PIXIE.

Smart Home

Engineering Specification

Prepared by: SAL National Pty Ltd

Applies to: PIXIE Partners and PIXIE Certified Installers

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Technical support: pixiepartners.com.au/pixie-online-support/

Website: pixiepartners.com.au/downloads/

This specification shall be read in conjunction with the relevant PIXIE product installation manuals, datasheets, and wiring diagrams, all available at pixiepartners.com.au. Always refer to the most current published version.

Note: SAL National Pty Ltd reserves the right to update this specification at any time. This document does not constitute a substitute for product-specific installation manuals or compliance with applicable Australian Standards.

1. System Overview

A PIXIE smart home solution shall be installed according to the control and integration requirements for this project.

The PIXIE wireless automation system consists of a range of Bluetooth™ Mesh enabled devices, which when combined with the PIXIE App on mobile and/or tablet devices provide direct control, group control, scene control, and scheduled control scenarios.

These PIXIE hardware devices are installed using standard electrical wiring practices, without the need for wired connections between devices to create automation scenarios, mobile device control, remote access when away from home, and integration with 3rd party devices and systems as detailed herein.

Smart 'mechs' and smart modules all communicate with each other using Bluetooth™ mesh. PIXIE Gen1, Gen2, and Gen3 smart mechs and modules are backwards compatible.

Unless specifically excluded in project documentation, a minimum of one PIXIE Gateway (SGW3BTAM) shall be installed and connected to the home network via a wired Ethernet connection.

Unless specifically excluded in project documentation, a minimum of one PIXIE Touch Panel (STP54BTAS) shall be installed and connected to the home network via a Cat6 POE connection.

A maximum of 8 PIXIE Touch Panels shall be installed per PIXIE Gateway.

All PIXIE Touch Panels and all PIXIE Gateways installed in the home shall reside on the same subnet IP of the home network.

2. System Commissioning

The PIXIE automation system is set up using the PIXIE mobile apps, available for free on both iOS and Android platforms. The app operates on both mobile devices and tablets.

The contractor, where requested, shall provide commissioning services as part of the installation offer. These services shall include:

- **Device discovery —** identify and locate all installed PIXIE devices, including naming of each device.
- **Rooms creation —** create the necessary rooms where PIXIE is installed and assign discovered devices into each room for intuitive control and navigation for the client.
- **Groups —** create the requested control groups and name them for intuitive broad system control.
- **Scenes —** create the requested control scenes and name them for intuitive broad system control.
- **Schedules —** create the requested control schedules and name them for intuitive broad system control.
- **Programs —** create the requested logic programs and name them for intuitive broad system control.
- **System integration —** ensure all nominated 3rd party systems identified for integration are operating with the PIXIE solution as expected, including any voice assistants specified.
- **Testing —** test control of each individual item, group, scene, and schedule prior to transferring ownership to the client.

3. PIXIE Smart Mechs

PIXIE smart mechs are a range of dimmers, switches, timers, and system controllers designed to be installed using standard electrical cabling in Australian homes.

PIXIE smart mechs are available in two device types:

- **Master devices** are load controllers, physically connected to the lighting (and other electrical appliances) under control.

- **Secondary devices** are system messaging mechs used to provide multiway control and scene capabilities.

Homes will have a combination of these smart mechs to create a smart home system. All smart mechs used shall be G3 (Gen3) or above.

These mechs are designed to fit into a range of Australian wall plates. The contractor shall confirm how PIXIE fits into the selected wall plate range. Smart mechs have interchangeable switch-caps, which shall be fitted by the contractor to accommodate the selected wall plate design elements.

4. PIXIE Smart Modules

PIXIE smart modules are physically similar to light drivers and come in different variants, including load controllers, input devices, and output devices.

PIXIE smart modules are available in two device types:

- **Master devices** are load controllers, physically connected to the lighting (and other electrical appliances) under control.
- **Secondary devices** are system messaging devices used to provide input and output capabilities to the PIXIE home automation solution.

Homes will have a combination of smart modules and smart devices to create a smart home system.

These modules shall be installed in electrically safe conditions and locations, as they are not designed for installation in wall plates. Mounting locations shall be marked on as-built drawings by the electrician.

5. Mesh Operation

PIXIE communication is via the Bluetooth™ mesh network. Each PIXIE Master device acts as a Bluetooth™ Mesh transceiver, relaying system messages between all devices to ensure all devices in the home receive the messages required to perform home automation functions.

The more PIXIE devices distributed throughout the home, the better the mesh network performs. The maximum distance between PIXIE devices shall be no more than 10–15 metres — a range that will be reduced by concrete, steel, glass, and other dense building materials.

Where this maximum distance is exceeded, or where intermittent or unreliable operation is experienced, a PIXIE Mesh Booster (SGB3BTAS) shall be installed between the problematic areas until robust wireless operation is achieved.

5.1 System Dimensions, Gateways, and Touch Panels

There shall be a maximum of 128 PIXIE Master devices in a single PIXIE Network. This limitation applies to Master devices only — Secondary devices are excluded from this count.

Gateways

A PIXIE Network can represent a single installation. When a PIXIE Gateway is used, no more than 128 Master devices are permitted per Gateway.

If a home requires more than 128 PIXIE Master devices, additional PIXIE Gateways shall be installed. Gateways are treated as separate ‘homes’ in the PIXIE App and can be switched between using the app.

Gateways connect to a power source via the included AC adaptor and to the home network via either Wi-Fi (2.4GHz only) or a wired Ethernet connection. Ethernet shall be prioritised whenever possible.

PIXIE Touch Panels

With the addition of one or more PIXIE Touch Panels, all PIXIE Gateways in the home can be controlled from a single or multiple Touch Panels — meaning all devices across all Gateways can be controlled from the Touch Panel(s).

Where more than one Gateway is required and whole-home control is also required, one or more PIXIE Touch Panels shall be installed.

No more than 8 PIXIE Touch Panels can be connected to a single PIXIE Gateway. If more than 8 Touch Panels are required, additional Gateways shall be added at a 1:8 Gateway-to-Touch Panel ratio. This ratio applies irrespective of the number of Master devices installed.

All PIXIE Touch Panels and all PIXIE Gateways shall reside on the same subnet IP of the home network for cross-network control to function.

Note: It is not possible to control two separate PIXIE Networks / Gateways simultaneously from a single button (hardware or software), other than via the PIXIE Touch Panel hardware buttons.

6. Mesh Boosters

PIXIE Bluetooth™ Mesh Boosters (part no. SGB3BTAS) may be required to ensure robust operation of the PIXIE mesh network. They are classified as PIXIE Secondary devices and do not count towards the 128 Master device maximum.

Mesh Boosters operate similarly to Wi-Fi access points, extending the range and reliability of the PIXIE Bluetooth™ Mesh network throughout the home. They require a hard Active supply. During final setup, they are added to the PIXIE app — no further configuration is required.

6.1 Installing PIXIE Mesh Boosters

In multi-storey homes, a minimum of one Mesh Booster shall be installed on each level, positioned as close as practically possible to the stairs between floors to maximise Bluetooth™ signal transmission between levels.

In large homes where levels have multiple stair locations, one Mesh Booster shall be mounted at each stair location.

In large single-storey homes, Mesh Boosters shall be positioned to ensure all wings of the home maintain optimal mesh network conditions.

Mesh Boosters shall be mounted discreetly — typically near a smoke detector or in the ceiling space. Mounting locations shall be marked on as-built drawings by the electrician.

7. Lighting Control

PIXIE provides dimming and switching of a wide range of lighting technologies using a combination of smart mechs and smart modules. The contractor shall determine the appropriate PIXIE lighting control mech and/or module for each specified lighting element, based on the control capability required — dimming (and technology type) or switching only.

7.1 De-rating

When using PIXIE smart mechs in multi-gang plates (2-gang to 6-gang), de-rating of the maximum operating load is required, irrespective of whether other smart or non-smart mechs are also installed on the same plate.

The contractor shall refer to each PIXIE smart mech installation manual for the applicable de-rating requirements, as these vary by device type. No single mechanism shall be connected to any load that will exceed its maximum de-rated operating load.

Any circuit where loads will exceed the maximum de-rated load shall be split (with additional mechanisms installed for the split portion of the circuit), or the PIXIE mechanism shall be moved to a separate wall plate with de-rating applied accordingly.

7.2 Load-bypass Capacitor Installation

A load bypass capacitor may be installed in certain circumstances to ensure reliable system operation. The applicable scenarios differ for switch mechs and dimmer mechs.

> **Warning: Capacitors shall never be installed with PIXIE dimmers if no load is connected — doing so will destroy the PIXIE phase dimmers.**

Switch mechs

Where the load connected to a PIXIE smart switch (SWL600BTAM) or Smart Timer Switch (STS600BTAM) is less than 13W, the load bypass capacitor shall be installed across the 'load' and 'neutral' wires. This ensures the relay inside these devices stays latched when operated.

Dimmer mechs

With PIXIE phase dimmers, the contractor shall first connect the lighting load and ensure that a lighting load is always present when the dimmer is operated and the capacitor is installed. The capacitor shall only be installed if one of the following problems exists:

- When the dimmer is turned off and the connected LED lights exhibit a soft residual glow — install the capacitor across 'load' and neutral to eliminate this.
- When dimming a small load (such as a single LED downlight or lamp) and flickering begins below a certain level — installing the capacitor across 'load' and neutral may eliminate this issue.

> *Note: Do not install the capacitor as a precaution. Only install it if one of the above problems is present.*

7.3 Inrush Current Limiter

The SAL SICL1235BTP is an inrush current limiter designed to reduce the destructive impact of in-rush current from poor-quality constant voltage LED drivers on electronic components such as PIXIE smart switches and dimmers.

This device shall be installed on all PIXIE smart dimmer and switch mechs in the following scenarios:

- Controlling more than a single constant voltage LED driver for LED strip, garden lights, or similar from a single switch.
- When using a heated towel rail with a remote driver that is not 240V direct-controlled.
- When using multiple LED globes or lamps to be dimmed together on a single circuit, as commonly found in chandeliers and pendants.

7.4 Phase Dimming

PIXIE phase dimmers are trailing edge only dimmers, compatible with trailing edge drivers and tungsten and halogen drivers only.

- The contractor shall use only trailing edge compatible drivers with PIXIE phase dimmers.
- Iron core drivers, ballasts, and transformers shall not be installed. Any iron core devices present on cabling connected to PIXIE phase dimmers must be removed in a retrofit scenario.
- The contractor shall ensure connected lighting loads do not exceed the load capacity of the dimmers, including de-rating requirements.

RippleShield dimming. In parts of NSW and South-East Queensland where off-peak hot water ripple control, or off-grid and rooftop solar, cause LED flicker, the PIXIE RippleShield Dimmer

(SDD400RSBTAM) shall be specified. This purpose-built trailing edge dimmer removes the flicker at source and dims to 1%. It shall be used only with SAL RippleShield downlights (such as the HCL-capable Coolum Plus S9068TW35WHRS), to a maximum of 10 downlights per dimmer.

7.5 Switching

PIXIE smart mech switches can be used for switching a wide range of lighting loads — LED downlights, lamps, strips, lighting drivers, and other electrical devices — within the smart mech load ratings.

The contractor shall ensure connected loads do not exceed the load capacity of the switches, including de-rating requirements for multi-gang grid plates. Maximum load capabilities for different load variants (resistive, capacitive, inductive) and de-rating requirements are detailed in the installation manual for each product.

7.6 Switching Larger Loads

When it is necessary to switch electrical loads larger than the maximum rated load of the PIXIE smart switch mech, the PIXIE Dual Relay Controller (PC206DR/R/BTAM) shall be used. This smart module features 2 × 6Amp (resistive) latching relays.

This device shall be remotely mounted (not at the grid plate location), ideally next to the loads under control — for example, in the ceiling space for bathroom heat lamp applications.

If the connected load exceeds the maximum load rating of the DRC's switching channels, the DRC shall be used to terminate to an appropriately rated contactor or relay supplied by others.

Where on-wall control of DRC-controlled loads is also required, the contractor shall install one or more PIXIE Multifunction Controllers (SMF/BTAS) and pair them wirelessly to the DRC during final setup.

Switching Contactors

The PIXIE DRC shall be used whenever switching 3rd party contactors or relays to control loads larger than the 6Amp DRC rating.

> **Note: The SWL600BTAM PIXIE smart switch shall not be used to operate contactors or other relays.**

Where on-wall control of contactor-switched loads is required, the contractor shall install one or more PIXIE Multifunction Controllers (SMF/BTAS) and pair them wirelessly to the DRC during final setup.

7.7 DALI2 Dimming

PIXIE controls DALI2 certified devices using the PIXIE DALI Broadcast Controller (PC155DLB-R-BTAM). The contractor shall only use DALI2 certified drivers carrying the official DALI2 label and certification.

- No more than 20 DALI2 drivers can be controlled from a single PIXIE DALI Broadcast Controller, as it has a maximum DALI line power output of 50mA.
- As the DBC provides DALI power supply, no additional DALI power supply shall be installed on the DALI line. Any existing DALI power supply must be disconnected, as it will prevent correct DBC operation.
- No DALI2 devices other than drivers (such as DALI2 sensors or switches) shall be connected to the DBC DALI line.
- The contractor shall follow all DALI wiring requirements regarding cable gauge and distances. DALI has mains potential — double insulated cabling shall be used for the DALI control signal between devices.

Where on-wall control is also required to dim DALI2 devices, the contractor shall install one or more PIXIE Multifunction Controllers (SMF/BTAS) or Multifunction Rotary Controllers (SMFR/BTAS) and pair them wirelessly to the DBC during final setup.

When using the PIXIE DALI2 Broadcast Controller, all DALI drivers terminated to the DALI output shall operate synchronously. Where individual control is required, a separate DBC shall be installed per DALI2 driver.

7.8 0–10V Dimming

PIXIE controls 0|1–10V drivers using the PIXIE 0-10V Controller (PC152V-R-BTAM). No more than 10 × 0-10V or 1-10V drivers can be controlled from a single PIXIE 0-10V Controller.

The contractor shall use the controller's on-board relay, wired as per the product installation guide wiring diagram, to isolate power to the fixtures when dimming to off (0%). This ensures controlled lighting is fully extinguished when dimmed to off.

Where on-wall control is also required, the contractor shall install one or more PIXIE Multifunction Controllers (SMF/BTAS) or Multifunction Rotary Controllers (SMFR/BTAS) and pair them wirelessly to the 0-10V Controller(s) during final setup.

When using the PIXIE 0-10V Controller, all drivers terminated to the signal output shall operate synchronously.

7.9 LED Strip Dimming

PIXIE controls 12V and 24V constant voltage LED strips using the PIXIE Universal LED Strip Controller (LT8915RTW-BTAM). A single DIP switch selects the strip type, so one part number covers every application. It supersedes the earlier single colour (LT8915DIM/BT) and RGB (LT8915RGB/BT) controllers, which are being phased out; the Universal LED Strip Controller shall be specified on all new work.

- **Strip types:** single colour, RGB, RGBW, CCT/TW and RGBTW, at 12V or 24V, from most manufacturers and not only PIXIE. Smooth flicker-free dimming from 100% to 1%. CCT/TW strip can run in HCL (human centric lighting) mode via the PIXIE app.
- **Ratings:** 16A maximum input; up to 6A per R/G/B channel and 7.5A per CW/WW channel. Dual bell-press inputs provide on-wall control without the app. IP20.

The connection path is: Non-dimmable driver to the PIXIE Universal LED Strip Controller to the LED strip. The non-dimmable driver requires a hard Active; all dimming and control is delivered via the PIXIE module.

Note: Dimmable drivers shall not be used with PIXIE LED Strip Controllers.

Where on-wall control is also required, the contractor shall install one or more PIXIE Multifunction Controllers (SMF/BTAS) or Multifunction Rotary Controllers (SMFR/BTAS) and pair them wirelessly to the LED Strip Controller(s) during final setup.

The contractor shall ensure connected LED strip loads do not exceed the load capacity of the LED strip controllers.

7.10 Controlling Shading Appliances

PIXIE controls all shading and operable window appliances using the PIXIE Blind and Signal Controller (PC206BS/R/BTAM). This includes motorised blinds, curtains, awnings, skylights, louvred windows, sash windows, and louvre sun protection devices.

The BSC has 2 × 6Amp relays which can be used to drive 240V motors directly, or to provide dry contact/volt-free signals to interface devices supplied by the motor manufacturer (which in turn transmit wireless messages to the motors).

The contractor shall contact the PIXIE support team with information regarding the motor manufacturer, model number, and on-site cabling to receive the correct wiring diagrams and connection information. Additional resources:

PIXIE Blind and Signal Controller Companion Document

pixiepartners.com.au/pixie-blind-and-signal-controller/

The signal path for BSC operation shall be one of the following:

- PIXIE BSC → Motor (controlling 2 Actives)
- PIXIE BSC → Dry contact/volt-free interface/transmitter (wireless) → Motor

Where driving motors directly using two Actives, a single BSC shall only control a single motor.

Where on-wall control is required, the contractor shall install one or more PIXIE Multifunction Controllers (SMF/BTAS) or Multifunction Rotary Controllers (SMFR/BTAS). Where open/stop/close operation is required from a single control point, the PIXIE Multifunction Rotary dial shall be installed. Where multiple buttons are acceptable, two or more Multifunction Controllers shall be installed.

BSC modules are fully controllable for all open, stop, and close functions from the PIXIE app, PIXIE Touch Panel, and schedules without requiring on-wall control.

7.11 Controlling Other Devices

PIXIE controls a range of devices beyond lighting using a combination of power control and systems integration processes.

Exhaust Fans

When controlling ceiling-mounted exhaust fans, the PIXIE STS600BTAM (Smart Timer Switch) shall be used to provide fan run-on functionality. The run-on time shall be set via the PIXIE app in liaison with the client.

Where inline exhaust fans have motors that exceed the maximum operating load of the SWL600BTAM or STS600BTAM, the contractor shall use the PIXIE Dual Relay Controller (PC206DR/R/BTAM) instead. Where on-wall control is also required, one or more PIXIE Multifunction Controllers (SMF/BTAS) shall be installed and paired wirelessly to the DRC during final setup.

Where fan run-on is required and the DRC is used, fan run-on shall be provided via the PIXIE PROGRAMode function, which requires a PIXIE Gateway (SGW3BTAM) to be installed.

The contractor shall ensure connected motor loads do not exceed the load capacity of the switches, including de-rating requirements for multi-gang grid plates.

Ceiling Fans

The contractor shall determine whether, in addition to a PIXIE control component, a separate isolation switch is required to comply with Australian Standards for each fan. If required, this isolation switch shall be either a PIXIE switch (SWL600BTAM) or a standard mechanical rocker mechanism installed per Australian Standards.

PIXIE controls ceiling fans from the following specific manufacturers:

Hunter Pacific International (HPI)

A compatible fan shall be selected from the Hunter Pacific DC V2 range. The PIXIEM098 module from HPI shall be installed into the fan base controller prior to fan installation. The PIXIEM098 is a PIXIE Master device and is commissioned in the same manner as all other PIXIE Master devices.

Where on-wall control is required, one or more PIXIE Multifunction Rotary Controllers (SMFR/BTAS) shall be installed and paired wirelessly to the PIXIEM098. Once paired, 9-speed control and (for light-enabled modules) step dimming and colour temperature selection is available via the dial. Up to 8 × SMFR/BTAS can be paired to any single fan control module.

These fan modules can also be controlled via the PIXIE app and PIXIE Touch Panels.

Ventair Skyfan DC

Once a compatible Ventair Skyfan DC fan has been selected, the PIXIE FanLink module (FLINKPIX) shall be installed into the fan base controller prior to fan installation. The FLINKPIX is a PIXIE Master device and is commissioned in the same manner as all other PIXIE Master devices.

Where on-wall control is required, one or more PIXIE Multifunction Rotary Controllers (SMFR/BTAS) shall be installed and paired wirelessly to the module. Once paired, 9-speed control and (for light-enabled modules) step dimming and colour temperature selection is available via the dial. Up to 8 × SMFR/BTAS can be paired to any single fan control module.

These fan modules can also be controlled via the PIXIE app and PIXIE Touch Panels.

Big Ass Fans (BAF)

The contractor shall purchase and install the Big Ass Fan Haiku L 0–10V Module (model no. 006352) for each BAF fan to be PIXIE-controlled. In addition, a PIXIE PC152V-R-BTAM 0-10V Controller shall be installed for each BAF.

Where light control is also required, both an additional BAF module and an additional PIXIE 0-10V Controller are required per fan — two of each module for both fan speed and light control.

Where on-wall control is also required, one or more PIXIE Multifunction Rotary Controllers (SMFR/BTAS) shall be installed and paired wirelessly to the PIXIE 0-10V Controller during final setup.

8. PIXIE Integration

PIXIE provides two approaches to integrating with 3rd party systems — high level and low level. The contractor shall confirm the best solution based on the 3rd party manufacturers chosen for systems where PIXIE integration is desired.

8.1 PIXIE Gateway

The PIXIE Gateway (SGW3BTAM) is required for high-level integration with 3rd party products and systems and shall be installed where these integration requirements arise.

8.2 High Level Integration

High-level integration depends on an official 3rd party integration being available from PIXIE for the specific system involved.

Intercom and Doorbell Systems

PIXIE integrates with intercom systems from specific manufacturers. In all cases, the PIXIE Touch Panel shall be used to provide:

- One-way video to one or more installed outdoor stations.
- Two-way voice communication.
- Security access via the integrated system's relays.

Compatible manufacturers include:

- **DaHua —** Integration guide at pixiepartners.com.au
- **Hikvision** (refer to pixiepartners.com.au for current integration guide).

Contractors shall confirm compatible components from these manufacturers prior to installation.

Air Conditioning

PIXIE integrates with air conditioning systems from specific manufacturers, including:

- **Mitsubishi Electric —** Integration guide at pixiepartners.com.au

Contractors shall confirm compatible components and confirm the current list of supported manufacturers at pixiepartners.com.au prior to installation.

8.3 Low Level Integration

Low-level integration depends on hard-wired, on-site connections to and from 3rd party devices using PIXIE devices. Common systems include alarm systems, door strikes, garage doors, and automatic gates.

Dry Contact Inputs from PIXIE to 3rd Party Systems

When 3rd party systems require a dry contact/volt-free input from PIXIE, the PIXIE Blind and Signal Controller (PC206BS/R/BTAM) shall be used. This device has 2 programmable relays, each capable of controlling a single input. Where more than 2 inputs from PIXIE are required, the contractor shall use the correct number of BSC devices.

Dry Contact Outputs from 3rd Party Systems to PIXIE

When 3rd party systems send signals to PIXIE via dry contact/volt-free output, either the PIXIE Translator (PC100T/R/BTAS) or the PIXIE Transceiver (PC100CS-R-BTAM) shall be used. The contractor shall select the correct device based on the integration requirements and desired outcome.

Support documentation: PIXIE Translator (PC100T/R/BTAS) | PIXIE Transceiver (PC100CS-R-BTAM)

Garage Doors and Gates

When control of garage doors and gates is required, the PIXIE Garage Door and Gate Controller (PC206GD-R-BTAM) shall be installed to provide open/stop/close motor control, display motor status (open or closed) in the PIXIE Plus App, and deliver push notifications on status changes.

The contractor shall determine compatibility between the PIXIE device and the motors for the garage door and gate.

To ensure door/gate status is known, the contractor shall install one of the following sensors per the installation manual:

- **Garage doors:** sensor CSR41BTP.
- **Metal gates:** sensor CSM41BTP.

Installation manuals are available at:

pixiepartners.com.au/product/pixie-gate-door-control-pc206gd-r-btam/

sal.net.au — PIXIE Gate Door Control (PC206GD-R-BTAM)