UT TECHNOLOGY

SMART BUIILDING AUTOMATION GUIDELINES

UTT Design guide requirements for Smart City Services

Revision 8.1

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Reem Island is considered as one of the most luxurious projects among the UAE which needs a high life standard for all types of units. One of the common technologies which can add value to residential and commercial buildings is Smart Building Technology. In order to insure quality, reliability and proper support of such critical technology, Ubiquitous Telecommunication Technologies (UTT) will be the sole provider of Smart Building Automation System and will be responsible of servicing and supporting Smart Building Automation System within Reem Island. Developers are kindly requested to insure the following:

- UTT is the exclusive provider of Smart Building Automation system within Reem Island and Rawdhat Abu Dhabi, no other third party will be allowed to provide Smart Building Automation systems within Reem Island.
- All apartments shall be either equipped with Smart Home Automation or shall be Smart Home Basic.
- Smart Home Basic System consists of mandatory items mentioned in section 1.2.
- All connections shall be as per UTT Smart Building Automation Guidelines.
- It's the responsibility of consultant/contractor of the project to submit the drawings of the smart building automation system layout, bus cable layout and the schematic diagram for each apartment type as shown in Figure 1.1.2, 1.1.3 & Figure 1.1.4 respectively or Figure 1.2.1, 1.2.2 & 1.2.3 for Smart Home Basic System. The application for building approval should be submitted along with the drawings. Refer to Annex 2.1 for application form. For any amendments or changes, the consultant is responsible to resubmit modified drawings to UTT indicating all the changes for re-approval prior starting of work.
- It's the responsibility of the MEP contractor assigned by the client to arrange the fixing of all conduits, back boxes, automation distribution panel, pull and terminate the electrical wires as mentioned in the Smart Building Automation Guideline and according to the approved drawings.
- UTT through its certified venders will supply and install all the smart Building Automation cables and equipment after receiving a confirmed order from the Owner/Developers/Contractor. This scope is not allowed to be carried out by any other party.
- UTT will be conducting periodic site inspections in order to make sure that all the works done are according to UTT guidelines & approved drawings. The contractor should apply for a site inspection by submitting the application for building inspection. Refer to Annex 2.2 & 2.3 for the application form and the inspection checklist.
- Etisalat's Building Completion Certificate (BCC) will not be issued unless all UTT Smart Building Automation Guideline and approved drawings are implemented on site.
- Delivery period of Smart Building Automation equipment is 4 months after placing a confirmed order.

1.1 SMART HOME

Smart Home Systems provided by Ubiquitous Telecommunication Technologies (UTT) are based on Centralized DIN rail System Design where load dimming and switching control will be placed in central enclosures called the Automation Distribution Panel (ADP). The ADP should be installed inside mechanical rooms or electrical closets and receives AC wiring directly from breaker panel in the Electrical Distribution Board (EDB). In the apartment scenario, the ADP will be placed near the EDB. With this design, traditional toggle switches to control each light or load will be eliminated. Instead, all the loads are controlled using programmable low voltage keypads and IP enabled Touch Panels.

The centralized ADP is interconnected with communication bus cable, and controls Lights, Fans, Motors, HVAC, Security, Audio/Video Equipment, Internet Cameras, Shades, Drapes, Skylights, Awnings, Shutters, Pool Equipment, and …etc. as shown in Figure 1.1.1.

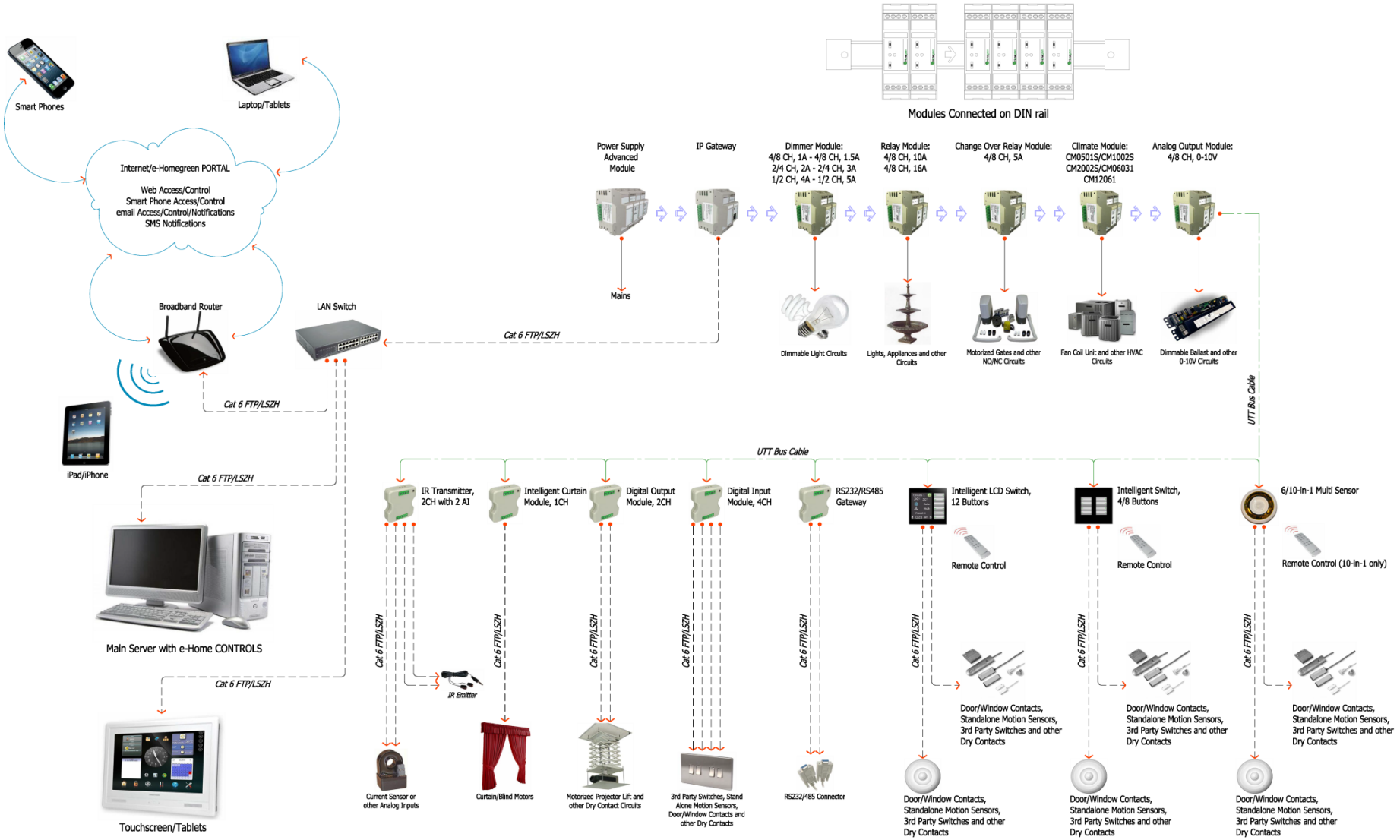


Figure 1.1.1: DIN Rail System Overview

The following sections will provide a detailed explanation about the DIN Rail Smart Home System that should be made inside the home:

1.1.1 AUTOMATION DISTRIBUTION PANEL (ADP)

There are two types of the DIN rail ADP that should be fixed inside the home next to the EDB which are:

1.1.1.1 5 DIN RAIL TYPE ADP:

- It should be used for two bedroom apartment type and above.
- It will house the dimmers and relays required for the lighting loads connections (channels):
  - 1st DIN rail : up to 16 lighting channels are available for dimming.
  - 2nd DIN rail : up to 16 lighting channels are available for relay.
  - 3rd DIN rail : up to 16 lighting channels are available for relay.
- It will house the HVAC modules required for the AC control:
  - 4th DIN rail : up to 10 HVAC channels are available for AC control.
- It will house the power supply and gateway:
  - 5th DIN rail : dedicated 220V protected breaker connection required.
- If more connection channels are required, please consult UTT.
- Its size is 875 x 435 x 101 mm (HWD). For more information, please refer to UTT certified ADP vendor.

1.1.1.2 3 DIN RAIL TYPE ADP:

- It should be used for studio and one bedroom apartment type only.
- It will house the dimmers and relays required for the lighting loads connections (channels):
  - 1st DIN rail : up to 16 lighting channels are available for dimming.
  - 2nd DIN rail : up to 12 lighting channels are available for relay.
- It will house the HVAC modules required for the AC control:
  - 2nd DIN rail : up to 4 HVAC channels are available for AC control.
- It will house the power supply and gate way:
  - 3rd DIN rail : dedicated 220V protected breaker connection required.
- If more connection channels are required, please consult UTT.
- Its size is 555 x 435 x 101 mm (HWD). For more information, please refer to UTT certified panel vendor.

1.1.2 CONNECTION BETWEEN ADP & THE OPTICAL NETWORK UNIT (ONU)

- 1 No. 25 mm conduit should be provided between the ADP and the ONU. It should enter the ADP and the ONU from the bottom center portion only as shown in Figure 1.1.4.
- 2 No. of Cat.6 cables should be pulled inside the conduit.
- 1 m length of cables should be kept inside the ADP and the ONU.

1.1.3 LOADS CONNECTION

- All the loads such as lightings, exhaust fans, doorbell and water heaters inside the home should be connected to the ADP using the electrical wires.
- The loads' wires should run inside conduits & enter the ADP from the top only.
- Each load should have its own line (wire) coming out from the ADP to the load location. The neutral wire can be shared between the loads fed from the same breaker and should return back to the ADP.
- 1 m length of electrical wire for each load should be kept inside the ADP.
- All the wires should be labeled and terminated at the ADP according to the approved drawings as shown is Figures 1.1.2, 1.1.3 & 1.1.4. The labeling should be as follows:
  - D1, D2, D3… up to D16 for Dimmer Module Channels. The connections termination should start from the right side of the 1stDIN rail.
  - R17, R18, R19… up to R48 for Relay Module Channels. The connections termination should start from right side of the 2nd and 3rd DIN rails.
- The details & rating of each load (for example: chandelier, 500watt) should be mentioned clearly in the apartment's smart home layout as shown in Figure 1.1.2.

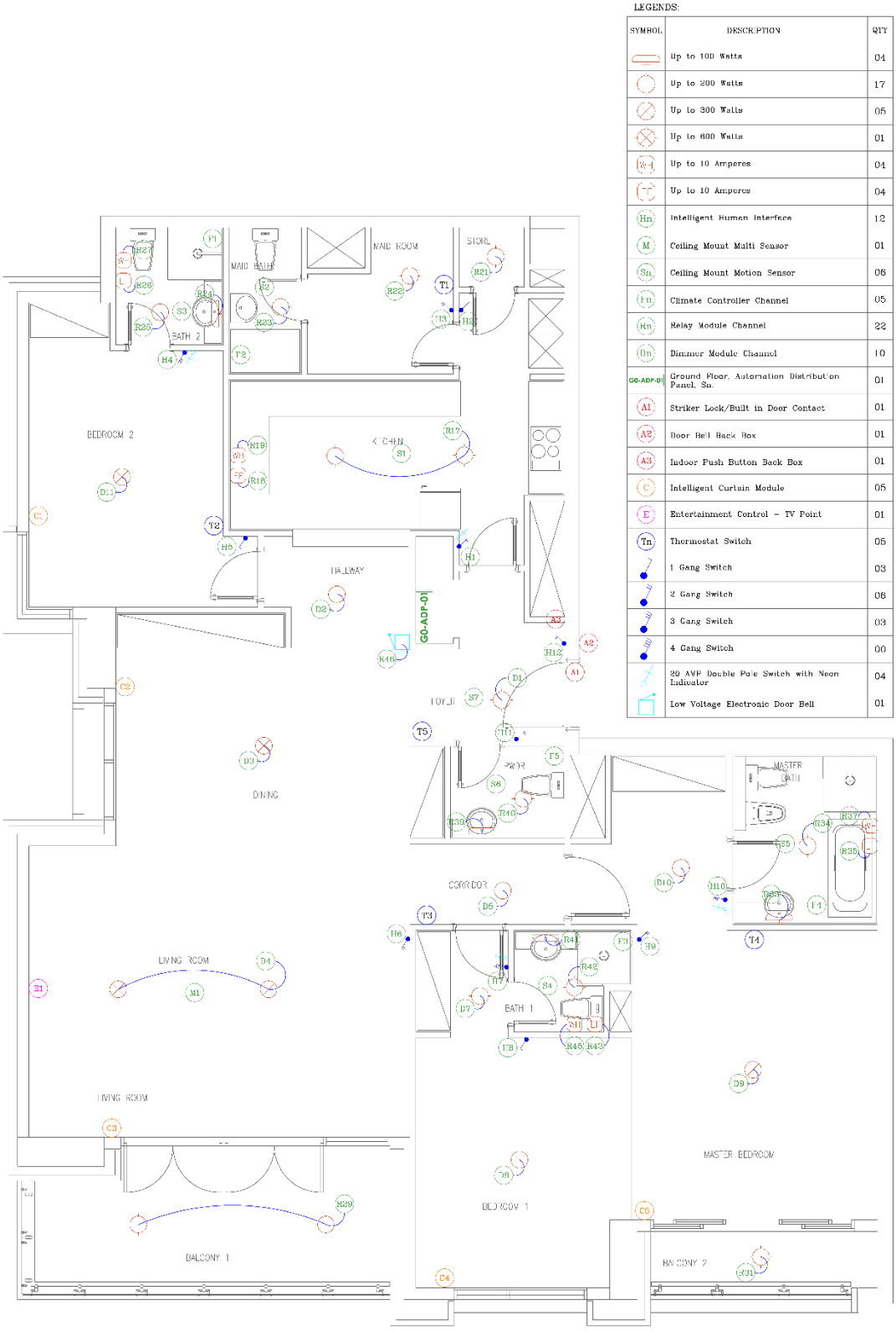


Figure I.I.2: Apartment's Smart Home System Layout

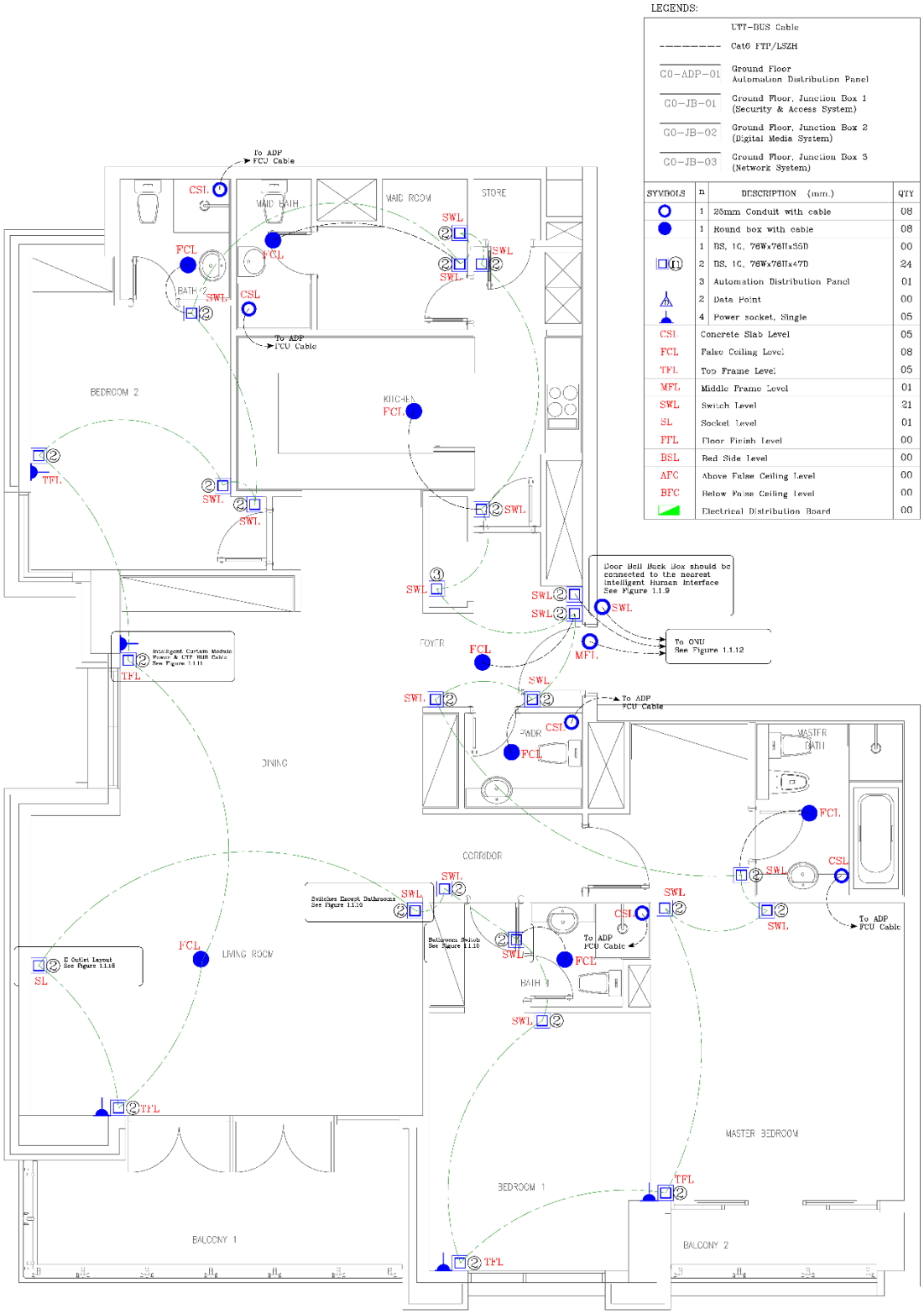


Figure 1.1.3: Apartment's Bus Cable Layout

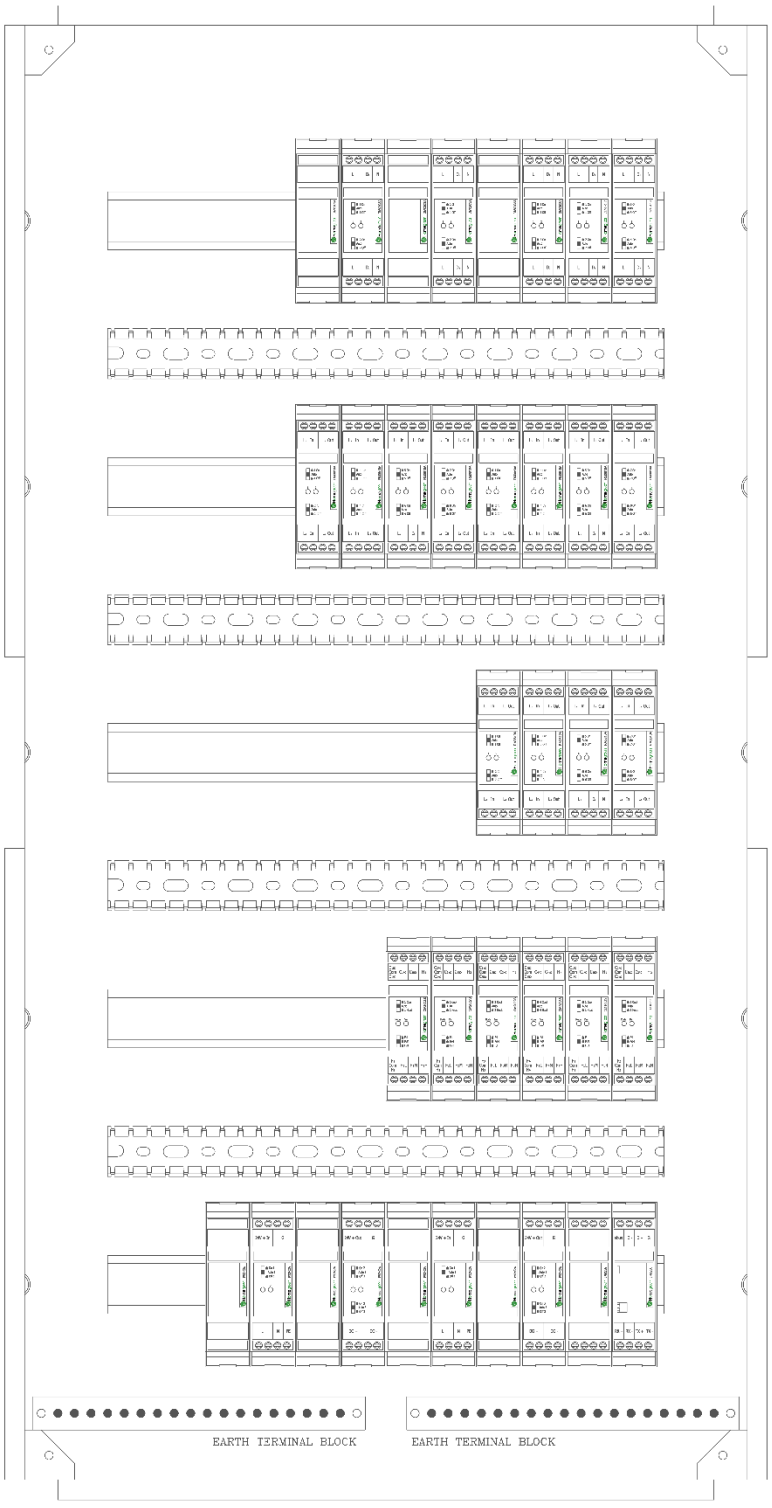


Figure I.I.4: Apartment's Smart Home System Schematic Diagram

There are two types of the DIN rail Modules where the loads should be connected to within the ADP and a Gateway which are:

1.1.3.1 DIN RAIL DIMMER MODULE:

- The DIN rail Dimmer Module shown in Figure 1.1.5 is used to dim the lights to a certain percentage as well as to turn them ON/OFF.
- The lighting loads in the living room, dining room, and all bedrooms should be connected to the output channels of the dimmer module(s).

Figure 1.1.5: DIN rail 4 Channels Dimmer Module

- There are different type of dimmer module(s) to be used, depending on the number of output (load) channels and the output (load) rating, which are:
  - 4 x 1A channels of dimming output.
  - 8 x 1A channels of dimming output.
  - 4 x 1.5A channels of dimming output.
  - 8 x 1.5A channels of dimming output.
  - 2 x 2A channels of dimming output.
  - 4 x 2A channels of dimming output.
  - 2 x 3A channels of dimming output.
  - 4 x 3A channels of dimming output.
  - 1 x 4A channels of dimming output.
  - 2 x 4A channels of dimming output.
  - 1 x 5A channels of dimming output.
  - 2 x 5A channels of dimming output.
- Each Unit (vertical slot/sideboard of the Module) from the dimmer module should be connected to the same breaker with its neutral as an input from the EDB.
- Each lighting load should have its own line (wire) connected to the dimmer module output. The neutral cable can be shared between the loads fed from the same breaker and should return back to the ADP.

- Dimmable ballasts for lights should be installed by the electrical contractor assigned from the client.
- The loads connections to the dimmer module are shown in Figure 1.1.4.

1.1.3.2 DIN RAIL RELAY MODULE:

- The DIN rail Relay Module shown in Figure 1.1.6 is used to toggle (ON/OFF) the lights, exhaust fans, doorbell and water heaters.
- The lighting loads in the kitchen, corridors and all bathrooms should be connected to the output channels of the relay module.
- The doorbell, exhaust fans and water heaters in the home should also be connected to the output channels of the relay module.

Figure 1.1.6: DIN rail 4 Channels Relay Module

- There are different type of relay module(s) to be used, depending on the number of output (load) channels and the output (load) rating, which are:
  - 4 x 10A channels of relay output.
  - 8 x 10A channels of relay output.
  - 4 x 16A channels of relay output.
  - 8 x 16A channels of relay output.
- Each channel from the relay module can be connected to a different breaker with its neutral as an input from the EDB.
- Each lighting load, exhaust fan, doorbell, and water heater should have its own line (wire) connected to the relay module output. The neutral cable can be shared between the loads fed from the same breaker and should return back to the ADP.
- The loads connections to the relay module are shown in Figure 1.1.4.

1.1.3.3 DIN RAIL GATEWAY:

- The gateway shown in Figure 1.1.7 is required to connect the smart home system to the TCP/IP network.
- A dedicated 220V surge protected breaker should be connected to the power supply of the gateway located at the last rail of the ADP shown in Figure 1.1.4.

Figure 1.1.7: DIN rail Gateway

1.1.4 THE SMART HOME KEYPAD AND THE BUS CABLE

- Smart home keypads, shown in Figure 1.1.8, are programmable keypads that consist of 4 to 8 buttons or an LCD with 12 buttons where each button can be used for a single or multiple actions (scenes).

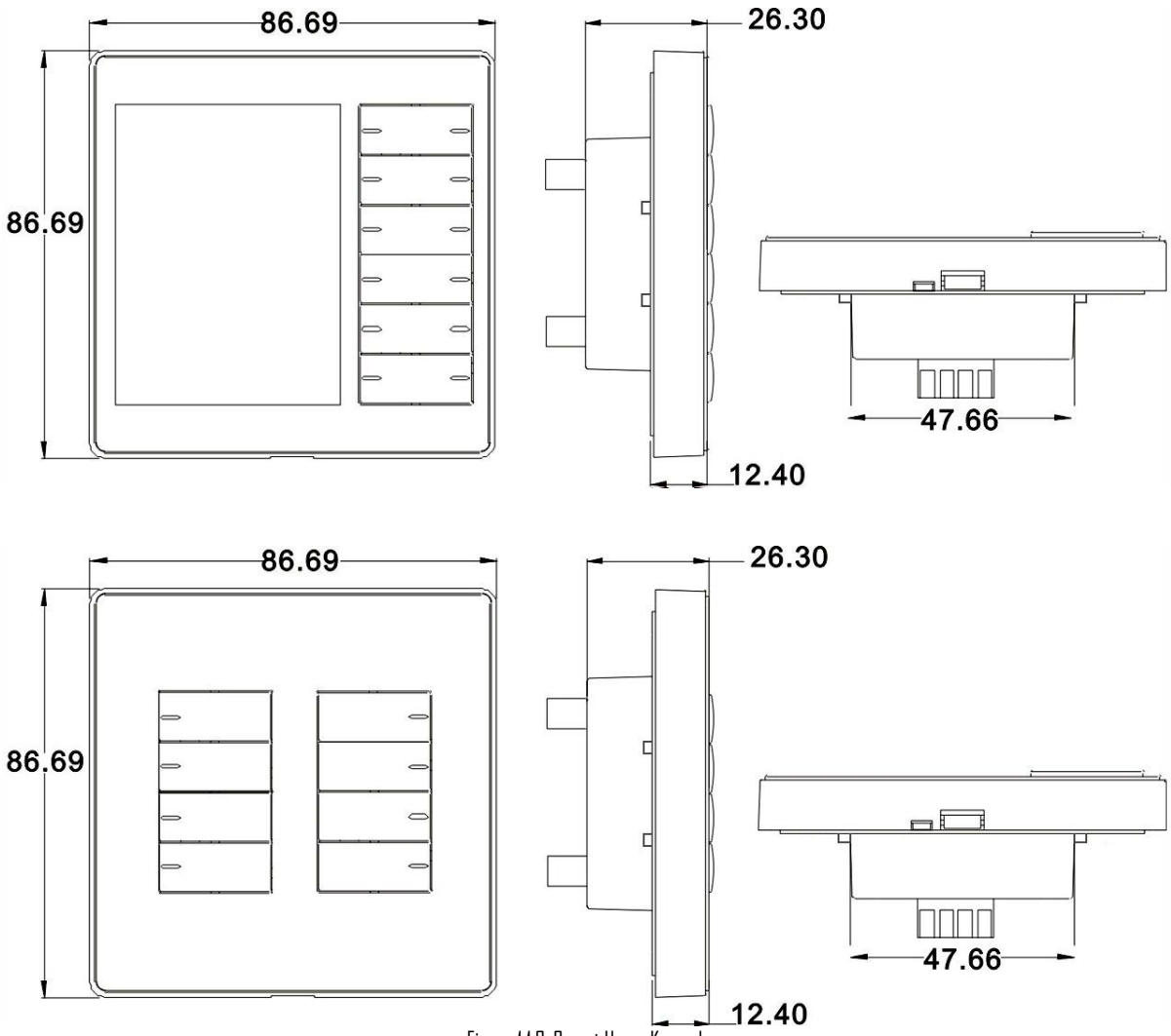


Figure 1.1.8: Smart Home Keypads

- A smart home keypad should be provided at the entry of each room, bathroom, kitchen & corridor inside the home as shown in Figure 1.1.2.
- If a bathroom is available inside a room & the bathroom is close to the entry of the room, one keypad is enough for both of them. However, if the bathroom is away from the entry of the room, two smart keypads should be provided: one for the bathroom & the other one for the room.
- Each smart home keypad requires a UK sized back box (3" x 3") with a minimum depth of 47 mm. It should be labeled as H1, H2, and H3…etc.
- The dimension of the keypad's faceplate is 86 x 86 mm (HW).
- The bus cable, supplied by UTT, should go out from the bottom center portion of the ADP in order to connect the back boxes of the smart home keypads, thermostats, curtains, multi-sensors, and the entertainment (E) outlet. The cable should come back

to the ADP after passing by the last back box in order to close the loop.

- The bus cable should pass by each back box without being cut where a minimum of 35cm from the cable should be kept inside each back box (two rounds inside the back box).
- The bus cable loop should be run inside 20 mm conduits. All the conduits should be laid from the ground below the tiles and not from the ceiling except for curtains and sensors.
- The looping is topology free (daisy chain, branch, star, etc.) If the total amount of cable used within a bus run is not more the 300m otherwise Daisy chain is highly recommended as shown in Figure 1.1.3.
- 1 No. 20mm conduit with Cat.6 cable should be provided between the doorbell switch and the nearest smart home keypad as shown in Figure 1.1.9.

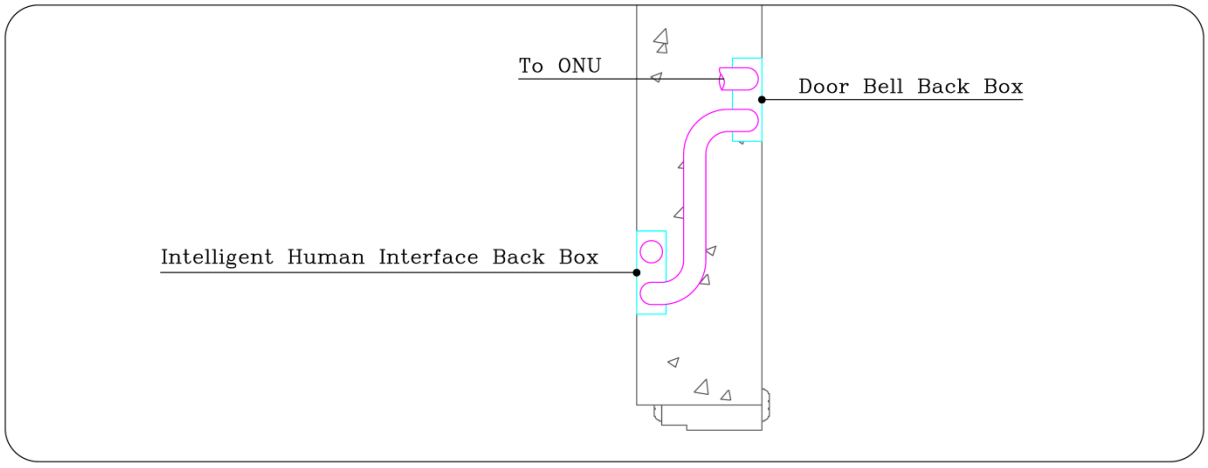


Figure 1.1.9: Connection between the Smart Home Keypad and the Doorbell

- 1 No. 20mm conduit with Cat.6 cable should be provided between the water heater conventional switch and the nearest smart home keypad as shown in Figure 1.1.10.

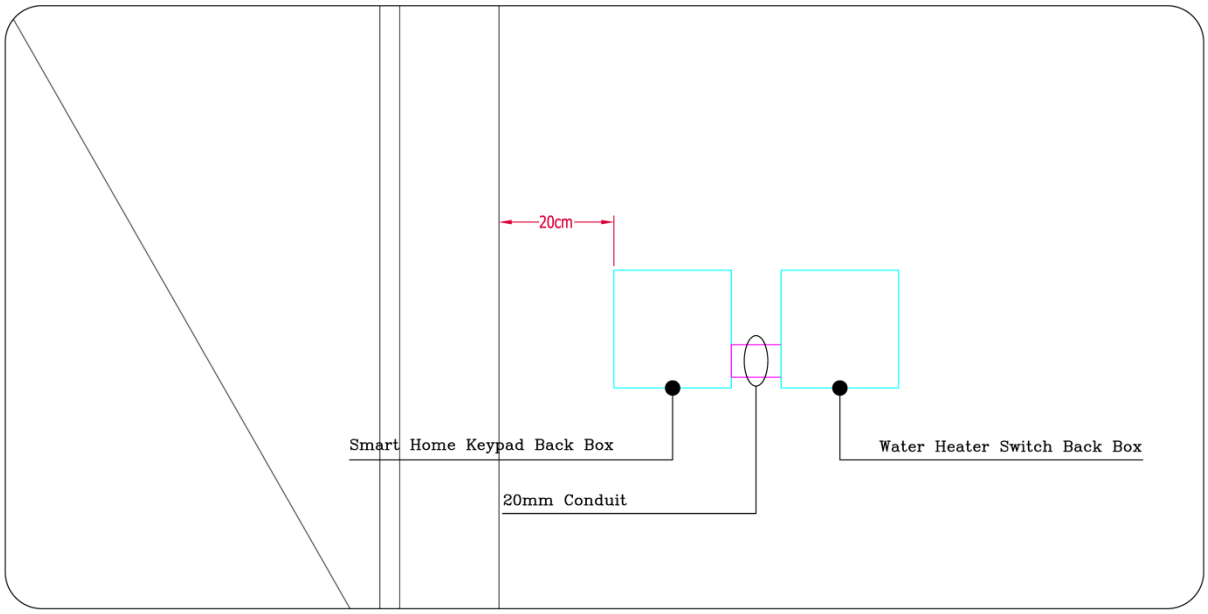


Figure 1.1.10: Connection between the Smart Home Keypad and Water Heater Switch

1.1.5 HEATING, VENTILATING, AND AIR CONDITIONING (HVAC)

- Each thermostat requires a UK sized back box (3" x 3") with a minimum depth of 47 mm. It should be labeled as T1, T2, and T3…etc.
- The bus cable loop should pass by the thermostat's back box without being cut where a minimum of 35cm from the cable should be kept inside each back box (two rounds inside the back box).
- If the thermostat is located exactly next to the smart keypad, there is no need to have a separate UK sized back box for it. The smart keypad will be used to control the lighting as well as the AC.
- The location of each thermostat & its labeling should be indicated on the smart home system layout, bus cable layout and the schematic diagram as in Figures 1.1.2, 1.1.3 & 1.1.4 respectively.
- Depending on the FCU used, extend all the wires (exclude neutral wire) terminated at each FCU controller PCB to the ADP by using 25mm conduit and label them accordingly in both sides. For example:
    - FCU1 cables will be 1Y, 1G1, 1G2, 1G3, 1R, and 1W.
    - FCU2 cables will be 2Y, 2G1, 2G2, 2G3, 2R, and 2W.
    - FCU3 cables will be 3Y, 3G1, 3G2, 3G3, 3R, and 3W.
- The wires coming from each FCU should be terminated at the 4th DIN rail of the 5 DIN rail Type ADP or at the 2nd DIN rail of the 3 DIN rail Type ADP
- A complete data sheets for HVAC system used should be submitted to UTT.

1.1.6 SHADES AND CURTAIN CONTROL

- Two back boxes with blank plates should be provided at the top right side of all windows at the curtain location (10-20 cm away from the window frame) as in Figure 1.1.11. As a suggestion, creating a curtain box helps hiding the back boxes.

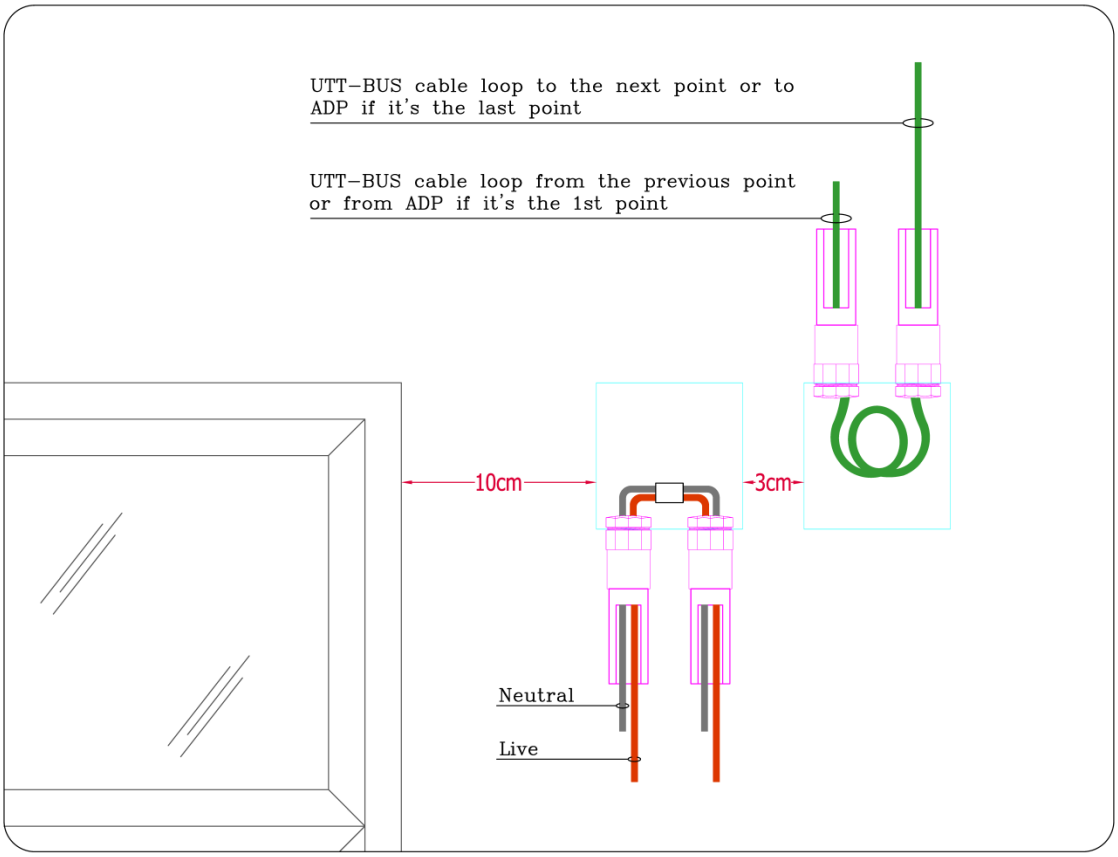


Figure 1.1.11: Shade & Curtain Connections

- The first covered back box has a power cable. It is a normal power used to energize the curtain's motor.
- The second back box is a UK sized back box (3" x 3") with a minimum depth of 47 mm. It should be provided with a blank plate and labeled as C1, C2, and C3…etc.
    - Inside this covered back box, the bus cable loop should pass without being cut where a minimum of 35cm from the cable should be kept inside each back box (two rounds inside the back box).
- The location of each curtain & its labeling should be indicated on the smart home system layout and bus cable layout in Figures 1.1.2 & 1.1.3 respectively.

1.1.7 MOTION SENSOR/MULTI-SENSOR

- A sensor is used to trigger the programmed actions once the presence of a person is detected
- two Type of sensors will be used as follows:

A. PIR Motion Sensor:

- Each bathroom, entrance, and kitchen inside the home should have a motion sensor on its ceiling and it's optional to have it for the other rooms & corridors. A Cat.6 cable should be extended inside a 20 mm conduit from each motion sensor to the nearest keypad available in the room. The Cat.6 cable should be labeled from both sides as S1, S2 and S3…etc. according to the number of motion sensors to be installed.

B. Multi-Sensor:

- In the living room zone, a multi-sensor labeled as M should be provided at the center of the ceiling near the TV location. The bus cable loop should pass by the multi-sensor round back box without being cut where a minimum of 35cm of the cable should be kept inside the round back box (two rounds inside the back box).
- The location of each sensor & its labeling should be indicated on the smart home system layout and bus cable layout as in Figures 1.1.2 & 1.1.3 respectively. According to the number of Multi-sensors to be installed, it should be labeled as M1, M2 and M3…etc.

1.1.8 ACCESS CONTROL SYSTEM

1.1.8.1 STAND ALONE SYSTEM:

- Four devices, which are the card reader, door lock, door contact and, exit button should be provided to each door that needs to be controlled as shown in Figure 1.1.12.
- The controller of the system will be installed inside the ONU. Therefore, a three separate Cat.6 cables should be extended from the controller to the:
  - Striker lock/built in door contact: located at the door latch.
  - Doorbell back box: A UK sized back box (3" x 3") is required.
  - Indoor push button back box: A UK sized back box (3" x 3") is required.
- The Cat.6 cables should be extended inside conduits from each device to the ONU. The cables should be labeled from both sides as A1, A2 and A3 for the striker lock/built in door contact, doorbell back box, and indoor push button back box respectively.
- The location of each device & its labeling should be indicated on the smart home system layout and bus cable layout as in Figures 1.1.2 & 1.1.3 respectively.

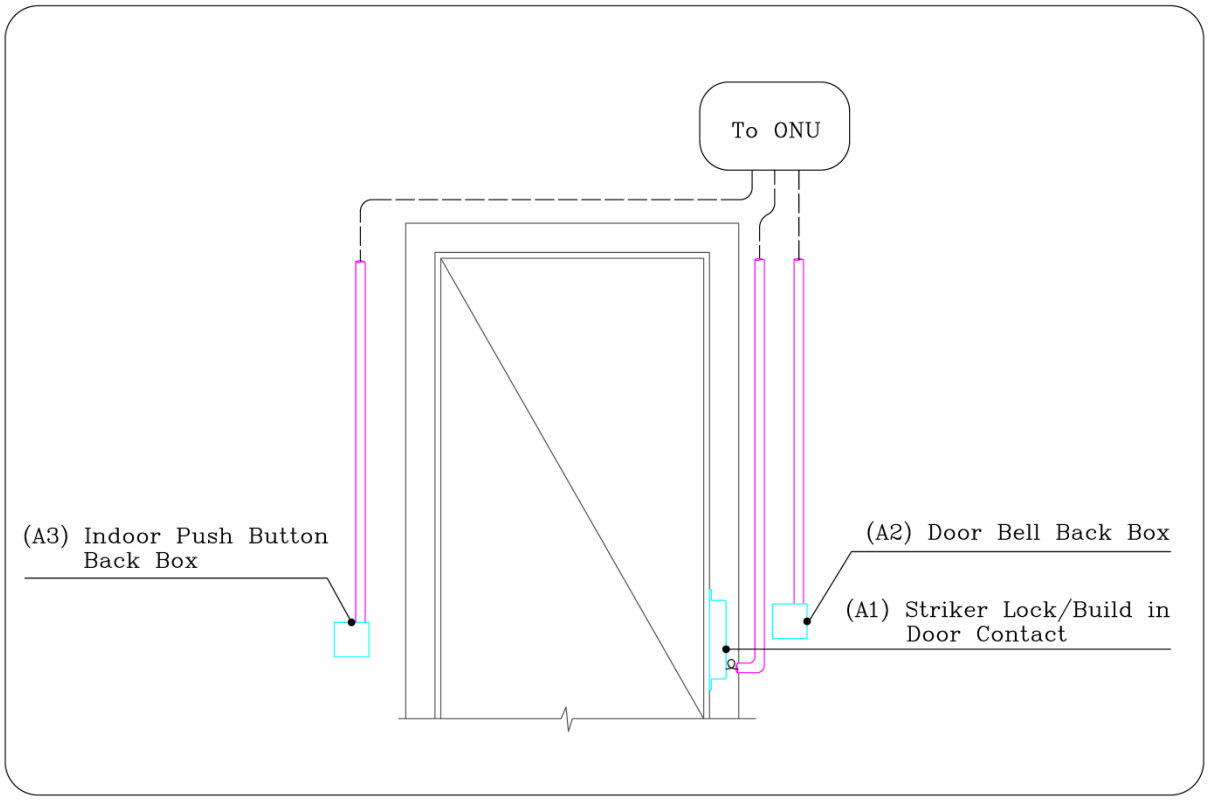


Figure 1.1.12: Connections of the striker lock, doorbell, and indoor push button

1.1.8.2 CONNECTION TO THE ACCESS MANAGEMENT SYSTEM (AMS):

If the end user wants to add the access control system of his/her apartment to the AMS, a floor controller should be installed in the Telecom room located at each floor (220v power supply should be provided in the same location). Added to that, a Cat.6 cable should be extended from the floor controller to loop each apartment's ONU as shown in Figures 1.1.13 & 1.1.14. The loop should pass by each ONU without cutting where a minimum of 35cm from the cable should be kept inside a 3"x3" plastic box (two rounds inside the back box) at the lower part of the ONU.

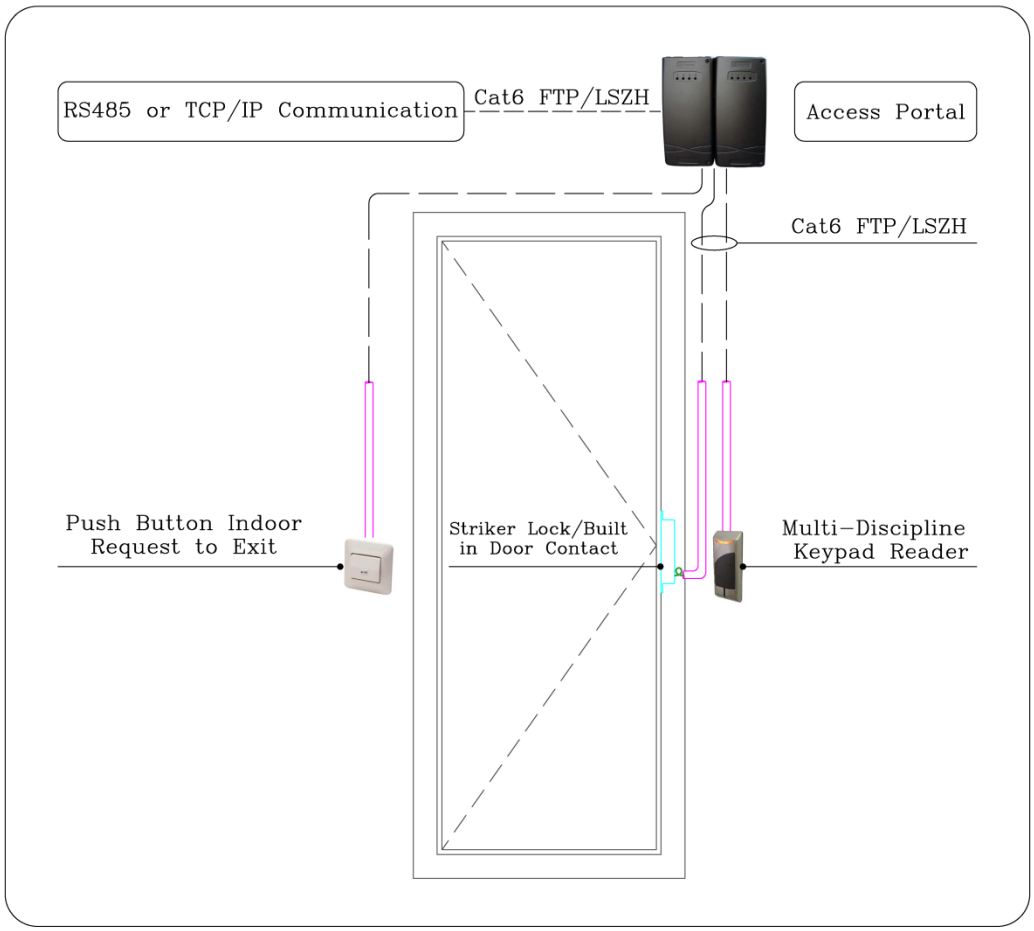


Figure 1.1.13: Door Connection to the AMS

- A main controller should be installed at the AMS location which is usually located at the ground floor. 220v power supply should be provided in the same location along with a data point. Also, a Cat.6 cable is required to be pulled from each floor telecom room to the AMS location.

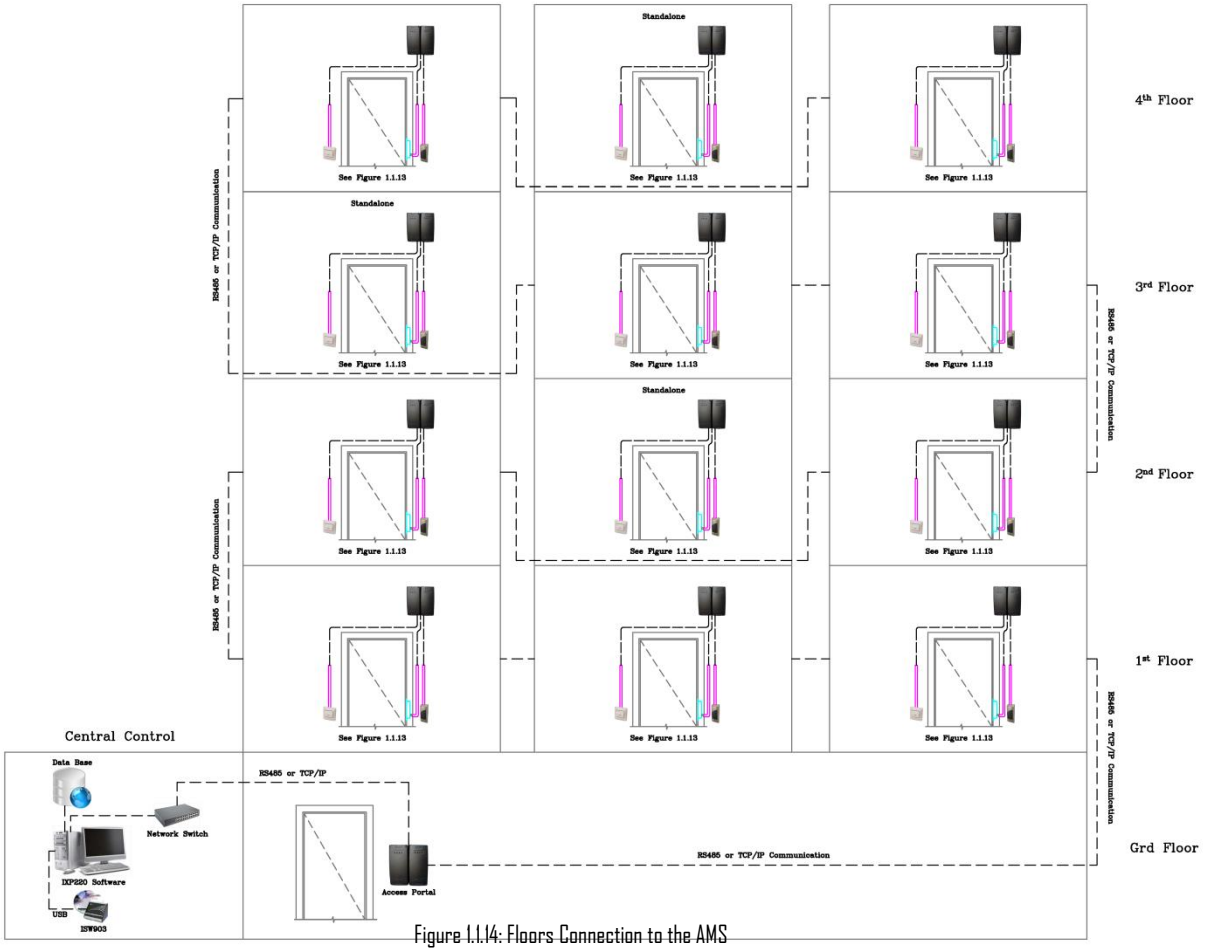


Figure 1.1.14: Floors Connection to the AMS

1.1.9 ENTERTAINMENT (E) OUTLET

- According to the telecom guidelines, at least 1 dual data socket is available in the living room zone at the TV location. Next to this data socket, an outlet labeled as E should be provided as shown in Figure 1.1.15 along with a dual power socket.

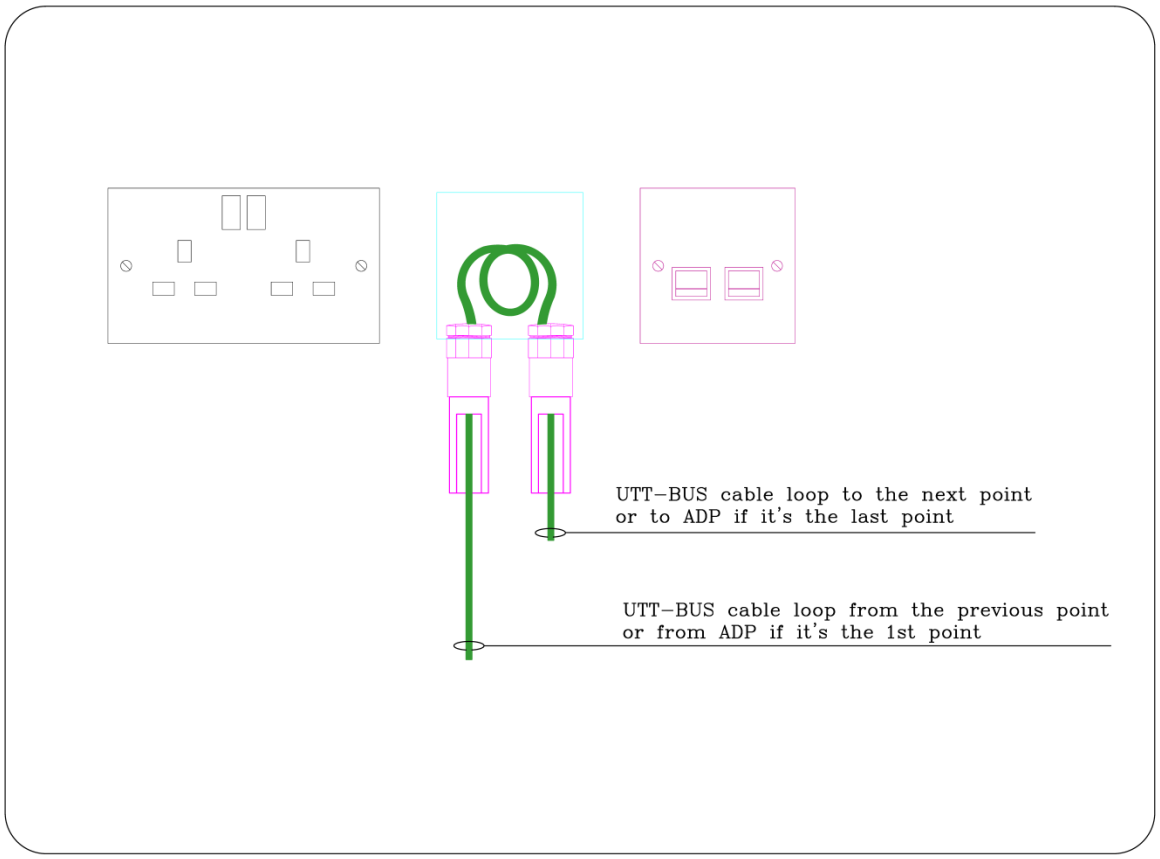


Figure 1.1.15: E Outlet Layout

- A UK sized back box (3" x 3") with a minimum depth of 47 mm should be used for the E outlet.
- The bus cable loop should pass by the E outlet without being cut where a minimum of 35cm from the cable should be kept inside the back box (two rounds inside the back box).
- The location of the E outlet & its label should be indicated on the smart home system layout, bus cable layout and the schematic diagram as in Figures 1.1.2 & 1.1.3 respectively. According to the number of Entertainment outlets to be installed, it should be labeled as E1, E2 and E3…etc…

1.1.10 AUDIO (A) DISTRIBUTION

- Each room (zone), which requires an audio distribution, will need the following to be installed in the ceiling:
    - 1 No. Amplifier: requires 220v power supply and Cat.6A cable from ONU.
    - 1 No. Pair of speakers: 1 speaker cable from each speaker in same zone to the amplifier.
- 1 No. E outlet will be required at each zone.
- A Cat.6 cable should be extended inside a 20 mm conduit from the amplifier location to the E outlet in the room. The Cat.6 cable should be labeled from both sides as E1, E2 and E3…etc.

The location of the speakers & its labeling should be indicated on the smart home system layout, bus cable layout and the schematic diagram.

1.1.11 IP CAMERA

- An RJ-45 outlet and single power outlet should be provided at the camera location.
- The Cat.6A cable of the RJ-45 outlet should come from the ONU & be labeled as IP1, IP2, and IP3…etc.
- The location of each IP Camera & its labeling should be indicated on the smart home system layout, bus cable layout and the schematic diagram.

1.1.12 IR RECEIVER

- IR receiver triggers the programmed actions once the end user uses an IR remote control.
- The bus cable loop should pass by the IR receiver round back box without being cut where a minimum of 35cm of the cable should be kept inside the round back box (two rounds inside the back box). It should be labeled from both sides as IR1, IR2 and IR3…etc.
- The location of each IR receiver & its labeling should be indicated on the smart home system layout, bus cable layout and the schematic diagram.

1.1.13 PENTHOUSE & TOWN HOUSE

- For a penthouse or town house consisting of a lower floor& upper floor, sections 1.1.1 to 1.1.12 are applied; however, the following should be taken into considerations for:
- Section 1.1.1, a secondary ADP should be fixed at the upper floor next to the upper floor EDB. 1 No. bus cable should be extended between the secondary ADP and the ADP located at the lower floor (which is called Master ADP) inside a 25 mm conduit. The bus cable should be labeled from both sides as L1.
- Section 1.1.2, another 1 No. Cat.6a cable should be extended from the ONU to the secondary ADP inside a 25 mm conduit. The Cat6a cable should be labeled from both sides as L1.
- Section 1.1.3, all the lighting loads, exhaust fans, and water heaters of the upper floor should be connected to the secondary ADP. A dedicated 220V surge protected breaker should be connected to the power supply of the gateway located at the last DIN rail of the secondary ADP.
- Section 1.1.4, the bus cable of the upper floor keypads, thermostats, curtains, sensors, and E outlet should be extended directly to the secondary ADP.
- Section 1.1.7, a Multi-sensor should be provided at the upper floor living room area.
- Section 1.1.9, an E outlet should be provided at the upper floor living room area at the TV location.

1.2 SMART HOME BASIC

Similar to Smart Home Section 1.1, all loads shall be connected through the ADP. However, just the basic Smart Home Modules will be plugged to the enclosure. First, terminal blocks (connectors) will be plugged in, in order to close the circuits and pass the current in order to test them from any short circuit. Then, lightings' terminal blocks will be replaced by Din rail Dimmer Modules and Din rail Relay Modules.

The difference in this case compared to the standard conventional electrical connection is that, instead of connecting the load from the EDB through the conventional switch, it will pass through the ADP first. For instance, the line voltages (breakers) will be connected from the EDB to the ADP then from the ADP to the load through the conventional switch. Controlling the loads will be through the normal conventional switches for the Private area and Public area will be controlled through Keypad which connected to UTT bus cable. Thus, all apartments and villas will have Smart Home Basic Devices from First Day.

The Smart Home Basic System consists of:

a) Fixing the ADP and terminating the lightings' wires into it through the terminal blocks (connectors) as mentioned in sections 1.2.1-1.2.3. The terminal blocks will be used for testing the lighting circuit, then the DIN Dimmer module, Relay module, the gateway/controller and Keypad will be installed as Smart Home Basic System.
b) Smart Home Keypad's & the bus cable required as mentioned in section 1.2.4.
c) HVAC provision as mentioned in section 1.2.5.
d) Shades and Curtain Control provision as mentioned in section 1.2.6.
e) Motion sensor/Multi-Sensor provision as mentioned in section 1.2.7
f) Access control system provision as mentioned in section 1.2.8.
g) Entertainment (E) Outlet provision as mentioned in section 1.2.9.

UTT through its certified venders will supply and install all the smart home/smart home Basic cables and equipment after receiving a confirmed order from the Owner/Developers/Contractor. This scope is not allowed to be carried out by any other party. All technical rules applied in Smart Home System are similar to Smart Home Basic System. The following sections will provide a detailed explanation about the DIN Smart Home Basic System that should be done in the home:

1.2.1 AUTOMATION DISTRIBUTION PANEL (ADP)

There are two types of the DIN rail ADP that should be fixed inside the home next to the EDB which are:

1.2.1.1 5 DIN RAIL TYPE ADP:

- It should be used for two bedroom apartment type and above.
- It will house the dimmers and relays required for the lighting loads connections (channels):
  - 1st DIN rail : up to 16 lighting channels are available for dimming.
  - 2nd DIN rail : up to 16 lighting channels are available for relay.
  - 3rd DIN rail : up to 16 lighting channels are available for relay.
- It will house the HVAC modules required for the AC control:
  - 4th DIN rail : up to 10 HVAC channels are available for AC control.
- It will house the power supply and gateway:
  - 5th DIN rail : dedicated 220V protected breaker connection required.
- If more connection channels are required, please consult UTT.
- Its size is 875 x 435 x 101 mm (HWD). For more information, please refer to UTT certified ADP vendor.

1.2.1.2 3 DIN RAIL TYPE ADP:

- It should be used for studio and one bedroom apartment type only.
- It will house the dimmers and relays required for the lighting loads connections (channels):
  - 1st DIN rail : up to 16 lighting channels are available for dimming.
  - 2nd DIN rail : up to 12 lighting channels are available for relay.
- It will house the HVAC modules required for the AC control:
  - 2nd DIN rail : up to 4HVAC channels are available for AC control.
- It will house the power supply and gateway:
  - 3rd DIN rail : dedicated 220V protected breaker connection required.
- If more connection channels are required, please consult UTT.
- Its size is 555 x 435 x 101 mm (HWD). For more information, please refer to UTT certified panel vendor.

1.2.2 CONNECTION BETWEEN ADP & THE OPTICAL NETWORK UNIT (ONU)

- 1 No. 25 mm conduit should be provided between the ADP and the ONU. It should enter the ADP and the ONU from the bottom center portion only as shown in Figure 1.2.5.
- 2 No. of Cat.6 cables should be pulled inside the conduit.
- 1 m length of cables should be kept inside the ADP and the ONU.

1.2.3 LOADS CONNECTION

- All the loads such as lightings, exhaust fans, doorbell and water heaters inside the home should be connected to the ADP using the electrical wires.
- The loads' wires should run inside conduits & enter the ADP from the top only.
- Each load should have its own line (wire) coming out from the ADP to the load location. The neutral wire can be shared between the loads fed from the same breaker and should return back to the ADP.
- 1 m length of electrical wire for each load should be kept inside the ADP.
- All the wires should be labeled and terminated at the ADP according to the approved drawings as shown in Figures 1.2.1, 1.2.2, 1.2.3, 1.2.4 & 1.2.5. The labeling should be as follows:
  - D1, D2, D3… up to D16 for Dimmer Module Channels. The connections termination should start from the right side of the 1stDIN rail as shown in Figure 1.2.4.
  - R17, R18, R19… up to R48 for Relay Module Channels. The connections termination should start from right side of the 2nd and 3rdDIN rails as shown in Figure 1.2.4.
- The details & rating of each load (for example: chandelier, 500watt) should be mentioned clearly in the apartment's smart home layout.

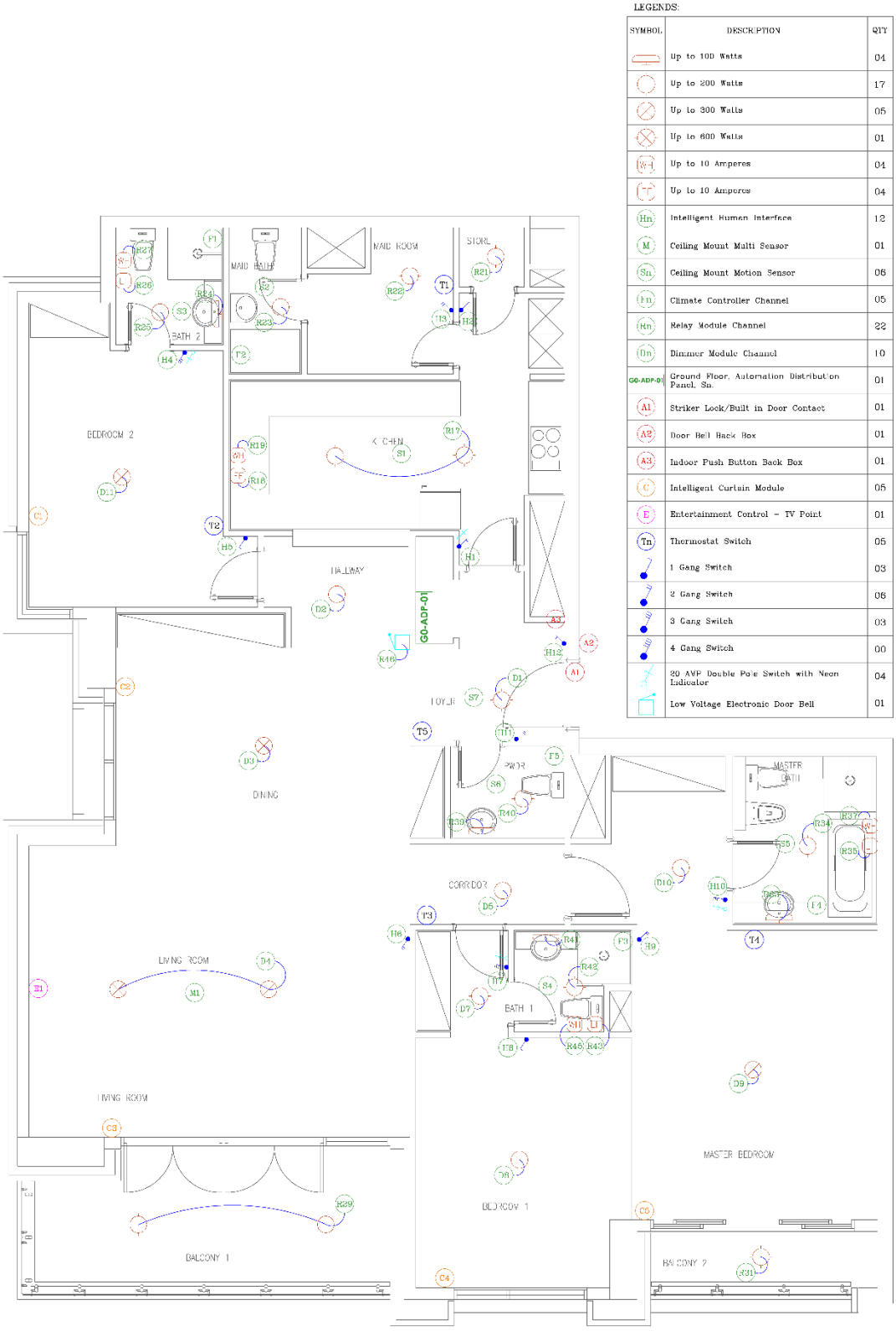


Figure 1.2.1: Apartment's Smart Home Basic System Layout

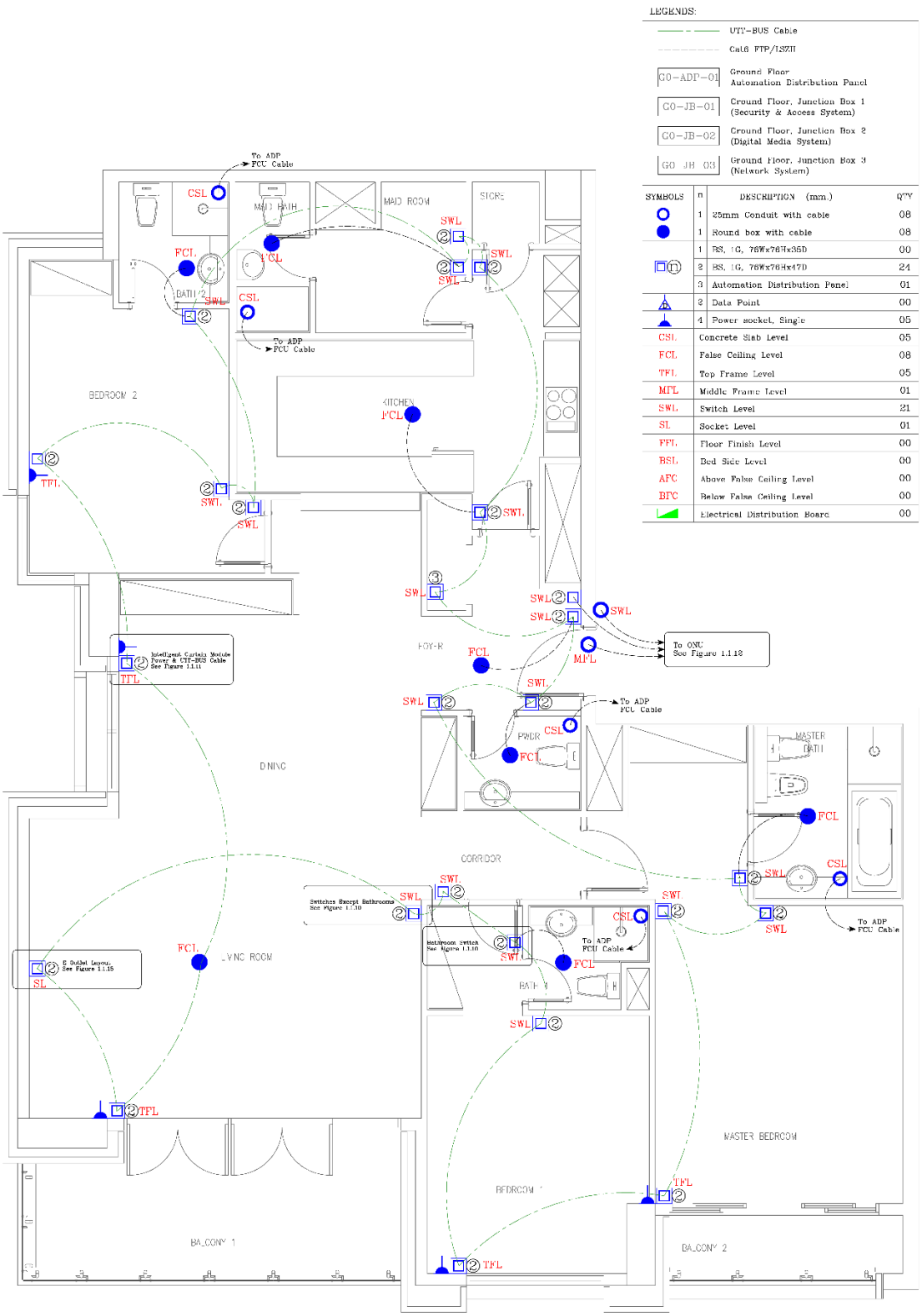


Figure 1.2.2: Apartment's Bus Cable Layout

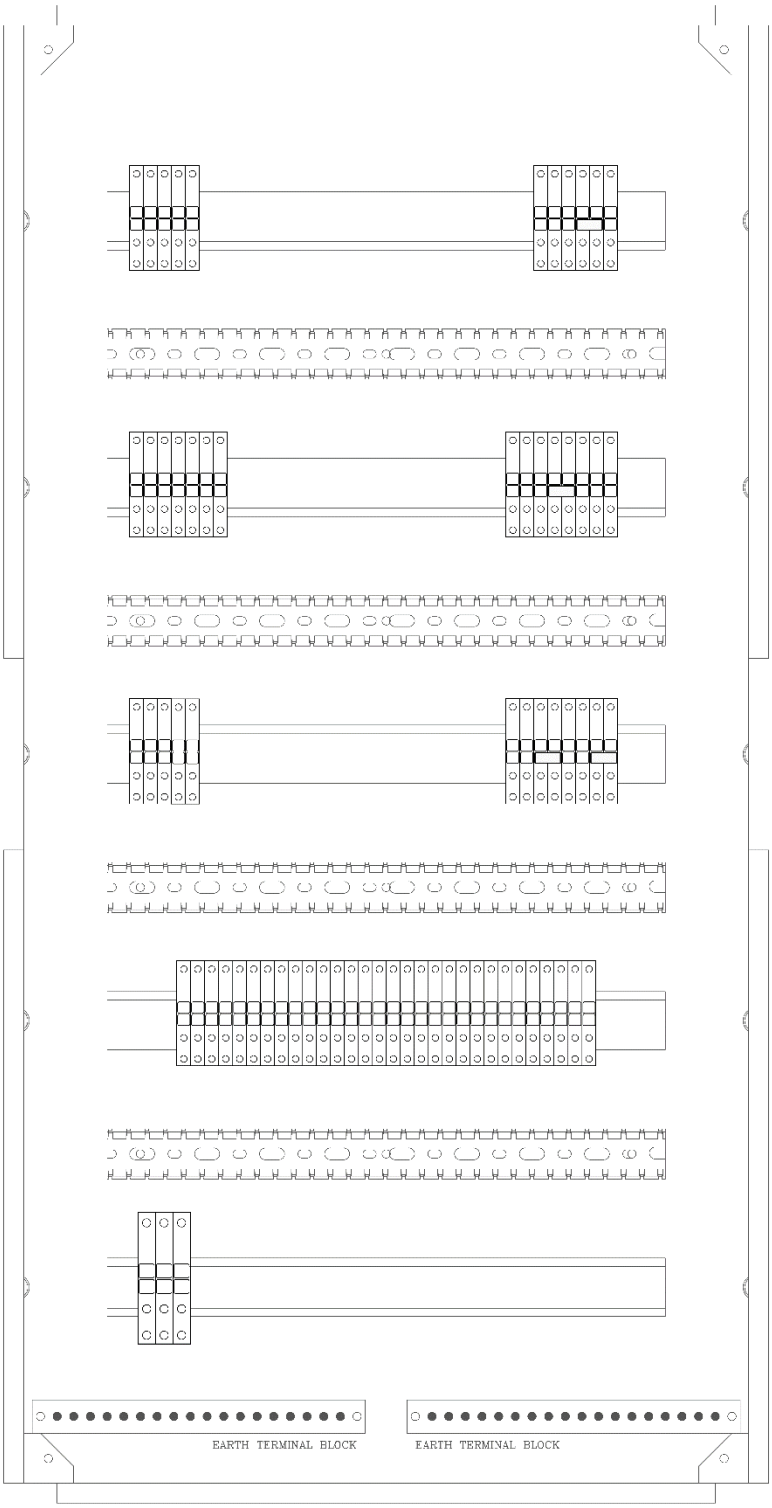


Figure I.2.3: 5 DIN rail Type ADP

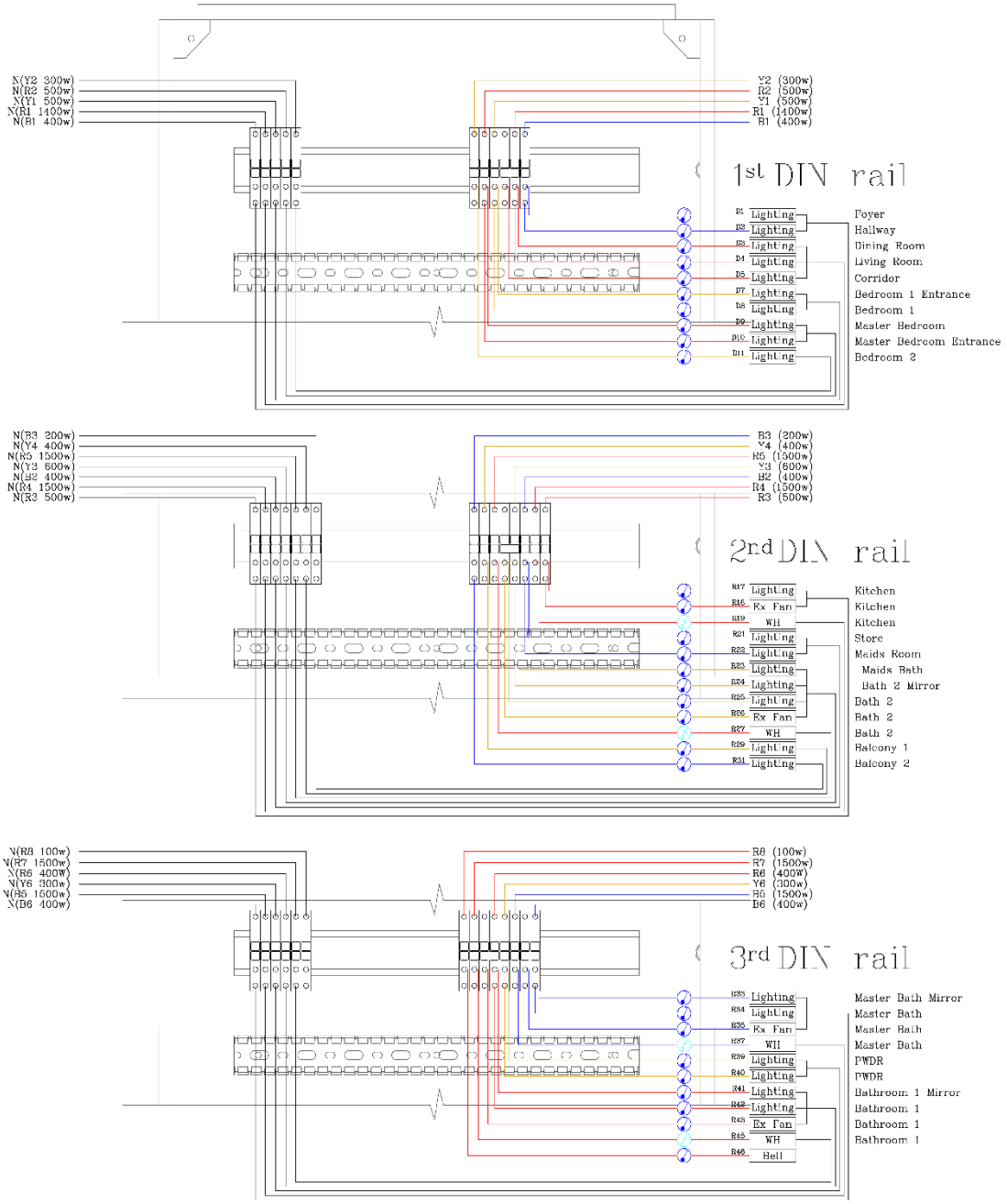


Figure 1.2.4: 1st, 2nd and 3rd Din rail Schematic Diagram

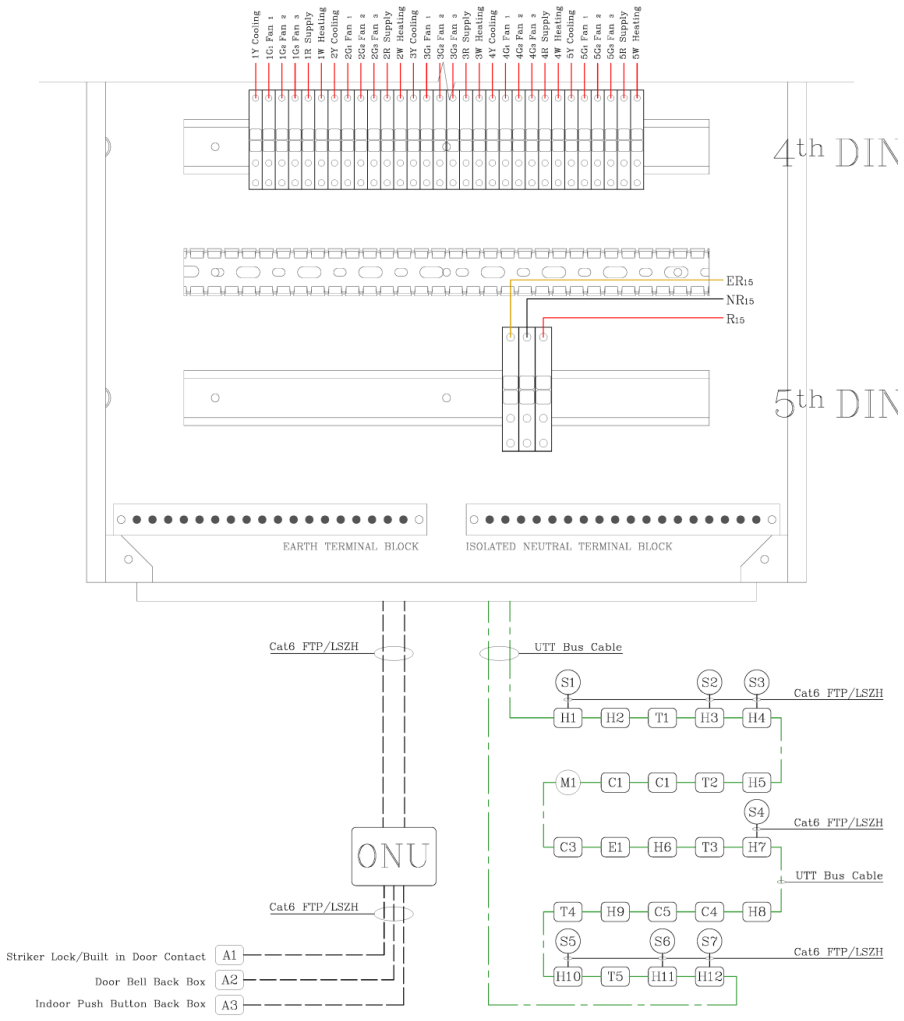


Figure 1.2.5: 4th and 5th Din rail Schematic Diagram

Note:

Terminal blocks will be used to terminate the lightings' electrical wires in order to test the loads from any short circuit, then the DIN Dimmer module, Relay module, and the gateway/controller will be installed as Smart Home Basic System. All the technical rules applied for the DIN Dimmer, DIN Relay, and Controller should be applied to the terminal blocks.

There are two types of the DIN rail Modules where the loads should be connected to within the ADP and a Gateway which are:

1.2.3.1 DIN RAIL DIMMER MODULE:

- The DIN rail Dimmer Module shown in Figure 1.2.6 is used to dim the lights to a certain percentage as well as to turn them ON/OFF.
- The lighting loads in the living room, dining room, and all bedrooms should be connected to the output channels of the dimmer module(s).

Figure 1.2.6: DIN rail 4 Channels Dimmer Module

- There are different type of dimmer module(s) to be used, depending on the number of output (load) channels and the output (load) rating.
- Each Unit (vertical slot/sideboard of the Module) from the dimmer module should be connected to the same breaker with its neutral as an input from the EDB.
- Each lighting load should have its own line (wire) connected to the dimmer module output. The neutral cable can be shared between the loads fed from the same breaker and should return back to the ADP.
- Dimmable ballasts for lights should be installed by the electrical contractor assigned from the client.
- The loads connections to the dimmer module are shown in Figure 1.2.4.

1.2.3.2 DIN RAIL RELAY MODULE:

- The DIN rail Relay Module shown in Figure 1.2.7 is used to toggle (ON/OFF) the lights, exhaust fans, doorbell and water heaters.
- The lighting loads in the kitchen, corridors and all bathrooms should be connected to the output channels of the relay module.
- The doorbell, exhaust fans and water heaters in the home should also be connected to the output channels of the relay module.

Figure 1.2.7: DIN rail 4 Channels Relay Module

- There are different type of relay module(s) to be used, depending on the number of output (load) channels and the output (load) rating.
- Each channel from the relay module can be connected to a different breaker with its neutral as an input from the EDB.
- Each lighting load, exhaust fan, doorbell, and water heater should have its own line (wire) connected to the relay module output. The neutral cable can be shared between the loads fed from the same breaker and should return back to the ADP.
- The loads connections to the relay module are shown in Figure 1.2.4.

1.2.3.3 DIN RAIL GATEWAY:

- The gateway shown in Figure 1.2.8 is required to connect the smart home system to the TCP/IP network.
- A dedicated 220V surge protected breaker should be connected to the power supply of the gateway located at the last rail of the ADP as shown in Figure 1.2.5.

Figure 1.2.8: DIN rail Gateway

Notes:

Basic smart home active equipment's will be installed in Public area as Din rail Relays, Din rail Dimmers, Din rail Gateway and Keypads, which will replace all the lighting wires' terminal blocks once the short circuit test is passed.

It's the responsibility of the MEP contractor assigned by the client to arrange the fixing of all conduits, back boxes, automation distribution panel, pull the electrical wires and termite it in ADP as mentioned in the Smart Home/Smart Home Basic Guidelines and according to the approved drawings. All the technical rules mentioned in these sections should be applied even though only back boxes and cables will be used.

1.2.4 THE SMART HOME KEYPAD AND THE BUS CABLE

- The conventional switch will be used to toggle all the loads as On/Off.
- For each keypad, a UK sized back box (3" x 3") with a minimum depth of 47 mm should be installed.
- No electrical wires will pass by the keypad back boxes.
- The bus cable, supplied by UTT, should go out from the bottom center portion of the ADP in order to connect the back boxes of the keypads, thermostats, curtains, multi-sensors, and the entertainment (E) outlet. The cable should come back to the ADP after passing by the last back box in order to close the loop.
- The bus cable should pass by each back box without being cut where a minimum of 35cm from the cable should be kept inside each back box (two rounds inside the back box).
- The bus cable loop should be run inside 20 mm conduits. All the conduits should be laid from the ground below the tiles and not from the ceiling except for curtains and sensors.
- The looping is topology free (daisy chain, branch, star, etc.) If the total amount of cable used within a bus run is not more the 300m otherwise Daisy chain is highly recommended as shown in Figure 1.2.2.

1.2.5 HEATING, VENTILATING, AND AIR CONDITIONING (HVAC)

- Each thermostat requires a UK sized back box (3" x 3") with a minimum depth of 47 mm. It should be labeled as T1, T2, and T3…etc.
- The bus cable loop should pass by the thermostat's back box without being cut where a minimum of 35cm from the cable should be kept inside each back box (two rounds inside the back box).
- The location of each thermostat & its labeling should be indicated on the smart home system layout, bus cable layout and the schematic diagram as in Figures 1.2.1, 1.2.2 & 1.2.5 respectively.
- Depending on the FCU used, keep all wires between the convention thermostat and FCU, and extend all the wires (exclude neutral wire) terminated at each FCU controller PCB to the ADP by using 25mm conduit and label them accordingly in both sides. For example:
    - FCU1 cables will be 1Y, 1G1, 1G2, 1G3, 1R, and 1W.
    - FCU2 cables will be 2Y, 2G1, 2G2, 2G3, 2R, and 2W.
    - FCU3 cables will be 3Y, 3G1, 3G2, 3G3, 3R, and 3W.
- The wires coming from each FCU should be terminated at the 4th DIN rail of the 5 DIN rail Type ADP or at the 2nd DIN rail of the 3 DIN rail Type ADP
- A complete data sheets for HVAC system used should be submitted to UTT.

1.2.6 SHADES AND CURTAIN CONTROL

- Two back boxes with blank plates should be provided at the top right side of all windows at the curtain location (10-20 cm away from the window frame) as in Figure 1.2.9. As a suggestion, creating a curtain box helps hiding the back boxes.

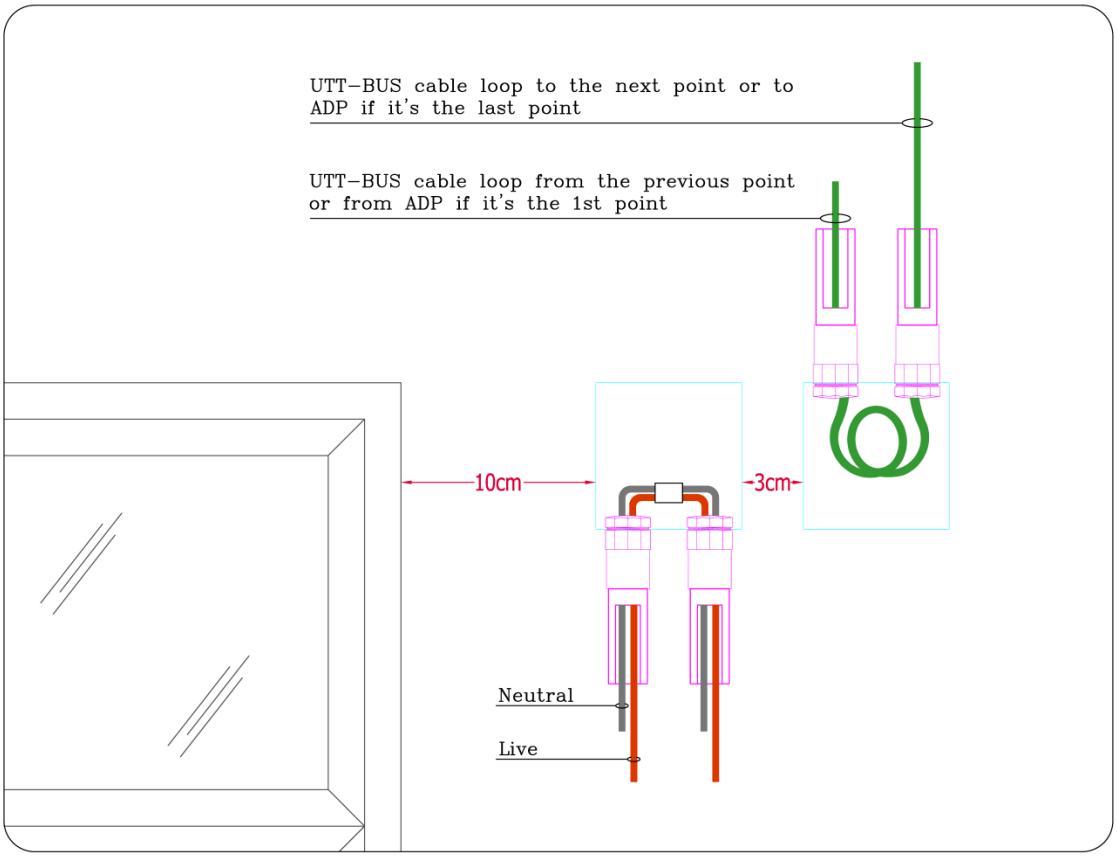


Figure 1.2.9: Shade & Curtain Connections

- The first covered back box has a power cable. It is a normal power used to energize the curtain's motor.
- The second back box is a UK sized back box (3" x 3") with a minimum depth of 47 mm. It should be provided with a blank plate and labeled as C1, C2, and C3…etc.
    - Inside this covered back box, the bus cable loop should pass without being cut where a minimum of 35cm from the cable should be kept inside each back box (two rounds inside the back box).
- The location of each curtain & its labeling should be indicated on the smart home system layout, bus cable layout and the schematic diagram as in Figures 1.2.1, 1.2.2 & 1.2.5 respectively.

1.2.7 MOTION SENSOR/MULTI-SENSOR

- A sensor is used to trigger the programmed actions once the presence of a person is detected.
- two Type of sensors will be used as follows:

A. PIR Motion Sensors:

- Each bathroom, entrance, and kitchen inside the home should have a motion sensor on its ceiling and it's optional to have it for the other rooms & corridors. A Cat.6 cable should be extended inside a 20 mm conduit from each motion sensor to the nearest keypad available in the room. The Cat.6 cable should be labeled from both sides as S1, S2 and S3…etc. according to the number of motion sensors to be installed.

B. Multi-Sensor:

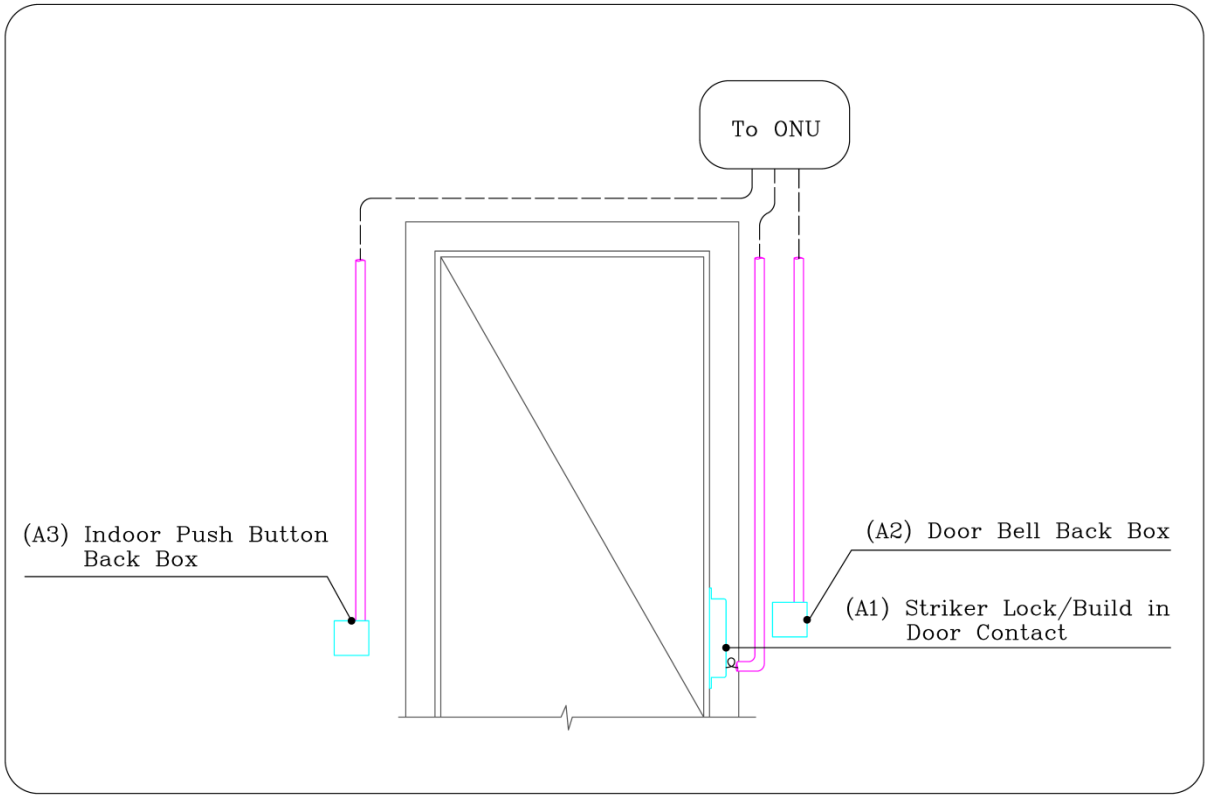
- In the living room zone, a multi-sensor labeled as M should be provided at the center of the ceiling near the TV location. The bus cable loop should pass by the multi-sensor round back box without being cut where a minimum of 35cm of the cable should be kept inside the round back box (two rounds inside the back box). The round back box should be covered by a blank plate.
- The location of each sensor & its labeling should be indicated on the smart home system layout, bus cable layout and the schematic diagram as in Figures 1.2.1, 1.2.2 & 1.2.5 respectively. According to the number of Multi-sensors to be installed, it should be labeled as M1, M2 and M3…etc…

1.2.8 ACCESS CONTROL SYSTEM

1.2.8.1 STAND ALONE SYSTEM:

- Four devices, which are the card reader, door lock, door contact and, exit button should be provided to each door that needs to be controlled as in Figure 1.2.10.
- The controller of the system will be installed inside the ONU. Therefore, a three separate Cat.6 cables should be extended from the controller to the:
  - Striker lock/built in door contact: located at the door latch.
  - Doorbell back box: A UK sized back box (3" x 3") is required.
  - Push button back box: A UK sized back box (3" x 3") is required with a blank plate.
- The Cat.6 cables should be extended inside conduits from each device to the ONU. The cables should be labeled from both sides as A1, A2 and A3 for the striker lock/built in door contact, doorbell back box, and indoor push button back box respectively.
- The location of each device & its labeling should be indicated on the smart home system layout, bus cable layout and the schematic diagram as in Figures 1.2.1, 1.2.2 & 1.2.5 respectively.

Figure 1.2.10: Connections of the striker lock, doorbell, and indoor push button



1.2.8.2 CONNECTION TO THE ACCESS MANAGEMENT SYSTEM (AMS):

- If the end user wants to add the access control system of his/her apartment to the AMS, a floor controller should be installed in the Telecom room located at each floor (220v power supply should be provided in the same location). Added to that, a Cat.6 cable should be extended from the floor controller to loop each apartment's ONU as shown in Figures 1.2.11 & 1.2.12. The loop should pass by each ONU without cutting where a minimum of 35cm from the cable should be kept inside a 3"x3" plastic box (two rounds inside the back box) at the lower part of the ONU.

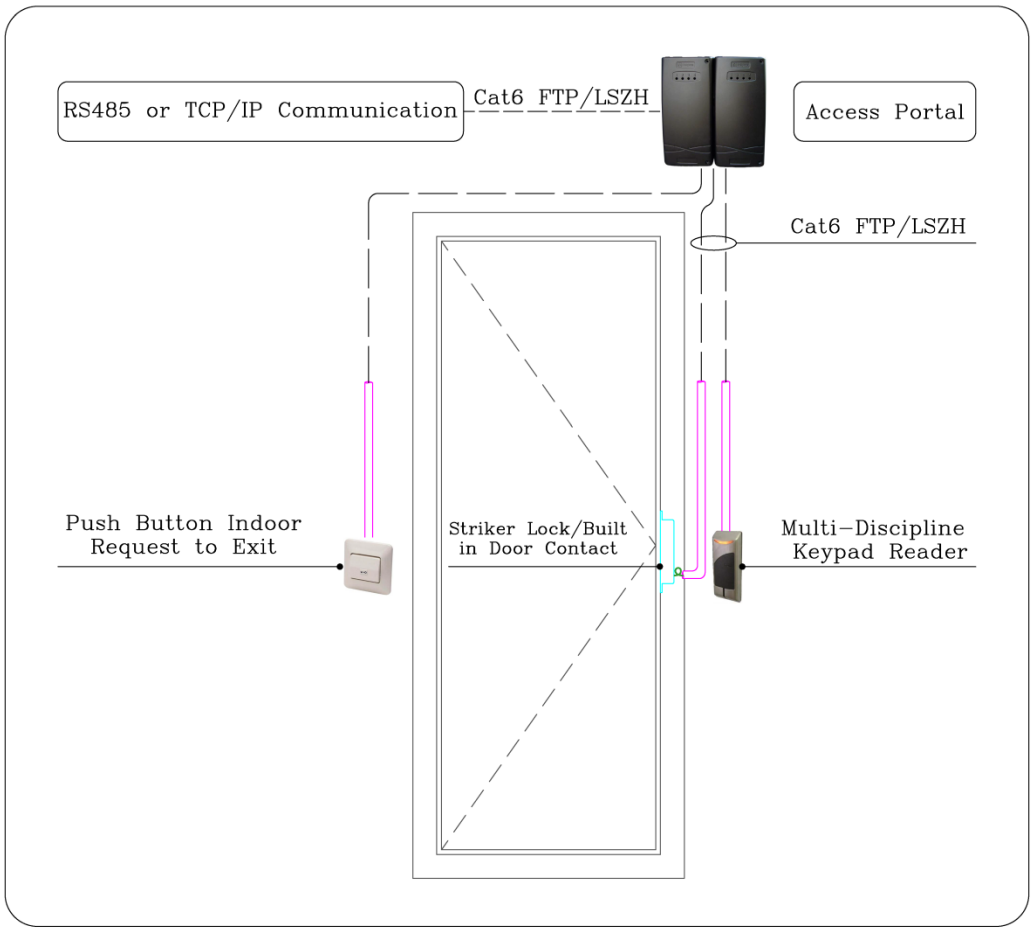


Figure 1.2.11: Door Connection to the AMS

- A main controller should be installed at the AMS location which is usually located at the ground floor. 220v power supply should be provided in the same location along with a data point. Also, a Cat.6 cable is required to be pulled from each floor telecom room to the AMS location.

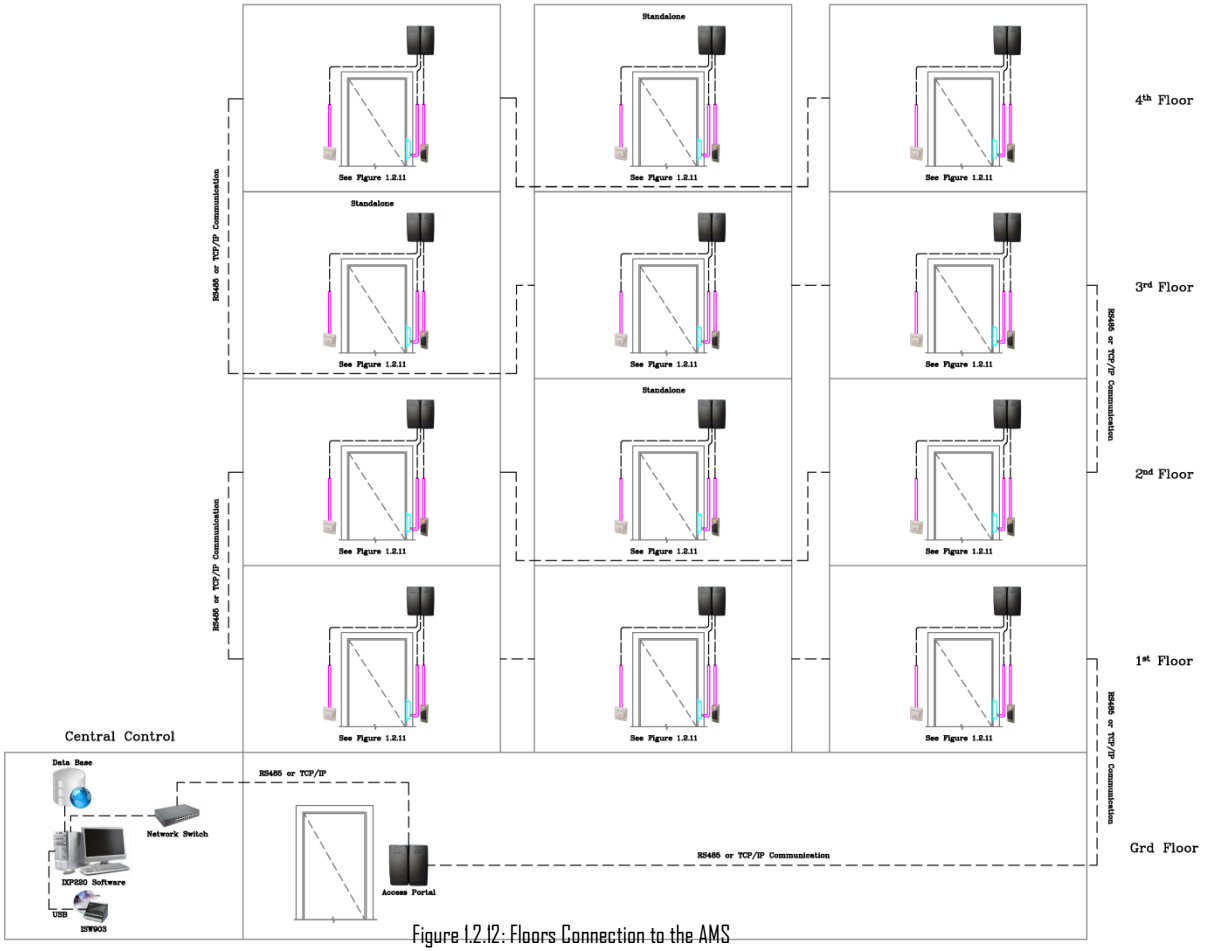


Figure I.2.12: Floors Connection to the AMS

1.2.9 ENTERTAINMENT (E) OUTLET

- According to the telecom guidelines, at least 1 dual data socket is available in the living room zone at the TV location. Next to this data socket, an outlet labeled as E with a blank plate should be provided as shown in Figure 1.2.13 along with a dual power socket.

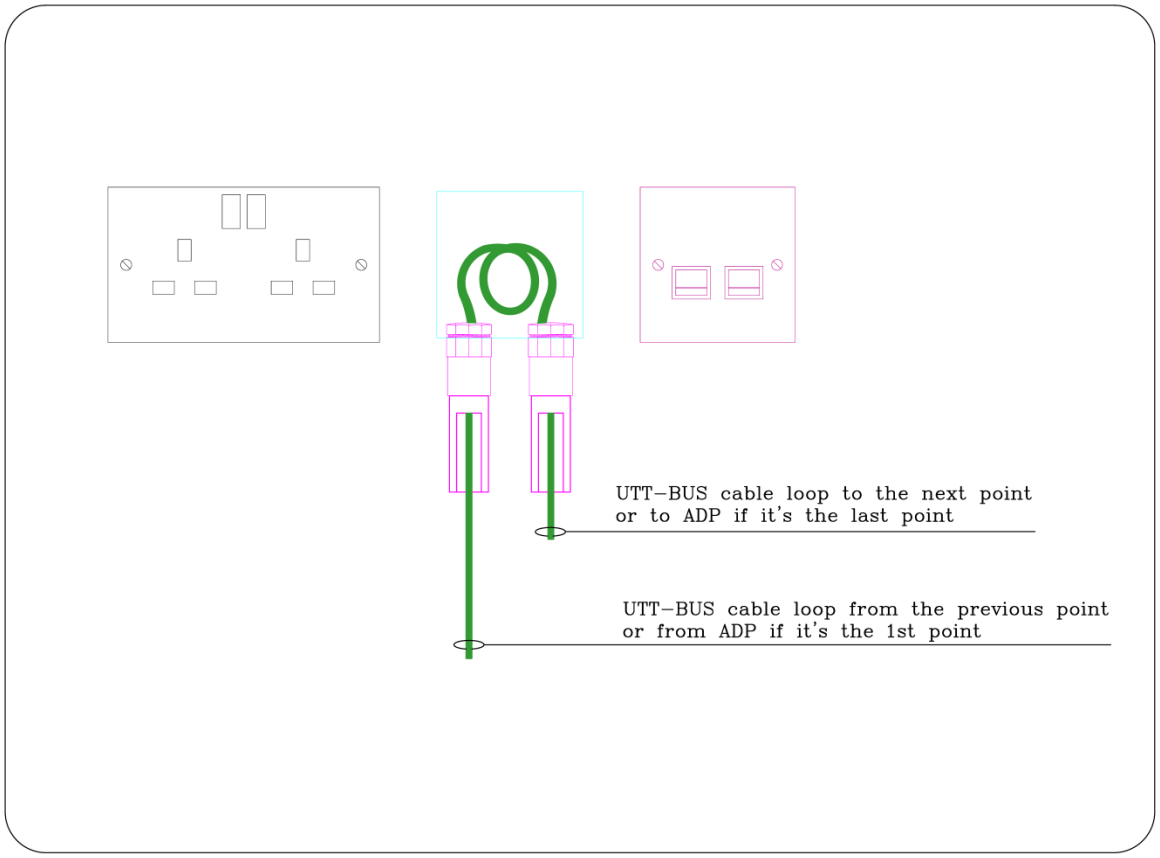


Figure 1.2.13: E Outlet Layout

- A UK sized back box (3" x 3") with a minimum depth of 47 mm should be used for the E outlet.
- The bus cable loop should pass by the E outlet without being cut where a minimum of 35cm from the cable should be kept inside the back box (two rounds inside the back box).
- The location of the E outlet & its label should be indicated on the smart home system layout, bus cable layout and the schematic diagram as in Figures 1.2.1, 1.2.2 & 1.2.5 respectively. According to the number of Entertainment outlets to be installed, it should be labeled as E1, E2 and E3…etc…

1.2.10 AUDIO (A) DISTRIBUTION

- Each room (zone), which requires an audio distribution, will need the following to be installed in the ceiling:
    - 1 No. Amplifier: requires 220v power supply and Cat.6A cable from ONU.
    - 1 No. Pair of speakers: 1 speaker cable from each speaker in same zone to the amplifier.
- 1 No. E outlet will be required at each zone.
- A Cat.6 cable should be extended inside a 20 mm conduit from the amplifier location to the E outlet in the room. The Cat.6 cable should be labeled from both sides as E1, E2 and E3…etc.
- The location of the speakers & its labeling should be indicated on the smart home system layout, bus cable layout and the schematic diagram.

1.2.11 IP CAMERA

- An RJ-45 outlet and single power outlet should be provided at the camera location.
- The Cat.6A cable of the RJ-45 outlet should come from the ONU & be labeled as IP1, IP2, and IP3…etc.
- The location of each IP Camera & its labeling should be indicated on the smart home system layout, bus cable layout and the schematic diagram.

1.2.12 IR RECEIVER

- IR receiver triggers the programmed actions once the end user uses an IR remote control.
- The bus cable loop should pass by the IR receiving round back box without being cut where a minimum of 35cm of the cable should be kept inside the round back box (two rounds inside the back box). It should be labeled from both sides as IR1, IR2 and IR3…etc.
- The location of each IR receiving& its labeling should be indicated on the smart home system layout, bus cable layout and the schematic diagram.

1.2.13 PENTHOUSE & TOWN HOUSE

- For a penthouse or town house consisting of a lower floor & upper floor, sections 1.2.1 to 1.2.12 are applied; however, the following should be taken into considerations for:
  - Section 1.2.1, a secondary ADP should be fixed at the upper floor next to the upper floor EDB. 1 No. bus cable should be extended between the secondary ADP and the ADP located at the lower floor (which is called Master ADP) inside a 25 mm conduit. The bus cable should be labeled from both sides as L1.
  - Section 1.2.2, another 1 No. Cat.6A cable should be extended from the ONU to the secondary ADP inside a 25 mm conduit. The Cat6a cable should be labeled from both sides as L1.
  - Section 1.2.3, all the lighting loads, exhaust fans, and water heaters of the upper floor should be connected to the secondary ADP. A dedicated 220V surge protected breaker should be connected to the power supply of the gateway located at the last DIN rail of the secondary ADP.
  - Section 1.2.4, the bus cable of the upper floor keypads, thermostats, curtains, sensors, and E outlet should be extended directly to the secondary ADP.
  - Section 1.1.7, a Multi-sensor should be provided at the upper floor living room area.
  - Section 1.2.9, an E outlet should be provided at the upper floor living room area at the TV location.

1.3 LED LIGHT

An LED lamp is a light-emitting diode (LED) product that is assembled into a lamp (or light bulb) for use in lighting fixtures. LED lamps have a lifespan and efficiency that is several times better than incandescent lamps, and significantly better than most fluorescent lamps, with some chips able to emit more than 100 lumens per watt.

The advantages of LED lighting over traditional light sources are numerous:

- High efficiency providing substantial energy savings
- Long lifetime reducing maintenance needs and costs
- Instant start and higher resistance to switching cycles
- Low operating temperature creating additional potential savings on air-conditioning
- No hazardous material, 100% mercury free

Figure 1.3.1: Advantages of LED lighting

This guideline is designed to assist the user in identifying potential interior and exterior architectural applications for LEDs by giving specific design examples typically found in residential and commercial categories. This guideline identifies lumen packages that would be necessary for various applications.

1.3.1 LED LAMP LUMINAIRES

In this part, minimum lumen required for various application will be present in table 1.3.2. LED lamp luminaires shall to be of a type as based on calculations submitted by the contractor.

GENERAL BUILDING AREAS	IES STANDARDS ILLUMINATION LEVEL	GENERAL BUILDING AREAS	IES STANDARDS ILLUMINATION LEVEL
CIRCULATION AREA			
Corridors, Passageway	100	**FURTHER EDUCATION ESTABLISHMENT**	
Lift	150	Lecture theatres general	500
Stairs	150	Chalkboard	500
Escalator	150	Demonstration benches	500
External Covered Ways	30	Examination halls, seminar rooms, teaching spaces	500
ENTRANCES		Laboratories	500
Entrance halls, lobbies, waiting rooms	150	**FURTHER EDUCATION ESTABLISHMENT**	
Enquiry desk	500	Workshop	300
Gate houses	300	Staff rooms, student rooms\students hostels etc.	300
KITCHENS		Gymnasium	300
Foods stores	150	**LIBRARIES**	
General	500	Shelves, book stack	150
OUTDOOR		Reading table	300
Controlled entrance halls or exit gate	150	Reading rooms, newspaper and magazines	300
Entrance and exit car park	30	Reference libraries	500
Stores, stockyards	30	Counters	500

GENERAL BUILDING AREAS	IES STANDARDS ILLUMINATION LEVEL	GENERAL BUILDING AREAS	IES STANDARDS ILLUMINATION LEVEL
Industrial covered ways	50	Cataloging and sorting	500
STAFF RESTAURANTS		Binding	500
Centre cafeterias, dining room	300	Closed book store	100
MEDICAL AND FIRST AIDS CENTERS	500	**MUSEUM AND ART GALLERIES GENERAL**	
Consultant room, treatment areas	500	Exhibits insensitive to light	300
Medical stores	100	Light sensitive exhibits	150
Rest room	150	Specially light sensitive exhibit	50
STAFF ROOM		**SCHOOL**	
Changing locker and cleaner's room,	150	Assembly halls general	300
Rest rooms	150	Platform and stage	special lighting
STORE AND STOCK ROOMS	150	Teaching spaces general	300
Telecommunication board,	100	Teaching spaces general	300
switchboard rooms	100	General where also used for further education	500
Cordless switchboard	300	Chalkboard	500
Apparatus rooms	150	Needlework rooms	500
Tele printer rooms	500	Art rooms	500
LABORATORIES(GENERAL)	750	Laboratories	500
LAUNDRIES & DRY CLEANING WORKS		Workshop	300
Receiving, sorting, washing, drying, ironing (cleaning) dispatch, drying cleaning	300	Gymnasium	300
Hand ironing, pressing, inspection, mending, spotting	300	Music practice rooms	300
PRINTING WORKS TYPE FOUNDRIES		**TRANSPORTS TERMINAL BUILDING**	
Matrix making, dressing type hand and machine casting	300	Reception areas (desk) customs and immigration halls	500
Front assembly sorting	750	Railway stations booking offices	500

GENERAL BUILDING AREAS	IES STANDARDSILLUMINATION LEVEL	GENERAL BUILDING AREAS	IES STANDARDSILLUMINATION LEVEL
COMPOSING PRESS		Railway station parcel and left luggage offices counters	300
Hand composing, imposition and distribution	750	Circulation area	150
Machine. Composition-keyboard	750	Waiting area	300
Machine composition-casting	300	**HOSPITAL**	
Proof press	500	Ward unit bed heads general	30-50
Illuminated tables general lighting	300	General	150
PRINTING MACHINE ROOM		Night	0.1
Presses	500	Nurse station evening	300
Premade ready	500	Pharmacies dispensing bench	500
Printed-sheet inspection	1000	Shelves	150
SLAUGHTER HOUSE		Reception general	300
General	500	Enquiry desk	500
Inspection	750	Laboratories	500
WELDING & SOLDERING SHOP		Operating theatre suits general	400
Gas and arc welding rough spot welding	300	Recovery room and intensive care units	30-50
Medium soldering, brazing spot welding e.g. domestic hand ware	500	X-ray department radio-diagnostic and rooms fluoroscopy	500
Fine soldering, spot welding e.g. instrument	1000	Dental surgeries	500
Very fine soldering, spot welding e.g. radio valves	1500	**HOMES**	
WOODWORKING SHOP		Living rooms general	50
Rough sawing, bench work	300	Casual reading	150
Sizing, planning, rough sanding medium and bench work gluing cooperage	500	Sewing darning studies desk and portaged	300
Fine bench and machine work fine sanding, finishing	750		

GENERAL BUILDING AREAS	IES STANDARDS ILLUMINATION LEVEL	GENERAL BUILDING AREAS	IES STANDARDS ILLUMINATION LEVEL
OFFICE		Bedroom general	50
General office with mainly clerical task and typing office	500	Bed lead kitchen	150
Deep plan general offices	750	Kitchen working areas	300
Business machine and typing	750	Bathrooms	100
Filling room	300	Halls and landings	150
Conference rooms	750	Stairs	100
OFFICES AND SHOPS		Workshops	300
Executive office	500	Garages	50
Computer rooms	500	**INDOOR SPORTS AND RECREATIONAL BUILDING**	
Punch card rooms	750	Athletics, basketball, bowls, judo	300
Drawing offices drawing boards	750	Hockey	700
Reference table and general	500	**BADMINTON COURTS**	300
Print room	300	**BILLIARD ROOMS**	
SHOP		General	100
Conventional with counters	500	Table	special lighting
Conventional with wall display	500	**CARD ROOMS**	300
Conventional with wall display	500	**GYMNASIA GENERAL**	500
SHOP		**SWIMMING POOL**	
Self service	500	Top pool	500
Supermarkets	500	Spectator areas	150
Hypermarkets	500	Club recreational	300
General	500		

GENERAL BUILDING AREAS	IES STANDARDS ILLUMINATION LEVEL	GENERAL BUILDING AREAS	IES STANDARDS ILLUMINATION LEVEL
PUBLIC AND EDUCATIONAL BUILDING ASSEMBLY AND CONCERT HALLS		**GENERAL**	
Theatre and concert halls	100	Changing rooms showers lookers rooms	150
Cinemas	50	**TABLE TENNIS**	
Multipurpose	500	Club	300
		Recreational	200

Table 1.3.2: IES Standards Illumination Level

1.3.2 PROTECTION CLASSIFICATION

All interior lighting fixture enclosures shall be classified in accordance with the IP classification system and two digit number code, following table 1.3.3 present some sample areas:

Installation	Considerations
Residential/Office/ School	Generally clean, dry and free from harmful deposits of dust, but some condensate may be present due to atmospheric conditions. Minimum protection typically IP2XC for dry conditions.
Control rooms/ Sub-Stations	Generally dry and free from harmful deposits of dust, but some condensate may be present due to atmospheric conditions. Where access is restricted to skilled or instructed persons, IP2X is the typical minimum requirement for dry conditions.
Commercial/ Light Industrial	May not be clean, but normally dry and free from harmful deposits of dust. Suitable minimum protection, a) Where condensate is not present, IP2XC b) Where condensate may be present, IP21C. c) Equipment installed within range of fire sprinkler systems, IP22C. Machine control equipment, where fluids may be present, e.g. lathes, millers etc., typically IP54. Consideration should also be given to the corrosive properties of certain fluids
Heavy Industrial, Chemical, Steel making etc	May not be totally clean, with possible presence of corrosive elements and harmful deposits of dust. Protection to IP54 will be typically required, with special consideration given to the corrosion resisting properties of the enclosure.
Food Processing	Will vary depending on the type of food being processed and the possible requirement for washing down. Where fine powders are present, a minimum of IP53 should be used. This should be increased to IP54/55 if the equipment needs to be washed/hosed down.

Installation	Considerations
Weatherproof	If subjected to exposure to any weather condition, agreement between the User and Manufacturer is necessary together with additional consideration given to the corrosion resisting properties of the enclosure and fittings.

Table 1.3.3: IP Code Protection Classification

The degrees of protection provided by an enclosure are indicated by the IP code in the following way:

CODE LETTERS IP 2 3

International Protection

FIRST NUMERAL 0-6, or letter X

Protection of persons by prevention or limiting ingress of parts of the human body or solid objects

SECOND NUMERAL 0-8, or letter X

Resistance to ingress of water

Notes:

UTT through its certified venders will supply all the LED Light fitting after receiving a confirmed order from the Owner/Developers/Contractor. This scope is not allowed to be carried out by any other party.

Delivery period of LED Light fitting is 4 months after placing a confirmed order.

2 ANNEXURE

2.1 IMPORTANT NOTES

- This design guide explains in general, all UTT requirements that will facilitate the provision of automation services to new buildings, yet the requirements indicated in the 'NOC' (No Objection Certificate) should be fully complied.
- Developers/Consultants/Designers/Contractor must liaise with UTT at the design stage and obtain UTT approval on the final Design Drawings.
- UTT approval is valid for one year from the date of the approval, the Owner/Developers/Contractor should re-submit the design drawing for renewal.
- Minimum two sets of automation design drawings must be submitted for study and approval. Before tendering, the submission shall be done through the proper channel
- Where deviations/comments/amendments are advised on the Design, Drawings must be corrected and re-submitted for approval.
- UTT through its certified venders will supply and install all the smart home/smart home basic cables and equipment after receiving confirmed order from the Owner/Developers/Contractor. This scope is not allowed to be carried out by any other party.
- On completion of the requirements, any comments and snags advised by UTT Building Inspector must be attended by the Contractor or Owner of the building, soon to avoid delays in the issuance of the Building Completion Certificate.
- One set of approved 'As-Built' drawings must be submitted along with the Building Completion Certificate, which will be certified by UTT.

2.2 REQUIRED DOCUMENTATION FOR HANDOVER (PROJECT COMPLETION) NOC/BCC ISSUANCE

Design Stage (before starting construction)

- Design Drawings approval form signed and stamped
- 2 sets of the design drawings stamped by the consultant
- 1 CD with the CAD drawings, CD shall be labeled with all the details
- Contact list of the concerned engineers for the project (consultant)

For Al Reem Island, all drawings to be submitted through M/s Bunya.

For Rawdhat Abu Dhabi, all drawings to be submitted by consultant directly.

Smart Building Automation Drawing approval

1) Cover letter from Consultant with drawing reference for each sheet
2) Two hard copies of Home Automation System drawings with soft copies in two separate hard box files clearly labeled with Sector & Plot
3) All contact information for Main contractor, MEP contractor and Consultant to be included along the cover letter.

Mock up inspection

- Mock up inspection request form signed and stamped
- Mock up Layout and schematic diagram showing all automation details.

Final inspection stage

- Final inspection request form signed and stamped by all parties
- 1 set of As Built Drawings (as per approved design drawings) signed and stamped by the consultant, main contractor and MEP contractor
- 1 CD with the CAD drawings, CD shall be labeled with all the details
- Contact list of the concerned engineers (Facility Management, Main contractor & MEP contractor)
- Unit types & apartment numbers sheet.

Building Completion Certificate (BCC)

- All of the above fully complied 100%
- Compliance with Smart City Infrastructure BCC requirements.

2.3 APPLICATION FOR BUILDING PLAN APPROVAL

Application Form
Building Plan Approval

يو تي للتقنية
UT Technology
LLC with capital 20 million AED

This application to be duly completed and submitted together with relevant documents

☐ SMART HOME ☐ TELECOM

STRUCTURE TYPE

☐ Villa	No. of Villas :
☐ Tower 1 - 09 Storey	No. of Towers :
☐ Tower 10 - 19 Storey	No. of Towers :
☐ Tower 20 - 29 Storey	No. of Towers :
☐ Tower 30 - 39 Storey	No. of Towers :
☐ Tower 40 - 49 Storey	No. of Towers :
☐ Tower ≥ 50 Storey	No. of Towers :
☐ Commercial Building	☐ Commercial Complex
☐ School	☐ Utility Building
☐ Hotel	☐ Mosque / Imam House
☐ Office Complex	☐ Hospital / Clinic
☐ GSM Site	☐ Others :

LOCATION DETAILS

Sector :		
Plot No. :	No. of Floors :	No. of Flats :

STRUCTURE DETAILS

Developer :	Owner :	Contract No. :

CONSULTANT DETAILS

Name :		
P.O. Box :	Fax No :	
Contact Person :	Contact No :	Signature & Company Stamp

CONTRACTOR DETAILS

Name :		
P.O. Box :	Fax No :	
Contact Person :	Contact No :	Signature & Company Stamp

SUB-CONTRACTOR / ELECTRICAL CONTRACTOR DETAILS

Name :		
P.O. Box :	Fax No :	
Contact Person :	Contact No :	Signature & Company Stamp

For Accounting Use Only

Ref :		
Invoice No. :	Date :	
Details :		Signature & Company Stamp

For Official Use Only

Ref :	Application Checked By :	Date :
Approved by :		Valid up to :

PO Box : 3838 - Abu Dhabi, United Arab Emirates T: +971 2 618 4718 E: info@utt.ae W: www.utt.ae

2.4 APPLICATION FOR BUILDING INSPECTION

Application for Building Inspection

يو تي للتقنية
UT Technology
LLC with capital 20 million AED

☐ Smart Home ☐ Telecom
☐ 1st & 2nd Inspection ☐ Subsequence Inspection

STRUCTURE TYPE

☐ Villa — No. of Villas : .....
☐ Tower 1-09 storey — No. of Towers : .....
☐ Tower 10-19 storey — No. of Towers : .....
☐ Tower 20-29 storey — No. of Towers : .....
☐ Tower 30-39 storey — No. of Towers : .....
☐ Tower 40 -49 storey — No. of Towers : .....
☐ Tower ≥ 50 storey — No. of Towers : .....
☐ Commercial Building ☐ Commercial Complex
☐ School ☐ Utility Building
☐ Hotel ☐ Mosque / Imam House
☐ Office Complex ☐ Hospital / Clinic
☐ GSM Site ☐ Others : .....

LOCATION DETAILS

Project Name: ..... Sector : .....
Plot No. : ..... No. of Floors : ..... No. of Flats : .....

STRUCTURE DETAILS

Developer : ..... Owner : ..... Contact No. : .....

CONSULTANT DETAILS

Name : .....
P.O.Box : ..... Fax No : .....
Contact Person : ..... Contact No : .....

CONTRACTOR DETAILS

Name : .....
P.O.Box : ..... Fax No : .....
Contact Person : ..... Contact No : .....

SUB CONTRACTOR / ELECTRICAL CONTRACTOR DETAILS

Name : .....
P.O.Box : ..... Fax No : .....
Contact Person : ..... Contact No : .....

FOR ACCOUNTING USE ONLY

Ref. : .....
Invoice No. : ..... Fax No. : .....
Details : .....

FOR OFFICIAL USE ONLY

Ref. : ..... Application Checked By : ..... Date : ... / ... / .....
Approved By : ..... Valid up to : ... / ... / .....

*Note : 6 Months Validity Relevant documents : Copy of approved drawings

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2.5 INSPECTION CHECKLIST

INSPECTION CHECKLIST

Date: / /

Project: **Sector:** **Plot:**

Inspection Types: Regular ❒ Final ❒

1. Enclosure:

1.1 Termination:	Done	❒	Not Done	❒	Done with comments	❒
1.2 Labeling:	Done	❒	Not Done	❒	Done with comments	❒
1.3 CAT-6:	Installed	❒	Not Installed	❒	Installed with comments	❒
1.4 Bus Cable:	Installed	❒	Not Installed	❒	Installed with comments	❒
1.5 Gateway Power:	Connected	❒	Not Connected	❒	Connected with comments	❒

2. Keypad:

2.1 Location:	Match	❒	Not Match	❒	Match with comments	❒
2.2 Back box (47mm): Installed		❒	Not Installed	❒	Installed with comments	❒
2.3 Bus Cable:	Installed	❒	Not Installed	❒	Installed with comments	❒

3. HVAC:

3.1 Back Box (47mm): Installed		❒	Not Installed	❒	Installed with comments	❒
3.2 Bus Cable:	Installed	❒	Not Installed	❒	Installed with comments	❒
3.3 Termination:	Installed	❒	Not Installed	❒	Installed with comments	❒
3.4 Labeling:	Done	❒	Not Done	❒	Done with comments	❒

4. Shade & Curtain Control:

4.1 Location:	Match	❒	Not Match	❒	Match with comments	❒	
4.2 Power:	Installed	❒	Not Installed	❒	Installed with comments	❒	
4.3 Bus Cable:	Installed	❒	Not Installed	❒	Installed with comments	❒	
4.4 Labeling:	Done	❒	Not Done	❒	Done with comments	❒	

5. Motion Sensor

5.1 Location:	Match	❒	Not Match	❒	Match with comments	❒	
5.2 CAT-6 Cable:	Installed	❒	Not Installed	❒	Installed with comments	❒	
5.3 Labeling:	Done	❒	Not Done	❒	Done with comments	❒	

6. Multi-Sensor

6.1 Location:	Match	❒	Not Match	❒	Match with comments	❒	
6.2 Bus Cable:	Installed	❒	Not Installed	❒	Installed with comments	❒	
6.3 Labeling:	Done	❒	Not Done	❒	Done with comments	❒	

7. Access Control System:

7.1 Location:	Match	❒	Not Match	❒	Match with comments	❒	
7.2 Card Reader Cable: Installed		❒	Not Installed	❒	Installed with comments	❒	
7.3 Exit Button Cable:	Installed	❒	Not Installed	❒	Installed with comments	❒	
7.4 Door Lock Cable:	Installed	❒	Not Installed	❒	Installed with comments	❒	
7.5 Labeling:	Done	❒	Not Done	❒	Done with comments	❒	

8. Entertainment (E) Outlet

8.1 Location: Match ❒ Not Match ❒ Match with comments ❒

.....

8.2 Back box (47mm): Installed ❒ Not Installed ❒ Installed with comments ❒

.....

8.3 Bus Cable: Installed ❒ Not Installed ❒ Installed with comments ❒

.....

8.4 Labeling: Done ❒ Not Done ❒ Done with comments ❒

.....

9. Audio (A) Distribution

9.1 Location: Match ❒ Not Match ❒ Match with comments ❒

.....

9.2 E Outlet (47mm): Installed ❒ Not Installed ❒ Installed with comments ❒

.....

9.3 Cat.6 Cable: Installed ❒ Not Installed ❒ Installed with comments ❒

.....

9.4Labeling: Done ❒ Not Done ❒ Done with comments ❒

.....

10. IP Camera

10.1 Location: Match ❒ Not Match ❒ Match with comments ❒

.....

10.2 RJ-45 Outlet: Installed ❒ Not Installed ❒ Installed with comments ❒

.....

10.3Labeling: Done ❒ Not Done ❒ Done with comments ❒

.....

11. IR Receiver

11.1 Location: Match ❒ Not Match ❒ Match with comments ❒

.....

11.2 CAT-6 Cable: Installed ❒ Not Installed ❒ Installed with comments ❒

.....

11.3Labeling: Done ❒ Not Done ❒ Done with comments ❒

.....

General Notes:

……

……

……

……

……

……

Next Inspection date ……

All the comments should be rectified maximum before two days from the next inspection date

UTT Engineer: ……

Signature ……

Site Engineer Name: ……

Signature: ……