mm2
5-A8

14   14   14

24v 3.0A = 72w
Sink mirror

LED strip

1

0.75mm2
red
24v
VDC
4-A8

B

MR16 bulb   MR16 bulb

Max power = 18w
@ 9v = 2A

5

Dimmer switch

Max power = 72w
@ 24v = 3.0A

C

14   14

Dimmer switch

0.75mm2
black
3A
GND
4-B8

D

GND
2A
blue
0.5mm2
5-B8

13   13

Window blinds

M

4

E

Ventilation
inlet boost fan

∞

3

ESP32 Hallway
12v PWM
12-H8

F

Pressure sensor

S+

ESP32 Hallway
I2C
12-H6

G

Left of bed

L+

7

Temperature

H

PoE Ethernet

16

2-C16

1

2

AC ring ph 2
1-H2

Humidity

1 %H 2

Author: ned		File: House DC wiring
Date:	Bedroom 2	Folio: 10/29

A

VDC
9v
brown
0.5mm2
5-A10

14   14   14

0.75mm2
red
24v
VDC
4-A10

24v 3.0A = 72w
Sink mirror

LED strip

1

B

⊗ MR16 bulb   ⊗ MR16 bulb

Max power = 18w
@ 9v = 2A

14   14

M Window blinds

Dimmer switch

5

Max power = 72w
@ 24v = 3.0A

C

Dimmer switch

0.75mm2
black
3A
GND
4-B10

4

D

GND
2A
blue
0.5mm2
5-B10

13   13

E

Ventilation
inlet boost fan

∞

ESP32 Hallway

12v PWM

12-H13

3

F

Pressure sensor

S+

ESP32 Hallway

I2C

12-H12

G

Right of door

Temperature

L+

7

H

PoE Ethernet

2-F16

1

AC ring ph 2

1-H0

Humidity

1   2

Author: ned		Bedroom 3	File: House DC wiring
Date:			Folio: 11/29

	0	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16

A

VDC
9v
brown
0.75mm2
5-A12

14   14   14   14   14

24v 3.0A = 72w
Bathroom mirror

B

MR16 bulb   MR16 bulb   MR16 bulb   MR16 bulb   MR16 bulb

Max power = 45w
@ 9v = 5A

14   14   14   14   14

C

Dimmer switch

GND
5A
blue
0.75mm2
5-B12

13

D

E

Wifi
pwr   eth

Outside bedrooms 2-3

F

1

G

3   3

To Bedroom 2   To Bedroom 3

H

PoE Ethernet

ESP32
out
eth   i2c
in

14

2-E16

1

7   7

10-F15   10-E15   11-F15   11-E15

A

VDC
9v
brown
0.5mm2
5-A14

14 14 14

24v 3.0A = 72w
Sink mirror

LED strip

1

0.75mm2
red
24v

B

MR16 bulb   MR16 bulb

VDC
4-A12

Max power = 18w
@ 9v = 2A

14 14

M Window blinds

5

Max power = 72w
@ 24v = 3.0A

Dimmer switch

C

Dimmer switch

0.75mm2
black
3A

D

GND
2A
blue
0.5mm2
5-B14

13 13

4

GND
4-B12

E

Ventilation
inlet boost fan

∞

4

ESP32 Bedroom

PWM

14-D7

F

Pressure sensor

S+

ESP32 Bathroom

I2C

G

Right of door

L+

7

14-H6

Temperature

H

PoE Ethernet

1

2

AC ring ph 1
1-G0

Humidity

1 2

2-G16

	0	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16

Row A

VDC
9v
brown
0.5mm2
5-H12

14   14

MR16 bulb   MR16 bulb

LED strip — 24v 3.0A = 72w Bathroom mirror

LED strip — 24v 3.0A = 72w Sauna

0.75mm2
red
24v
VDC
4-A0

Row B

Max power = 18w
@ 9v = 2A

Max power = 144w
@ 24v = 6A

Row C

GND
2A
blue
0.5mm2
5-G12

14   14

13

Dimmer switch

5

5

Dimmer switch   RGBWW dimmer switch

0.75mm2
black
6.5A
GND

13   13   13

Row D

To Bedroom 4
13-E15

Radiator pump (Sauna)   4-B0

Row E

Ventilation
outlet boost fan

4

Humidity (Sauna)

Temperature (Sauna)

Row F

4   4

Pressure sensor

Sauna Turn On Switch

Row G

7

Humidity (Bathroom)

Temperature (Bathroom)

Max toilet seat = 1000w

Sauna heater
1-A4

Row H

PoE Ethernet

2-D16

ESP32
eth   out
i2c
in
1

7   7

To Bedroom 4
13-E15

8

1-G16 AC ring ph 2

AC ring ph 1

Author: ned

Date:

Main Bathroom

File: House DC wiring

Folio: 14/29

	0	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16

A

VDC
9v
brown
0.33mm2
5-H10

14

1-H14 ▽ AC ring ph 1

B

Wall switch

M Window blinds (lower)

C

3000W quartz infrared heater

D

GND
1A
blue
0.33mm2
5-G10

13

E

F

Endless
Pool

30 mA

G

H

To wastewater

AC 3 ph 6mm2 32A
(non-backup)

1-A2

	0	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16

Softened mains cold water

DHW pumped loop

4

Ret.

55 C

Vent HE

26

MVHR + subsoil HE

19

AC ring ph 3
(backup) 1-A0

Living room
Underfloor heating

7

1 1/4   1/2 1 1/4

7

1/2

6

Tank manometer   3

1 1/2

1 1/2
1 1/2
1 1/2

20

30 C

25

Assuming 0.0007 water-glycol
thermal expansion coefficient
a 3,200 litre system would expand
by 180 litres when going from 10 C
to 90 C

Failover summer immersion (initially unused)

3 ph 9 kW

3 ph 9 kW

1 1/2
1

Summer
+ Solar bypass
immersion

23

19

Sauna

15

Space heating pump
DC ?

Reversible
DC pump
(sauna)

14

VDC
9v
red   5-C15
0.1mm2

Expansion tank   27

1/2

Failover winter immersion (initially unused)

3 ph 9 kW

1 1/2
1
1 1/2

23   23

Winter 2 immersion

8

14

MR16 bulb

Wall switch

1/2

3 ph 9 kW

3 ph 9 kW

1 1/2
1
1 1/2

16

Winter 1 + Solar bypass immersion

Manual winter/summer switch

2

Non-backup
AC 3 ph

1-F0

GND
0.5A
black   5-C15
0.1mm2

13

Ventilation
outlet boost fan

9

Temperature (Room)

Humidity

NOT SHOWN to declutter page:
- ESP32 has eight temp sensors
on tank to determine how full it is
- ESP32 may charge tank if lithium
batteries are full and we are exporting
spare electricity to grid (ideally balancing
the three AC phases)
- ESP32 will PWM control DC pumps so they
don't always run full speed

PoE Ethernet

28

2-A14

ESP32

eth

i2c

in

out

1

2

2

2   1

2

Temperature (Room)

Humidity

For washing machine and dryer

Author: ned		File: House DC wiring
Date:	Utility	Folio: 16/29

VDC
9v
brown
0.75mm2
5-D15

14 14 14 14

MR16 bulb MR16 bulb MR16 bulb MR16 bulb

Max power = 36w
@ 9v = 4A

14 14 14 14

GND
4A
blue
0.75mm2
5-D15

13

Dimmer switch

Lights under bridge as far
as living room

AC light ph 3   1-A10

3000K flood light

4000K flood light

Wall switch   Wall switch

Pantry

VDC
9v
red
0.1mm2
5-A0

8

MR16 bulb

7   6

Wall switch

GND
0.5A
black
0.1mm2
5-B0

AC 3 ph
1.5 mm2

L1

L2

L3   1-F16

Left of pantry

Left of pantry

PoE ethernet

29

2-A12

1

1-A16   AC ring ph 2

Mini oven   Fridge-Freezer   Microwave   Air fryer

Kitchen South

Column headers: 0 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16
Row labels: A B C D E F G H

Row A–D (left):
VDC
9v
brown
0.75mm2
5-E15

Max power = 45w
@ 9v = 5A

GND
5A
blue
0.75mm2
5-E15

Lights:
14 14 14 14 14
MR16 bulb MR16 bulb MR16 bulb MR16 bulb MR16 bulb
14 14 14 14 14

13
Dimmer switch

Lights over countertop

Top right:
AC 3ph 2.5mm2
(backup)

Hob, 3 ph, 7.62 kW

AC 3ph 1.5mm2
(non-backup)

Hood extractor

Big Oven, 2.45 kW

Center:
Ventilation
inlet boost fan
2

Emergency ventilation fan

Emergency air inlet valve

ESP32
out
i2c
in
eth

L+
S-
Pressure sensor
2   2
2

2
2
2
PM2.5 sensor
3
4

Temperature

H%
Humidity
1
2

Between hob and sink

1

PoE ethernet
30C
2-A10

Bottom right:
Left of hob   Between hob and sink   Right of sink
2   2   2

1-B16   AC ring ph 2

	0	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16

A

VDC
9v
brown
0.33mm2
5-F15

14

B

(M) Window blinds (lower)

AC ring ph 2
1-H12

Wall switch

C

GND
1A
blue
0.33mm2
5-F15

13

3000W quartz infrared heater

D

ESP32

out

eth

i2c

in

E

2

F

Right of greenhouse

1

Pressure sensor

2

2

2

Left of greenhouse

2

G

Left of greenhouse

1

Temperature

1-C16
AC ring ph 1

H

PoE ethernet

1

Humidity

Right of greenhouse

2

2-A8

3

H%

2

1

	0	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16

A
VDC
9v
brown
0.75mm2
5-H8

14 14 14 14 14 14

1.0mm2
red
24v
VDC
4-A2

B
Max power = 45w
@ 9v = 5A

MR16 bulb   MR16 bulb   MR16 bulb   MR16 bulb   MR16 bulb

14 14 14 14 14

LED strip   24v 3.0A = 72w
Bottom of TV wall

LED strip   24v 3.0A = 72w
Top of TV wall

2x 72w = 144w
6A cable needed 1.0mm2

C
Dimmer switch

D
GND
5A
blue
0.75mm2
5-G8

13   13

Window Blinds

Dimmer switch   Dimmer switch

13   13

1.0mm2
black
6A
GND
4-B2

E
Ventilation
outlet boost fan

out

ESP32

eth   i2c

in

F
Behind wall sliding door

Pressure sensor

TV and Satellite
Behind TV

G
Behind TV

Temperature

Right of conservatory door   Behind TV   Behind sofa on floor

H
PoE ethernet

2-A6   %sequ_1   Behind sofa on floor

Humidity

1-D16   AC ring ph 3

Author: ned

Date:

Living room

File: House DC wiring

Folio: 20/29

A

VDC
9v
brown
0.33mm2
5-H6

14

1-H10
AC ring ph 3

0.75mm2
red
24v
VDC
4-A6

B

(M) Window blinds (inner)

Wall switch

LED strip

24v 3.0A = 72w
floor of conservatory

Max power = 72w
@ 24v = 3.0A

C

GND
1A
blue
0.33mm2
5-G6

13

3000W quartz infrared heater

(M) Window blinds (side of greenhouse)

5

RGBWW Dimmer switch

0.75mm2
black
3.5A
GND
4-B6

D

4

E

F

G

On Wall

H

PoE ethernet

On Wall

1

2

1-E0

AC ring ph 2

2-A4

Author: ned

Date:

Greenhouse (Conservatory)

File: House DC wiring

Folio: 21/29

	0	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16

A — VDC 9v brown 0.75mm2 5-H14

14 14 14 14 14

B — MR16 bulb MR16 bulb MR16 bulb MR16 bulb

M Window blinds

Max power = 36w @ 9v = 4A

14 14 14 14

C — Dimmer switch

GND 4A blue 0.75mm2 5-G14

13 13

D

Wifi — pwr / eth — Office ceiling

E — To Upstairs Bathroom 24-H4

2

Ventilation outlet boost fan

2

F — ESP32 — eth / out / i2c / in

%sequ_1

+L / S+ Pressure sensor

G — South wall — East wall, near door — South wall — West wall

Temperature

%sequ_1 %sequ_%sequ_1

H — PoE Ethernet — 2-A2 — West wall — Humidity — 1-E16 — AC ring ph 1

%sequ_1

To Upstairs Bathroom

1

	0	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16

Mains water inlet from outside

28

28

Fill tanks with mains water

Water softener

32

32

31

Reverse osmosis

32

29

To rainwater harvesting tanks

33

To wastewater

34

Water processing

House server

PoE ethernet

34

2-H14

1

House server

To office tap and
living room drinking water

Cold water to
rest of house

1-D0

AC ring ph 1

	0	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16

A

1.5mm2
red
24v
VDC
4-A14

B

LED strip   24v 3.0A = 72w
Bathroom mirror

LED strip   24v 6.0A = 144w
Roof

Max power = 216w
@ 24v = 9A

C

Dimmer switch   Dimmer switch

1.5mm2
black

D

9A
GND
4-B14

E

Ventilation
outlet boost fan

F

L+

Pressure sensor

S+

G

AC ph2
1-A3

H%

Humidity

Temperature

H

Max toilet seat = 1000w

From
Office

22-E8

From
Office

22-H6

| | 0 | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 | 13 | 14 | 15 | 16 |

A
VDC
9v
brown
1.5mm2
5-H4

1.5mm2
red
24v
VDC
4-C15

B
Max power = 81w
@ 9v = 9A

14 14 14 14 14 14 14 14 14 14

MR16 bulb MR16 bulb MR16 bulb MR16 bulb

14

LED strip

24v 8.0A = 192w
Top of stairs pointing upwards

Max power = 192w
@ 24v = 8A

C
Dimmer switch

14 14 14 14

MR16 bulb MR16 bulb MR16 bulb MR16 bulb

M Window blinds

5

D
GND
9A
blue
1.5mm2
5-G4

13
13

14 13

14 14 14

Dimmer switch

13

1.5mm2
black
8A
GND
4-C15

E
Cris-crossing pattern 4x4 within flat space top of vaulted ceiling

MR16 bulb

14

On/off switch

13

In tiny corridor between Games Room door and Guest Bedroom door. Expected to be left turned on almost always as a night light, so a low wattage long life bulb would be recommended.

F

G
Wifi
pwr   eth

Somewhere near Games Room/Guest Bedroom door

2

H
PoE Ethernet

14

2-H12

Above Office door

1

AC ring ph 1
1-A5

A

VDC
9v
brown
0.1mm2
5-H2

0.75mm2
red
24v
VDC
4-D15

B

24v 3.0A = 72w
Far end roof
pointing down

24v 3.0A = 72w
Sink mirror

LED strip

LED strip

1

Max power = 72w
@ 24v = 3.0A

M Windows blinds

14

C

GND
0.1A
blue
0.1mm2
5-G2

13

Dimmer switch

Dimmer switch

5

5

4

4

0.75mm2
black
3A
GND
4-D15

D

(Games Room)

2

Ventilation
inlet boost fan

2

E

(Games Room)

2

AC light ph2

Flood light

Wall switch

1-C0

F

out

eth ESP32 i2c

in

L+

S-

Pressure Sensor

2

2

G

1

Wall left of door

2

Temperature

Wall left of door

2

AC ring ph 1

1-B0

H

PoE Ethernet

14

2-H10

1

Humidity

2

1

Wall opposite door

2

	0	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16

A

VDC
9v
brown
1.5mm2
5-C0

14 14 14 14 14 14 14 14 14

1.5mm2
red
24v
VDC
4-E15

14

B

Max power = 72w
@ 9v = 8A

MR16 bulb MR16 bulb MR16 bulb MR16 bulb

LED strip

24v 3.0A = 72w
Over cubby section just
to left of door

Max power = 72w
@ 24v = 3A BUT
reserve more for
future light

M Window blinds

14 14 14 14

C

GND
8A
blue
1.5mm2
5-C1

Dimmer switch

MR16 bulb MR16 bulb MR16 bulb MR16 bulb

13

Dimmer switch

1.5mm2
black
8A
GND
4-E15

13

14 14 13

13

14 14 14

Dimmer switch

D

One set of four bulbs is outer around the sides of the room
The other set of four bulbs is inner pointing at the middle of the room

E

Ventilation
inlet boost fan

From Guest Bedroom

2

26-D7

F

Wifi

pwr   eth

High up near vaulted roof ideally
left of centre to avoid central steel pole

Pressure sensor

L+

S+

G

%sequ_1

Cubby section just to left of door

Temperature

From Guest Bedroom

26-E7

2

H

PoE Ethernet

14

%sequ_1

Humidity

Far corner away from door

Cubby section just to left of door

AC ring ph 1

1-A7

2-H8

Author: ned		Games Room	File: House DC wiring
Date:			Folio: 27/29

	0	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16

A

B

C

D

E

F

G

On South wall wherever no ventilation pipes

Mist suppression system

H

PoE Ethernet

%sequ_1

On South wall wherever no ventilation pipes

14

2-H6

AC ring ph 1

1-A9

File: House DC wiring

Author: ned

Under Mezzanine

Date:

Folio: 28/29

	0	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16

A

VDC
9v
brown
0.75mm2
5-D0

14 14 14 14

B

MR16 bulb MR16 bulb MR16 bulb MR16 bulb

Max power = 36w
@ 9v = 4A

14 14 14 14

C

Dimmer switch

GND
4A
blue
0.75mm2
5-D1

13

D

E

F

G

South wall corner next to portal frame

H

PoE ethernet

14

%sequ_1

South wall corner next to portal frame

2-H4

AC ring ph 1

1-A11