



**Operation / Technical Manual**

**Standalone OWS**

**Rev 2.3**

# **Occupant Warning System**

**BOWS020W, BOWS060W &**

**BOWS120W**

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## Document History

Issue	Date	Description	Written By	Checked By
Draft 0	25 Sep 2008	Original Draft Document.	Wallace Zhong	Anis Shenouda
Rev 1	17/08/2009	Update & finalise draft issue	W.Z. / A.S.	A. S.
Rev 2	01/05/2011	Add current calculation, add 20W model and update DIP switch table	W.Z. / A.S.	A.S.
Rev 2.1	22/08/2013	Minor update, add photos and updated drawings	A.S.	A.S.
Rev 2.2	23/03/2016	Add table 3 for voice messages and update drawings	A.S.	
Rev 2.3	07/09/2017	Update SUB862 to use SUB999 instead	Edwin Thein	A.S.

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## Table of Contents

<b>1</b>	<b>INTRODUCTION .....</b>	<b>4</b>
1.1	Overview .....	4
1.2	Features.....	4
1.3	Specifications .....	5
<b>2</b>	<b>OPERATIONS .....</b>	<b>6</b>
2.1	Display Layouts.....	6
2.2	Mode of Operation .....	6
2.2.1	Isolate mode .....	6
2.2.2	Automatic mode.....	6
2.2.3	Manual mode.....	7
2.3	Fault Indications .....	7
2.4	Auxiliary Audio Input .....	7
<b>3</b>	<b>PLANNING .....</b>	<b>8</b>
3.1	System Components .....	8
3.2	Monitored Inputs and Outputs.....	8
3.3	OWS Main Control Board SUB860.....	9
3.3.1	OWS Tones and Messages.....	9
3.3.2	Cables Terminations .....	10
3.3.3	On-Board LED indications .....	11
3.4	Optional OWS 4 Zone Splitter Board fits 4580 Brackets - SUB999 .....	12
3.5	Audio Amplifiers .....	14
3.5.1	Amplifiers Specifications .....	15
3.5.2	20 Watt Amplifier Module.....	15
3.5.3	60/120 Watt Amplifier Module.....	15
3.5.4	250 Watt Amplifier Module.....	16
3.6	Power Supply Supervision SUB760.....	17
3.6.1	General.....	17
3.6.2	Connections.....	19
3.6.3	On-Board LED indications .....	19
3.6.4	Battery Calculations .....	19
3.6.5	Fuses .....	20
3.7	Configurations.....	21
3.7.1	DIP switch settings.....	21
3.7.2	RS232 and RS485 selection.....	21
3.7.3	Voice message programming.....	21
<b>4</b>	<b>INSTALLATION AND COMMISSIONING .....</b>	<b>22</b>
4.1	Battery Check .....	22
4.2	AC/DC Power Supply Adjustment.....	22
4.3	Sound Pressure Level (SPL) Adjustment.....	22
<b>5</b>	<b>BLOCK WIRING DIAGRAMS.....</b>	<b>23</b>

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## Figures List

Figure 1 Brooks Standalone OWS Control Panel .....	4
Figure 2 Main Display Layouts of Brooks Standalone OWS .....	6
Figure 3 OWS Main Control Board Layout .....	9
Figure 4 OWS Main Control Board C/W 120W Amplifier mounted .....	10
Figure 5 SUB999 Board Layout .....	12
Figure 6 SUB999 fitted into Mounting Brackets CB575 & CB574 .....	13
Figure 7 Class-D 20W Audio Amplifier Board Layouts .....	15
Figure 8 Class-D 60W Audio Amplifier Board .....	16
Figure 9 Class-D 120W Audio Amplifier board .....	16
Figure 10 Class-D 250W Audio Amplifier Board Layouts .....	17
Figure 11 SUB760 Power Supply Monitoring Board .....	18
Figure 12 F646B Iss6- Standalone 20W OWS .....	23
Figure 13 F647A Iss5 - OWS 60W Interfaced to CIE .....	24
Figure 14 F647B Iss8 - OWS 60W Standalone .....	25
Figure 15 F648A Iss6 - OWS 120W Interfaced to CIE .....	26
Figure 16 F648B Iss9 - OWS 120W Standalone .....	27
Figure 17 F649A Iss6 - OWS 250W Interfaced to CIE .....	28
Figure 18 F649B Iss6 - OWS 250W Standalone .....	29
Figure 19 F649C Iss7 - OWS 500W Interfaced to CIE .....	30
Figure 20 Remote Desktop Microphone PA-1, PA-8 and PA-16 F626 Issue 4 .....	31

## Tables List

Table 1 General Specifications .....	5
Table 2 Supervised Inputs and Outputs .....	8
Table 3 Tones and messages specifications .....	10
Table 4 Connections of the OWS Main Control Board .....	10
Table 5 LED indicators on the OWS Main Control Board .....	12
Table 6 SUB999 OWS 4 Zone Splitter Board Status Indications .....	13
Table 7 I/Os on SUB999 .....	14
Table 8 Audio Amplifiers Specifications .....	15
Table 9 Connection of the Audio Amplifier 20W, 60W, 120W and 250W .....	17
Table 10 Power Supply Supervision Jumper Link Setting .....	18
Table 11 Connections of the Power Supply Supervision Module .....	19
Table 12 LED Indicators on the Power Supply Supervision Board .....	19
Table 13 Current consumption of OWS components .....	20
Table 14 Fuse Specifications .....	20
Table 15 DIP Switch Settings .....	21
Table 16 Sound Volume Adjustment .....	22

# 1 INTRODUCTION

## 1.1 Overview

The Brooks Occupant Warning System (OWS) is capable of providing reliable audio and visual warnings to building occupants. The system is designed to alert occupants to an emergency situation and evacuate the building in emergency conditions. The standard system is available in 3 different configurations depending on the amplifier fitted, 20W amplifier "BOWS020", 60W amplifier "BOWS060" or 120W amplifier "BOWS120W". The OWS with 250W amplifier fitted is also available on request, it requires larger enclosure, PSU and batteries.

This document provides the technical information required to configure, install, maintain and operate a Brooks OWS and its related components. This document should be read prior installation. Should you have any queries, please contact Brooks for technical support.



Figure 1 Brooks Standalone OWS Control Panel

## 1.2 Features

A Brooks standalone OWS comprises a main control board, a main display board, an audio amplifier, a power supply supervision module, an AC/DC power supply and backup batteries within a metal enclosure. Optional 4 Zone Splitter Board can be added (if the space is available). An optional Brooks series of remote paging desk microphones can also be added<sup>1</sup>.

The Brooks series of OWS systems have the following features.

1. Automatically switch from alert to evacuation tone in emergency conditions. Time is configurable via a DIP switch setting; 0, 1, 3 or 5 minutes. Refer to Table 15 page 21.
2. Configurable audio warnings with pre-recorded digital voice messages.
  - For Australian convention, it meets the requirements of ISO7731, ISO8201, clause 3.22 of AS1670.1 and relevant clauses of AS1670.4
  - For New Zealand convention, it meets the requirements of AS2220.1 as required in NZS4512 standard.
  - For non-regulatory applications, the tones and voice message can be customised<sup>2</sup>.
  - Local PA facility via a built-in electret microphone.

<sup>1</sup> Only PA-1 remote desk top microphone can be connected to the standard series of Brooks OWS, PA-8 requires the addition of 4 zone splitter boards.

<sup>2</sup> Contact Brooks for customised tones and/or voice messages.

- Speaker output can be split into a max of 16 individual speaker circuits. Each circuit is individually supervised for short and open-circuit faults.
 

**Note:** Check space availability in the OWS enclosure to mount *the 4 Zone Splitter Boards, it may require larger enclosure.*
- Optional remote desk microphone with an auxiliary input for background music and PA zone selection (if 4 Zone Splitter Board is fitted).
- 3. Fully supervised power supply via AS4428.5 power supply supervision module.
- 4. Intuitive indications and controls via well-grouped LED indicators and momentary switches.
- 5. A wide range of quality class-D audio amplifiers.
  - High power efficient amplifiers with standby input to maximize the power conservation.
  - The available standard amplifiers are 20W, 60W and 120W. The 250W amplifier is available on customer's request.
- 6. Inputs and outputs available to interface to any CIE.
  - One supervised trigger input (clean N/O contact) to activate the audible and visual warnings from the fire panel or from any mechanical trigger device e.g. MCP.
  - One OWS changeover relay contact output to signal fault condition to CIE.
  - Two changeover relays contact outputs for power supply fault and power fail provided by the power supply supervision module to connect to an input in the CIE.
  - One supervised 24V bi-polarity strobe output to provide alert and evacuation visual warnings.

## 1.3 Specifications

Table 1 General Specifications

Feature		Specification
Mains Power Supply		230V AC, +/- 20%. Wattage 60W - 320W based on the system power supply requirements.
Battery Backup		2 x 12V SLA batteries 7 or 12 AH. The battery capacity is based on the system power supply calculations and is limited by the enclosure size.
Trigger Input		Supervised N/O clean contact, EOL resistor 47K
Speaker Circuit		Supervised 100V RMS speaker output, EOL 47K
Strobe Output		Supervised 24V Bi-polarity strobe output fused to 1 Amp, EOL resistor 47K
Fault Output		2 x Changeover clean contact for OWS and PSU fault respectively
Operating Temperature		0°C to +50°C.
PA Microphone		Built-in electret microphone
Remote Microphone		Terminals for optional remote desk top microphone, single or multiple zone selection <sup>3</sup>
Operating Humidity		5-95%, non-condensing.
Enclosure	IP Rating	IP31 (estimated)
	Material	1.5mm zinc anneal steel powder coated oyster.
	Dimension	400mm H x 320mm W x 165mm D
	Weight	12Kg Without backup battery,
Compliance		ISO 7731, ISO 8201, NZS4512, AS4428.5 and Clause 3.22 of AS 1670.1

<sup>3</sup> Multiple zone selection requires 4 zone splitter board (SUB999)

## 2 OPERATIONS

### 2.1 Display Layouts

The OVS main display layout is shown in Figure 2.

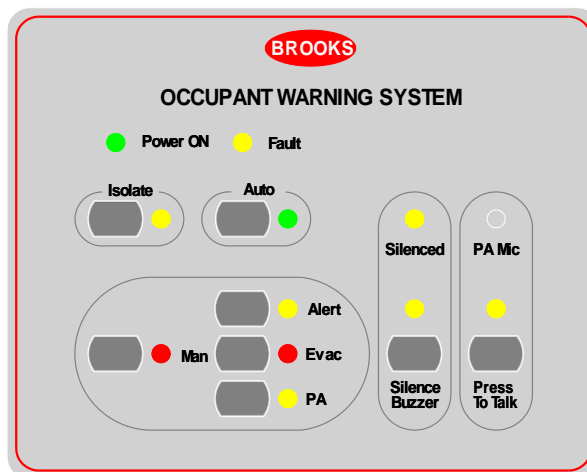


Figure 2 Main Display Layouts of Brooks Standalone OVS

### 2.2 Mode of Operation

The OVS has 3 modes of operation as shown in Figure 2: isolate, automatic and manual mode. Only one of these modes can be selected at any one time. A mode is selected by pressing the mode selection button on the display and is indicated by a LED next to the button. Pressing the mode selection button again will de-select the mode and return to the default automatic mode.

#### 2.2.1 Isolate mode<sup>4</sup>

The OVS operates in the isolate mode as follow:

- All the outputs are deactivated.
- All the alert, evacuation, PA and background music functions are disabled.
- When the trigger input becomes active e.g. alarm signal, either the Alert or Evac LED will flash based on settings i.e. no tone or voice broadcasted to the speakers.
- When a wiring fault is detected, the Fault LED illuminates and the fault relay remains in its active (normal) state

#### 2.2.2 Automatic mode

In auto mode, when the trigger input is activated, the following will occur:

- Audio warning signals (tone and voice) will be broadcasted to all the speakers.
- Bi-polarity strobe output will be activated.
- Either the Alert or the Evac LED will flash based on the setting.
- The buzzer will sound.

<sup>4</sup> In software version  $\geq$  V1.5, when the system is left in the isolate or manual mode for more than 5 minutes, the OVS generates fault. This fault remains active until the system manually exits the isolate or manual mode and default back to auto mode. This feature is added to avoid leaving the system in non-auto mode.

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To disable activate emergency warning signals in auto mode, select one of the following:

1. Press the Isolate button.
2. Press the Manual button then press the button of the active tone / message (alert or evac). Either the alert or the evacuation LED will continue flashing until the trigger input becomes inactive.

**Note:** A fault signal will be generated, after 5 minutes if the isolate or manual mode is selected (V1.5 and higher)

### 2.2.3 Manual mode<sup>4</sup>

In manual mode; alert, evacuations or PA can be selected manually<sup>5</sup>.

To access the PA feature:

- Press the "Manual" control, the manual LED illuminates.
- Press the "PA" control, the PA LED illuminates.
- Press "Press to talk" button and while pressed speak into the microphone.
- The LED above the "Press to talk" button illuminates while the microphone is active.

## 2.3 Fault Indications

When a fault in the OWS (SUB860) or in the power supply supervision (SUB760) is detected, the fault LED on the front display illuminates and the Fault relay will de-energise.

The buzzer will sound in either alarm or fault conditions. To mute the buzzer, press the Silence Buzzer button, the silenced LED illuminates.

The power supply fault relay output and the common OWS fault contact can be used to provide a local warning or report to a remote monitoring equipment.

A new feature is added in the OWS software V1.5 to latch the fault condition when the system is left in the manual or isolate mode in excess of 5 minutes. The feature has been added to provide audible warning during routine maintenance or testing if the system is left in no-operative condition.

**Note:** *The buzzer does not re-sound if a new alarm or fault condition is detected when it is muted.*

## 2.4 Auxiliary Audio Input

The auxiliary audio input is available in both automatic and manual modes. The audio signal is fed into the "AUX" audio input terminals and enabled or disabled via the "AUX. EN" switch input. It supports either a local background music input or a remote desktop microphone<sup>6</sup>. Refer to the Brooks remote paging desktop microphone technical data sheet TDS002 for further details.

The auxiliary audio input can be activated only in the non-alarm condition, it will be automatically overridden by any alarm signal (activated via the trigger input) or when manually selected for public address.

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<sup>5</sup> If one or more zone splitter boards (max 4) are installed as well as the PA display board, the PA speaker zones can be individually enabled or disabled by pressing the related PA zone selection button.

<sup>6</sup> Brooks desk top microphone provides direct connection of BGM source via built-in audio socket.

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## 3 PLANNING

### 3.1 System Components

The following standard modules are used in the Brooks OWS in conjunction with one of the four available amplifiers:

- SUB860, OWS main control module
- SUB925, OWS main display board for standalone OWS<sup>7</sup>,
- SUB760, Power supply supervision module,
- One of the following class D audio amplifiers:
  - SUB864, 20W amplifier
  - SUB865, 60W amplifier or
  - SUB866, 120W amplifier or
  - SUB867, 250W amplifier (special option),

Other options can be used, depending on system requirements and available space in the standard metal enclosure:

- SUB862, OWS 4 Zone Expansion Termination Board (obsoleted)
- SUB999<sup>8</sup> OWS 4 Zone Splitter Board fits 4580 brackets
- SUB863, OWS PA 8 Zone Expansion Display Board<sup>9</sup>
- PA-1 Brooks Remote Paging Desktop Microphone with BGM / PA enable / disable control
- PA-1 or PA-8 / PA-16<sup>10</sup> Brooks Remote Paging Desktop Microphone

SUB862 is replaced with SUB999 which is about 30% smaller. Its circuitry and features remain unchanged. The board profile was replicated from 458x series of expansion boards that are used in the Addressable CIEs so that the mounting brackets CB575 & CB574 can be used for mounting up to 4 boards, see Figure 6.

### 3.2 Monitored Inputs and Outputs

The Brooks OWS provides inputs and outputs as listed in Table 2 below, each input or output is supervised for open or short circuit faults. The inputs or outputs require an End Of Line (EOL) resistor, 47K, 1%, metal film, 1/2W.

Table 2 Supervised Inputs and Outputs

Board	Item	Terminal
SUB860 OWS Main Control Board	Warning trigger input	TB1, 11 - 12
	Bi-polarity strobe output	TB2, 3 - 4
	Speaker line output	TB2, 13 - 14
Optional SUB999 OWS 4 Zone Splitter Board	Speaker zone 1 output	+ #1 -
	Speaker zone 2 output	+ #2 -
	Speaker zone 3 output	+ #3 -
	Speaker zone 4 output	+ #4 -

<sup>7</sup> Display board and decal label used in OWS interfaced to CIE is slightly different.

<sup>8</sup> SUB999 is a replacement for the previous version SUB862.

<sup>9</sup> Requires different enclosure, cannot be fitted in the standard box.

<sup>10</sup> Requires 4 Zone Splitter Board SUB999

**Note:** Up to 4 x SUB999 Zone Splitter Boards can be added to the OWS depending on the available space. The above table shows the outputs and terminals for one splitter board.

### 3.3 OWS Main Control Board SUB860

The PCB layout of the OWS main control board is shown in Figure 3 and terminals description is shown in Table 4. The physical picture of the main OWS control board SUB860 with 120W amplifier board SUB866 mounted on top is shown in Figure 4.

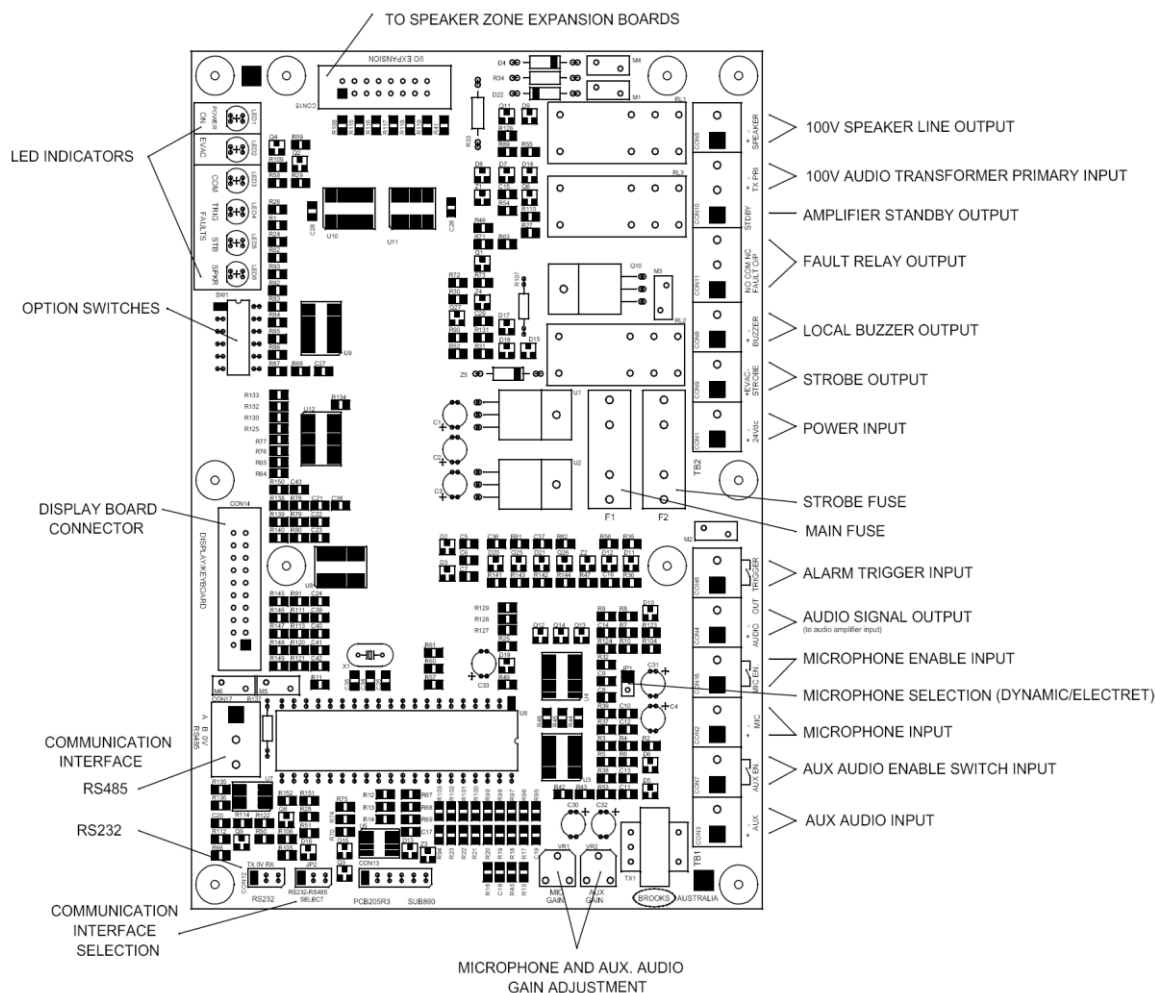


Figure 3 OWS Main Control Board Layout

The display board SUB925 is mounted behind the decal label on the front face plate of the standalone OWS series and connected to the main board SUB860 via a 20 way ribbon cable.

The connection diagrams of the main control board connected to different amplifiers is shown in Chapter 5 “BLOCK Wiring Diagrams” page 23.

#### 3.3.1 OWS Tones and Messages

The standard format of the OWS provides T3 evacuation tone and message in alarm conditions. The alert tone / message can be activated manually from the OWS Front Display. Alternatively, it can in auto mode be configured to activate the alert tone / message followed by T3 (or AS2220) evacuation tone / message after a pre-set time delay. When used in NZ, the DIP switch S6 must be in the ON position to provide AS2220.1 tone as required by NZS5412. The pattern, frequency and time of each tone are described in Table 3 below. The standard evacuation and alert Messages are also shown in the same table.

Table 3 Tones and messages specifications

Audio Indication	Active conditions	Description
Evacuation T3 tone & message	Alarm condition or manual activation via the front display	Sweeping from 500-1200Hz with the ON/OFF time of 0.5s, repeated for 3 times followed by an additional 1 second silence. This is repeated 4 times then followed by the following voice message: <i>"Attention, attention, fire alarm evacuate now"</i> When the voice message is completed, the tone repeats again.
AS2220 Evacuation tone & message	Alarm condition or manual activation via the front display	Sweeping from 500-1200Hz with the ON 3.75S and OFF 0.25S, followed by the following evacuation voice message: <i>"Attention, attention, fire alarm evacuate now"</i> When the voice message is completed, the tone repeats again.
Alert tone & message	Alarm condition (for the duration of delay time) or manual activation via the front display	Repeat the tone below for twelve times. Continuous tone at 420Hz with the ON/OFF time of 0.6s, repeated for three times followed by the following voice message: <i>"Attention, attention, a fire alarm has been detected within the building. Standby for further instructions"</i> When the voice message is completed, the tone repeats again. If 3 minutes delay is selected, the alert tone will automatically change to the evacuation tone.

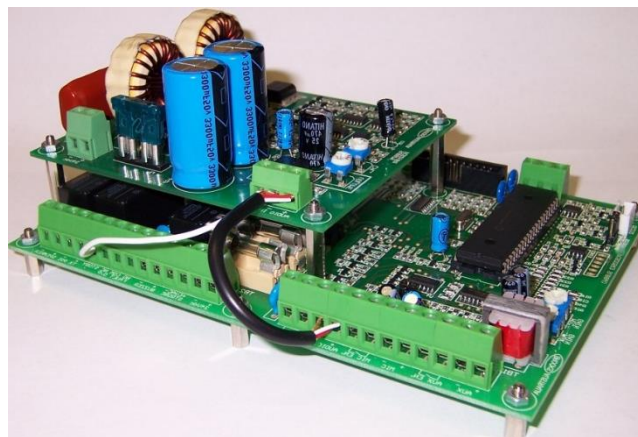


Figure 4 OWS Main Control Board C/W 120W Amplifier mounted

### 3.3.2 Cables Terminations

Table 4 Connections of the OWS Main Control Board

Designator	Type	No.	Label	Pin	Description
TB1	Screw terminals	1	AUX	+	Auxiliary audio input. ≤ 1V RMS
		2		-	
		3	AUX EN	+	Auxiliary audio enable input. Closed contact enables the input e.g. remote mic.
		4		-	
		5	MIC	+	Microphone input from the built-in electret microphone.
		6		-	
		7	MIC EN	+	Used only to enable optional dynamic mic (if used). Leave it unconnected.
		8		-	

Designator	Type	No.	Label	Pin	Description
		9	AUDIO OUT	+	Audio output to amplifier <= 1V RMS.
		10		-	
		11	TRIGGER	+	Monitored trigger input. Connected to the N/O alarm contact in the CIE or any N/O clean contact. EOL resistor: 47kΩ 0.5 Watt 1%.
		12		-	
TB2	Screw terminals	1	24Vdc (Supply)	+	20 – 30Vdc, 80mA – 120mA
		2		-	
		3	EVAC STROBE	+/-	Monitored bi-polarity visual warning output. 20-30V, <=1A. Normal polarity for alert and reverse polarity for evacuation. EOL resistor: 47kΩ 0.5 Watt 1%.
		4		-/+	
		5	BUZZER	+	Open collector output < 100mA @ 24V. Drives the buzzer on the main display
		6		-	
		7	FAULT O/C	NO	Wiring fault output. Dry-contact 30V @ 5A Connects to a programmable input in the CIE. Relay is normally energised
		8		COM	
		9		NC	
		10	STDBY <sup>11</sup>	+	Connected to Brooks amplifiers to reduce quiescent current consumption. When the logic is high (5V), amplifier output is disabled.
		11	TX PRI	+	Transformer input. <100V RMS. Connected to transformer primary coil output. Maximum current based on amplifier type.
		12		1	
		13	SPEAKER	+	Monitored speaker output. Connected to the speaker line or the optional zone splitter board SUB999. EOL resistor: 47kΩ 0.5 Watt 1%.
		14		-	
CON7	Screw terminals	1	RS485	A	RS485 interface.
		2		B	Connected to optional remote microphone with PA zone selections e.g. PA-8, PA-16.
		3		0V	
CON12	Molex 3 Pin Header	1	RS232	TX	RS232 interface. TX – PC RX, RX – PC TX, 0V – PC GND. Used for digital voice message programming.
		2		0V	
		3		RX	
CON15	IDC header, 2X10	N/A	I/O EXPANSION	N/A	PA Expansion Interface. Connect to the first OWS 4 Zone Splitter Board <sup>12</sup> .
CON14	IDC header, 2X5	N/A	DISPLAY / KEYBOARD	+	IDC connector to the main display board.
CON13	IDC header, 2X10	N/A		N/A	Not used.

### 3.3.3 On-Board LED indications

In addition to the LED indicators on the front display, other indicators are provided on the OWS main control board as shown in Table 5. The status of the fault indicators is determined by the number of flashes of each LED. The flash rate provides further indication of the fault type e.g. whether the wiring fault in the speaker circuit is open or short circuit, etc.

<sup>11</sup> Available only in Brooks series of amplifiers to minimise the quiescent current.

<sup>12</sup> Not available in the standard standalone series of Brooks OWS

Table 5 LED indicators on the OWS Main Control Board

Designator	Label	Colour	Active conditions
LED 1	POWER ON	Green	OWS main board power input is ON.
LED 2	EVAC	Red	Trigger input activated.
LED 3	FAULTS-COM	Yellow	Common Fault, indicates speaker, strobe or trigger fault. If only COM Fault is ON, it may be a wiring fault in the 4 Zone Splitter Board SUB999 (if fitted) or PSU fault.
LED 4	FAULTS TRIGGER	Yellow	Trigger input wiring fault. Flashing twice indicates an open-circuit fault detected.
LED 5	FAULTS STB	Yellow	Strobe output wiring fault. Flashing once per cycle indicates a short-circuit fault detected. Flashing twice indicates an open-circuit fault detected.
LED 6	FAULTS SPEAKER	Yellow	The speaker output has a wiring fault. Flashing once per cycle indicates a short-circuit fault detected. Flashing twice indicates an open-circuit fault detected.

### 3.4 Optional OWS 4 Zone Splitter Board fits 4580 Brackets - SUB999

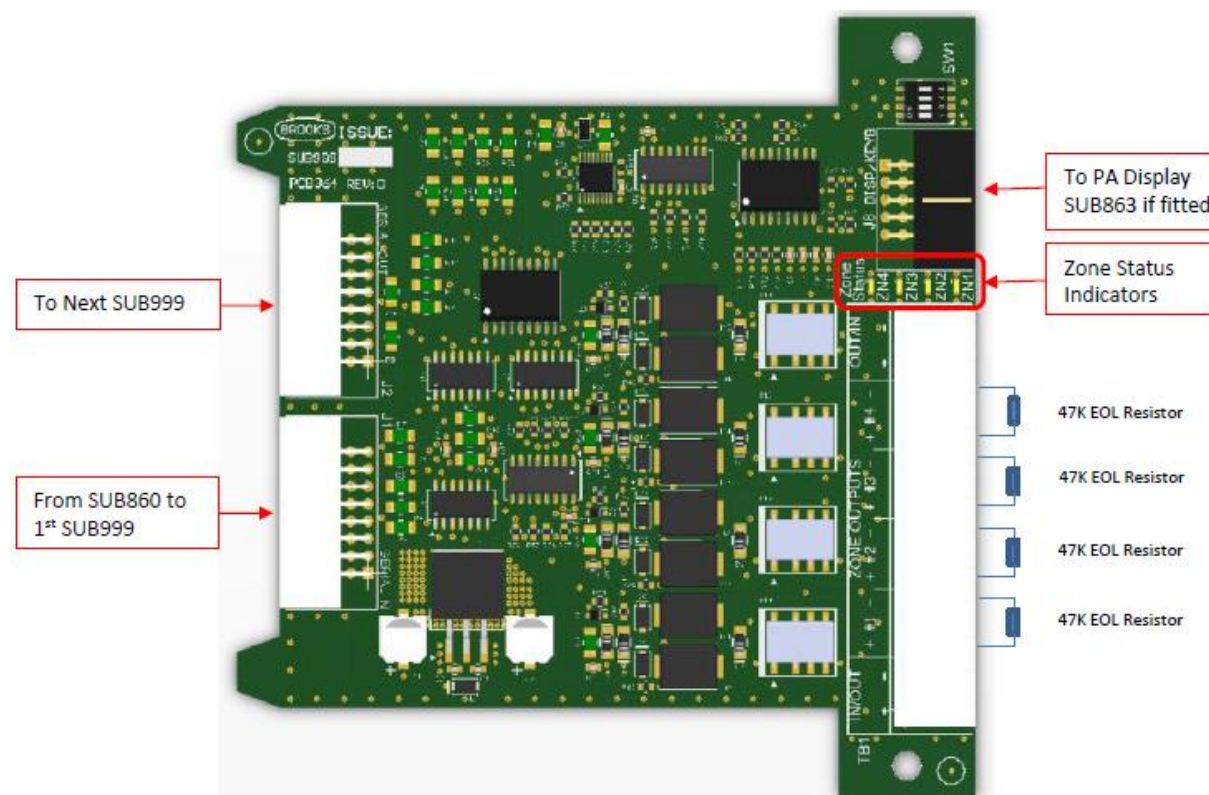


Figure 5 SUB999 Board Layout

The OWS main control board supports only a single zone speaker output. The optional SUB999, 4 Zone Splitter Board, allows for the speaker output from the main board to split into 4 individual speaker circuits. Each of the four speaker outputs is individually monitored for short and open circuit fault. The optional SUB999 allows the PA to be only controlled over selected speaker zones<sup>12</sup> (not used in the standard standalone OWS).

There are 4 status LED indicators on each SUB999. When lit, they indicate which zones are being activated. These LEDs mimic the PA selection Display Board on SUB863 (when used) as shown in Table 6.



Should a Public Address (PA, Models PA-1 or PA-8 / PA-16) be required, use the optional SUB863<sup>13</sup> (8 Zone PA Display Module). This allows each PA zones to be individually selectable. Up to 16 zones are possible depending on the PA model being used. Where PA-16 is used, a second SUB863 is required. The zone continue counting from its previous SUB863 and begin count from Zones 9 - 16.

Up to four boards (SUB999) can be daisy-chained to provide a maximum of 16 speaker zones.

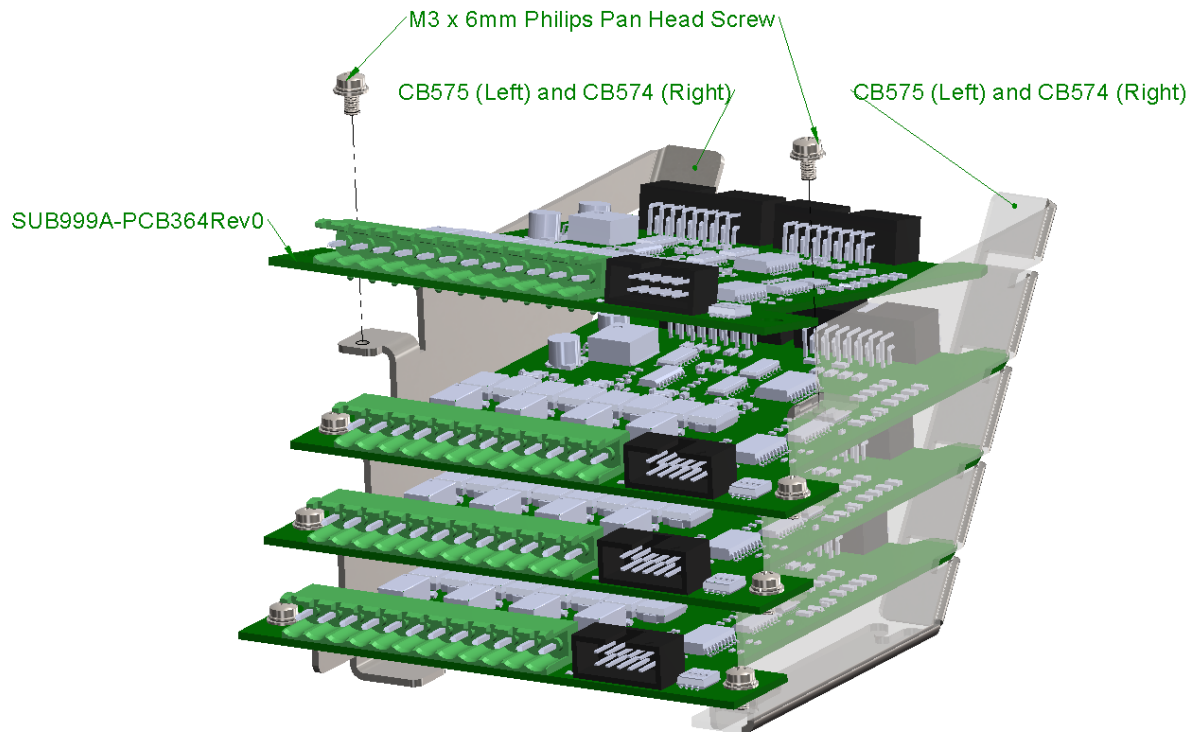


Figure 6 SUB999 fitted into Mounting Brackets CB575 & CB574

Table 6 SUB999 OVS 4 Zone Splitter Board Status Indications

Designator	Label	Colour	Active conditions
LED 1	ZONE STATUS	Yellow	<b>Steady:</b> Zone 1, 2, 3 and/or 4 active, tone / message or PA <b>Flashing:</b> Speaker zone 1, 2, 3 and/or wiring fault
LED 2			
LED 3			
LED 4			

<sup>13</sup> Space in the standard BOWS20W, BOWS60W or BOWS120W is not available for these options

Table 7 I/Os on SUB999

Designator	Connector Type	No.	Label	Pin Markings	Description/Specifications
J1	IDC header, 2X8, Right Angle	N/A	SERIAL IN	N/A	PA Expansion Interface. Connected to the Main Control Board (SUB860) or the preceding SUB999 board.
J2	IDC header, 2X8 Right Angle	N/A	SERIAL OUT	N/A	PA Expansion Interface. Connected to the next SUB999 board.
TB1	Screw terminals	1	IN/OUT	+	Audio source input from the Main Control Board (SUB860) or the preceding SUB999 board.
		2		-	
		3	ZONE OUTPUT	+	Speaker Zone 1 output.
		4		-	$\leq 100V_{rms}, \leq 2A,$ Max. $60W_{MAX}$
		5		+	Speaker Zone 2 output.
		6		-	$\leq 100V_{rms}, \leq 2A,$ Max. $60W_{MAX}$
		7		+	Speaker Zone 3 output.
		8		-	$\leq 100V_{rms}, \leq 2A,$ Max. $60W_{MAX}$
		9		+	Speaker Zone 4 output.
		10		-	$\leq 100V_{rms}, \leq 2A,$ Max. $60W_{MAX}$
		11	OUT/IN	+	Audio source output to the next 4 zone splitter board.
		12		-	
J8	IDC header, 2X5, Right Angle	N/A	DISPLAY	N/A	PA 8 Zone Expansion Display Board

### 3.5 Audio Amplifiers

Brooks OVS has a wide range of class-D audio amplifiers. The standard standalone OVS enclosure can be fitted with 20W, 60W or 120W with 2x12V / 7AH or 2x12V / 12AH sealed lead acid batteries. Larger amplifiers e.g. 250W or larger batteries require different size enclosure or additional standalone enclosure fitted underneath.

Four audio amplifiers available:

1. SUB864 20 Watt audio amplifier with built in transformer.
2. SUB865 60 Watt audio amplifier
3. SUB866 120 Watt audio amplifier
4. SUB867 250 Watt audio amplifier
5. 2 x SUB867 250 Watt audio amplifier to provide 500 Watt

### 3.5.1 Amplifiers Specifications

The specifications of Brooks class “D” amplifiers are shown in Table 8

Table 8 Audio Amplifiers Specifications

Function	20W version	60W version	120W version	250W version
Voltage input range	20 to 32Vdc	20 to 32Vdc	20 to 32Vdc	20 to 32Vdc
Fuse	1.5A Glass fuse	5A Blade fuse	7.5A Blade fuse	15A Blade fuse
Low voltage shutdown	13.5V (approx.)	15V (approx.)	15V (approx.)	19V (approx.)
Audio input impedance	10kΩ	10kΩ	10kΩ	10kΩ
Output load	4Ω	4Ω	2Ω	1Ω
Current draw – quiescent (standby on)	28mA	40mA	40mA	40mA
Current draw – full load @ 27V	1.1A	2.8A	5.2A	10A
Audio input level	<= 1V RMS	<= 1V RMS	<= 1V RMS	<= 1V RMS

### 3.5.2 20 Watt Amplifier Module

#### Features:

- High energy efficient class D amplifier design.
- Built in 100V output transformer
- Standby function to reduce power consumption.
- Designed to mount on top of main control OVS module to save space.

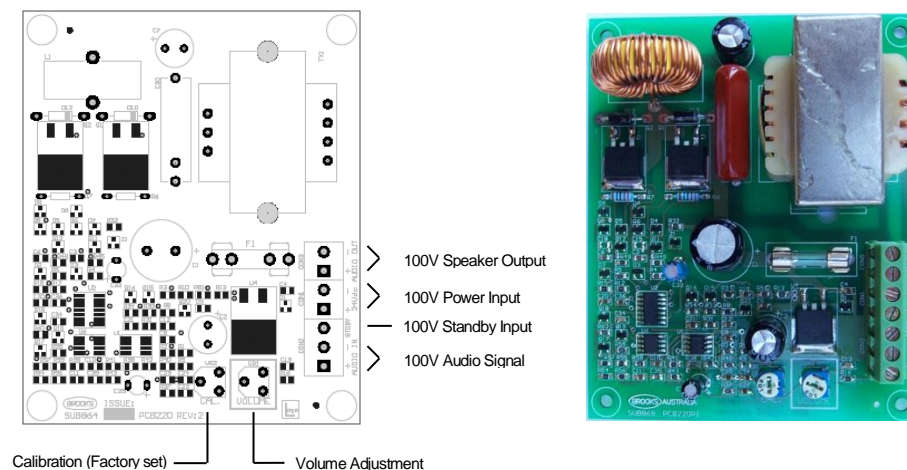


Figure 7 Class-D 20W Audio Amplifier Board Layouts

### 3.5.3 60/120 Watt Amplifier Module

#### Features:

- High energy efficiency class D amplifier design.
- Available in 60W or 120W configuration.
- Standby function to reduce power consumption.
- Designed to mount on top of main control OVS module to save space.

The 60W version is shown in Figure 8 below and 120W is shown in Figure 9 page 16.



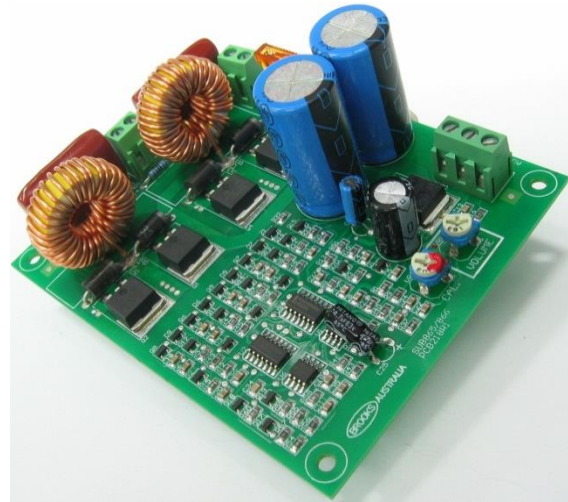
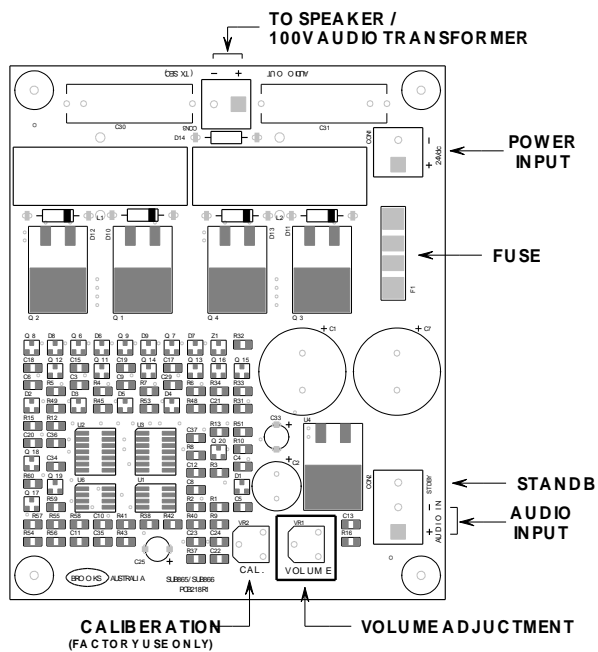


Figure 8 Class-D 60W Audio Amplifier Board

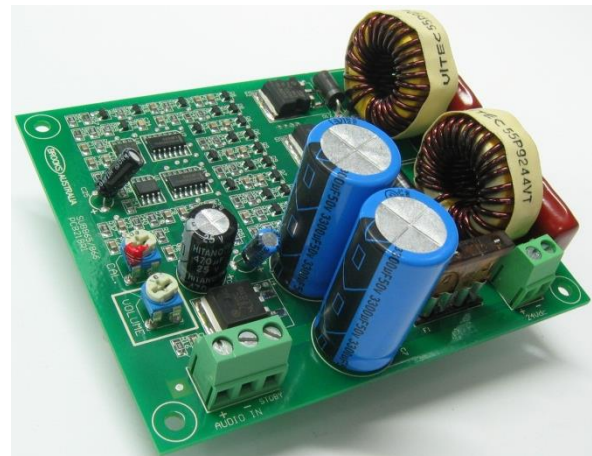
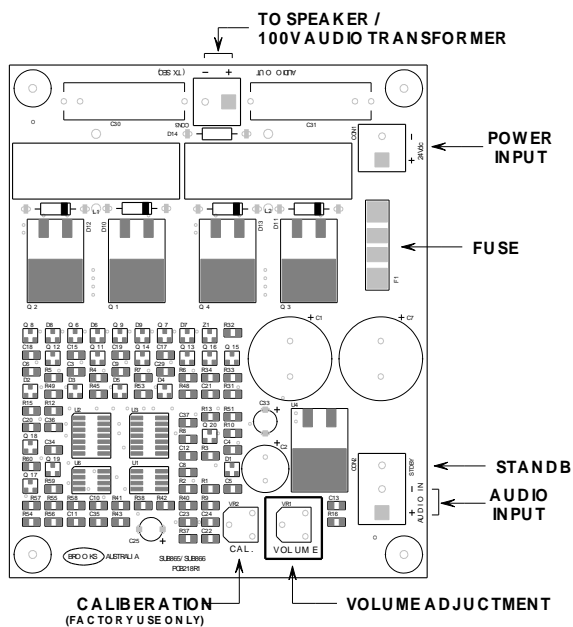


Figure 9 Class-D 120W Audio Amplifier board

### 3.5.4 250 Watt Amplifier Module

- High energy efficiency class D amplifier design.
- Low voltage protection.
- Over current protection
- Standby function to reduce power consumption.

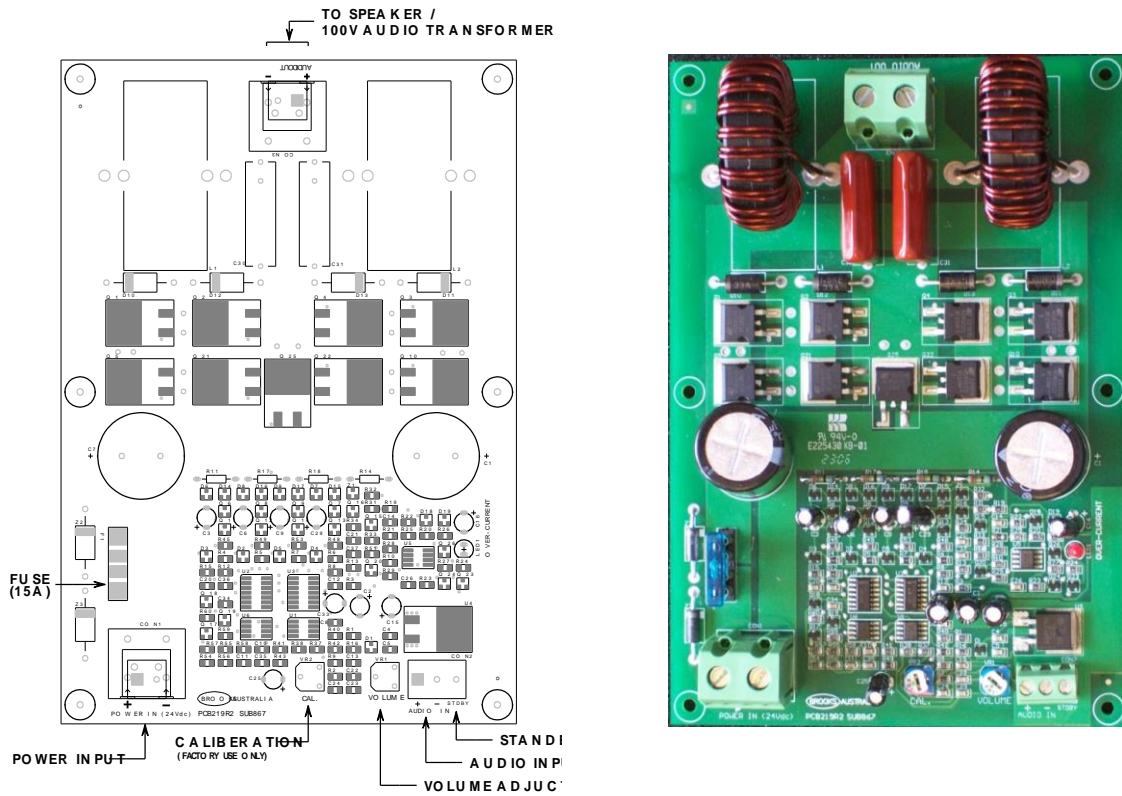


Figure 10 Class-D 250W Audio Amplifier Board Layouts

Table 9 Connection of the Audio Amplifier 20W, 60W, 120W and 250W

Designator	Type	No.	Label	Pin	Description
CON1	Screw terminals	1	24Vdc	+	24Vdc Power input
		2		-	
CON2	Screw terminals	1	AUDIO IN	+	Audio input from the main control board.
		2		-	
		3		STDBY	Audio amplifier enable/disable input, logic 5V, <= 5mA. It is to minimize the unit power consumption. The amplifier output will be disabled when the input is high.
CON3	Screw terminals	1	AUDIO OUTPUT	+	Audio output to the transformer secondary side on the main control board. 16V RMS to the associated different transformer.
		2		-	

### 3.6 Power Supply Supervision SUB760

#### 3.6.1 General

The SUB760 power supply supervision module is designed to meet the requirement of the Australian Standard AS4428.5. The board layout and picture are shown in Figure 11

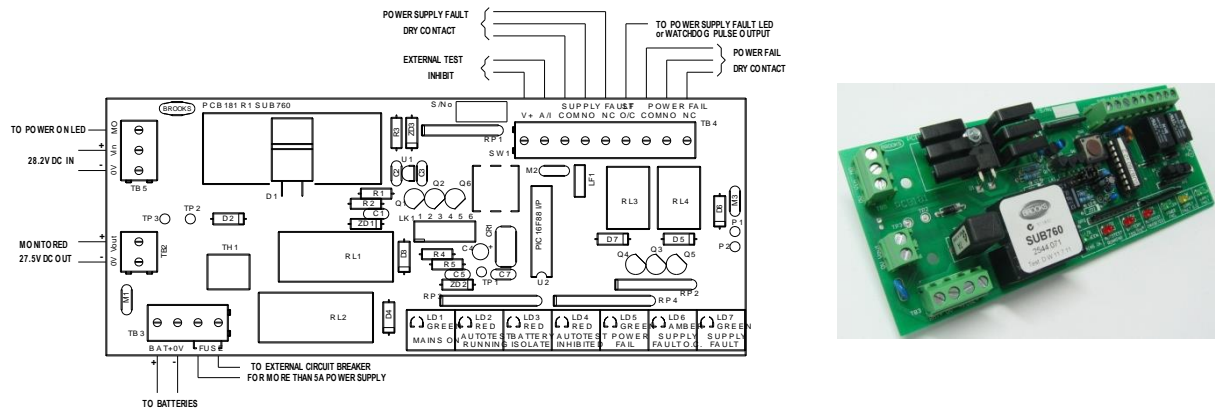


Figure 11 SUB760 Power Supply Monitoring Board

The power supply supervision module continuously monitors the battery charger and batteries to detect any of the following fault conditions:

- Loss of Mains power source,
- Loss of standby power source (batteries),
- Charger output voltage higher than 28.2V or lower than 26.5V,
- Battery capacity low i.e. battery voltage less than 23.8V
- Auto battery test fail,
- Total loss of the dual power sources, battery voltage less than 21V.

SUB760 provides an automatic battery test facility every approximately 70 hours. During the test, the DC supply input is disconnected and the system operates on batteries only for approximately 30 minutes at normal quiescent condition. If the auto battery test failed, the power supply fault LED latches and the test will be terminated, to reset the latched LED, press switch SW1.

An automatic battery test inhibit input is available to terminate the auto battery test, if required. A typical application for the battery test inhibit switch is the alarm condition. An alarm N/O contact can be connected to the input to inhibit the auto battery test in alarm condition, this is normally used when the OWS is fitted inside the CIE.

The on-board jumper link LK1 is set as shown in Table 10. Due to different requirements in both AS4428.5 and NZS4512, LK1.3 must be fitted when the power supply supervision module is to be used in any system for the New Zealand market.

Table 10 Power Supply Supervision Jumper Link Setting

Jumper	Function	Position	Selection
LK1.1	Mode of Operation	IN	Test Mode (factory only)
		OUT	Normal Mode (default)
LK1.2	Not Installed		
LK1.3	Mode of Operation	IN	New Zealand
		OUT	Australia (default)
LK1.4	Not Installed		
LK1.5	Charger Fault Tolerance	IN	3%
		OUT	2% (default)
LK1.6	Not used		

### 3.6.2 Connections

Table 11 Connections of the Power Supply Supervision Module

Designator	Type	No.	Label	Pin	Description
TB2	Screw terminals	1		Vout	27.5 V DC +/- 2% to provide power to OVS
		2		0V	
TB3	Screw terminals	1		BAT+	Connect to the batteries.
		2		0V	
		3	FUSE		Parallel to the built-in 7A circuit breaker. Connect to an additional circuit breaker when the current exceeds 7A.
		4			
TB5	Screw terminals	1		ON	Power ON indicator.
		2		Vin	DC power input, Connect to DC output of the AC/DC power supply, set to 28.2V +/- 2%.
		3		0V	
TB4	Screw terminals	1		V+	External automatic battery test inhibit input. Disable the automatic battery test when two pins are shorted.
		2		A/I	
		3	Supply Fault	COM	PSU fault changeover relay contact, 5A @ 30V. Normally energised relay
		4		NO	
		5		NC	
		6	S/F	O/C	Transistor open collector PSU fault output. Connected to display board SUB925 to provide Power ON indication.
		7	Power Fail	COM	PSU Power fail changeover relay contact, 5A @ 30V. Normally energised relay
		8		NO	
		9		NC	

### 3.6.3 On-Board LED indications

Table 12 LED Indicators on the Power Supply Supervision Board

Designator	Label	Colour	Active conditions	Normal Condition
LD1	MAINS ON	Green	Mains power input is normal.	On
LD2	AUTOTEST RUNNING	Red	Automatic battery test is running.	OFF
LD3	BATTERY ISOLATE	Red	Batteries have been disconnected from the system.	OFF
LD4	AUTOTEST INHIBITED	Red	Automatic battery test is inhibited.	Off
LD5	POWER FAIL	Green	System is not in Power Fail conditions.	On
LD6	SUPPLY FAULT O.C.	Yellow	One or more power supply faults have been detected.	Off
LD7	SUPPLY FAULT	Green	No power supply fault has been detected.	On

### 3.6.4 Battery Calculations

Brooks BOWS020W, BOWS060W and BOWS120W are fitted with 150 Watt switch mode power supply (BOWS020W can be fitted with 70W or 50W), batteries may vary. The battery capacity is determined by the following:

- Standby time, the system in quiescent condition and running on batteries only.
- Activation time, system in active condition and running on batteries only.
- Maximum speaker load.
- Size of audio amplifier in system.
- The quiescent and activation current consumptions of individual system components.

The OVS quiescent current, full load current and the recommended batteries for each system are shown in Table 13 below. For more details, refer to the OVS power supply and battery calculation spread sheet.

Table 13 Current consumption of OVS components

Module	Quiescent Current in mA <sup>14</sup>		Full Load Current	Battery <sup>15</sup> Capacity	Notes
	Standby	BGM Enabled			
20 Watt OVS	106	154	1.1 A	3 AH	7 AH can be used
60 Watt OVS	118	183	2.8 A	4.5 AH	7 AH can be used
120 Watt OVS	119	239	5.2 A	7 AH	
250 Watt OVS	119	240	10 A	12 AH	Requires larger box
OVS 4 Zone Splitter Board	35 (all OFF)	150 (all ON)			
1 Zone Desktop Mic	9		40		
8 Zone Desktop Mic	20		100		All LEDs On

### 3.6.5 Fuses

The system fuses are listed in Table 14.

Table 14 Fuse Specifications

Board	Designator	Circuit Protected	Specification
Main Control Board	F1	Power Input	M205, glass sealed, fast blow 1A.
	F2	Strobe output	M205, glass sealed, fast blow 1A.
20W Audio Amplifier	F1	Power Input	Glass fuse 32VDC , 1.5A
60W Audio Amplifier	F1	Power Input	ATO blade fuse 32VDC , 5A
120W Audio Amplifier	F1	Power Input	ATO blade fuse 32VDC , 7A
250W Audio Amplifier	F1	Power Input	ATO blade fuse 32VDC , 15A
Remote Desktop microphone	F1	Power input	M205, glass sealed, fast blow 1A in-line fuse inside the control panel.
In-line battery fuse	TH1	Battery	Thermal circuit breaker, 7A.
	FUSE	Battery	Dependent on Amplifier size.

<sup>14</sup> Current calculated at 27V supply.

<sup>15</sup> Battery capacity calculated with BGM disabled, if enabled, larger batteries should be used. Calculation is based on 24 hours in quiescent and 30 minutes alarm conditions (activation).



## 3.7 Configurations

### 3.7.1 DIP switch settings

The DIP switch on the OWS main control board (SUB860) is used to configure the system for different applications. The default switch settings are all OFF. This DIP switch needs to be correctly set as shown in Table 15 below, to meet the application requirements.

Table 15 DIP Switch Settings

Function	Status		Descriptions
	S1	S2	
Time delay between Alert/Voice and Evac/Voice in auto mode	OFF	OFF	Evacuation tone / voice messages only <b>(no delay)</b> .
	ON	OFF	<b>One</b> minute delay between alert tone/voice and Evac tone/voice message.
	OFF	ON	<b>Three</b> minutes delay between alert tone/voice and Evac tone/voice message.
	ON	ON	<b>Five</b> minutes delay between alert tone/voice and Evac tone/voice message.
Enable/disable voice with Alert	S3	ON	Voice message <b>enabled</b> with alert tone.
		OFF	Voice message <b>disabled</b> with alert tone.
Enable/disable voice with Evac	S4	ON	Voice message <b>enabled</b> with evacuation tone.
		OFF	Voice message <b>disabled</b> with evacuation tone.
Trigger input Latch/non-latch	S5	ON	Trigger input is latching. Must be disabled in manual mode
		OFF	Trigger input is non-latching, follows the trigger input in auto mode
AU / NZ Convention configuration	S6	ON	New Zealand convention, tones / messages comply with the AS2220.1 and the NZS4512.
		OFF	Australian convention, T3 tone / message comply with the ISO7731, ISO8201 and AS1670.4.

### 3.7.2 RS232 and RS485 selection

The OWS main control board supports serial communication, the signal level can be configured to either RS232 or RS485 via jumper JP2 on the main control board. To download the audio sound file from a PC, the jumper needs to be set to the RS232. To support remote desktop microphones, the jumper needs to be set to the RS485 level.

- Jumper 1-2 installed for RS232 option,
- Jumper 2-3 installed for RS485 option.

### 3.7.3 Voice message programming

The alert and evacuation tones are digitally generated in the firmware. The alert and evacuation voice messages are pre-recorded and stored in a flash memory. The flash memory size is 524288 bytes which can provide up to 30 seconds of voice message at sample rate 22.05 KHz. The digital sound is in 8-bit resolution PCM format.

The digital sound files used in the OWS can be created using PC software such as the Sound Recorder provided by Microsoft Windows as an accessory software. The sound files then can be uploaded from a PC via RS232 connection to CON12 on the OWS main control board. If special tones or messages are required, please contact Brooks office to organise the engineering department to upload the required files into the main OWS control board.

## 4 INSTALLATION AND COMMISSIONING

The installation and commissioning of Brooks OVS must follow all the relevant standard requirements, such as AS1670.1, AS3000 and AS/NZS3100, and the additional requirements below.

### 4.1 Battery Check

Check the battery voltage before connecting the batteries. The voltage of each battery should be measured using a certified and calibrated multimeter.

If the battery voltage of the cell is less than 10.7V, the battery should be replaced since it could have been deeply discharged or outside its functional life span.

### 4.2 AC/DC Power Supply Adjustment

Check the voltage across the two battery leads after turning the mains power ON.

If the voltage is out of the specified range of the battery manufacturer 27.0V – 27.6 V, adjust the trimpot of the AC/DC power supply slightly until the voltage is approximately 27.5V (Turn anticlockwise to increase voltage).

### 4.3 Sound Pressure Level (SPL) Adjustment

The audio volume shall be adjusted to ensure that the required sound pressure level is met. The sound pressure level should be measured by a certified and calibrated sounder pressure level meter which meet the requirements of the related standards, such as ISO7731.

**Note:** *selection of suitable speakers and spacing between them will also help to achieve the required sound pressure level.*

The OVS utilises a trimpot on the main control board and another one in each amplifier to adjust the sound level. To adjust the sound level, tune the trimpots first then measure the sound level according to the related standards.

**Please note that the warning sound level must be adjusted first.**

Table 16 Sound Volume Adjustment

Sound	Board	Trimpot	Sound Activation
Warning sound	Audio Amplifiers	VR1, Volume	Enter the manual mode, Press the evacuation key
Local microphone PA	Main control board	VR1, MIC GAIN	Enter the manual mode, Press the PA key Press and hold the PTT button Speak to the built-in microphone or the hand-held microphone if any.
Auxiliary audio	Main control board	VR2, AUX GAIN	Enter Auto mode and confirm the system is in quiescent conditions. Connect the sound source, such as an mp3 or CD player. Keep the auxiliary enable input active.
Remote desktop microphone	Remote desktop microphone board	Refer to the remote desktop microphone technical datasheet.	
Remote desktop microphone background music	Remote desktop microphone board	Refer to the remote desktop microphone technical datasheet.	

## 5 BLOCK Wiring Diagrams

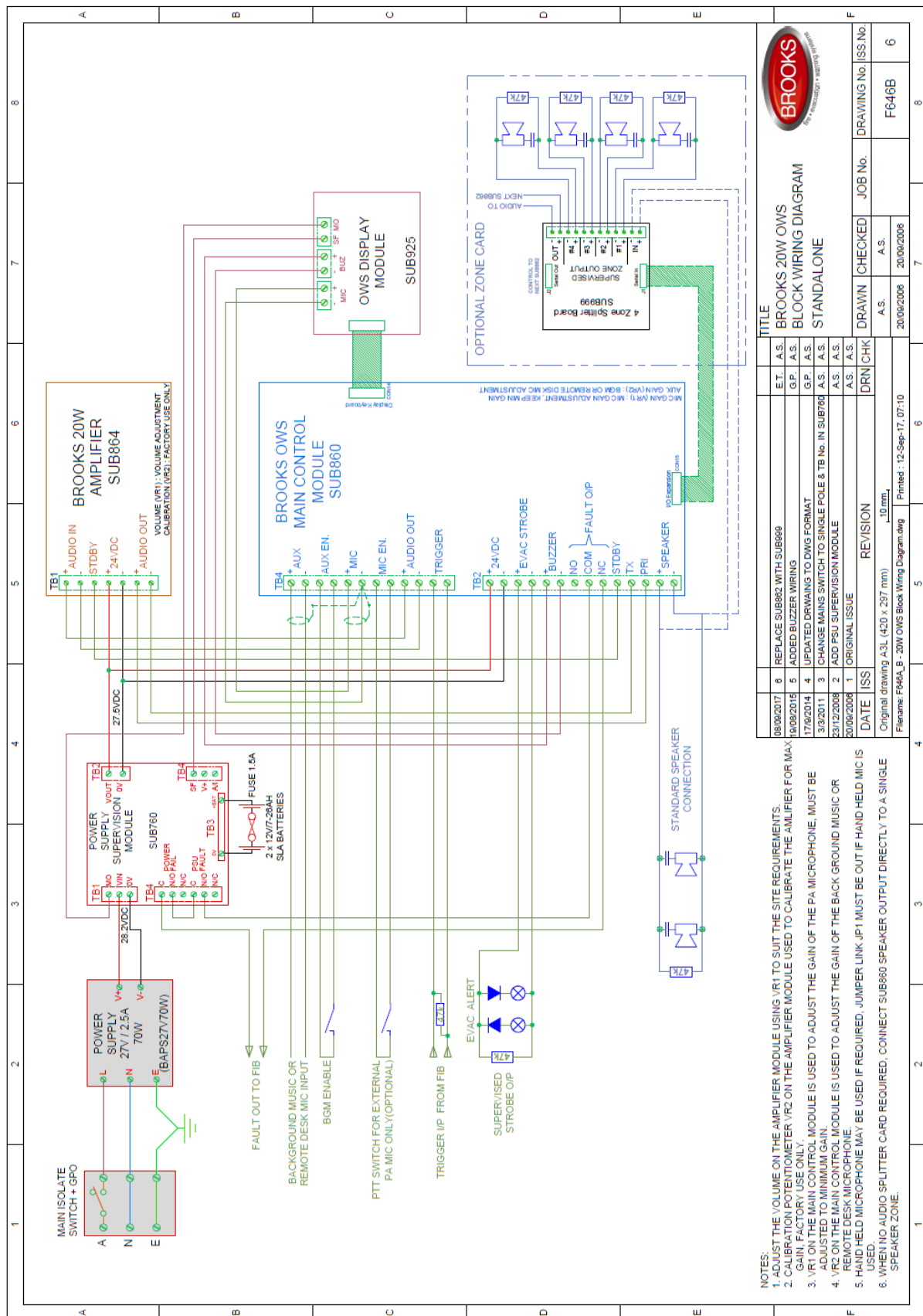


Figure 12 F646B Iss6- Standalone 20W OWS



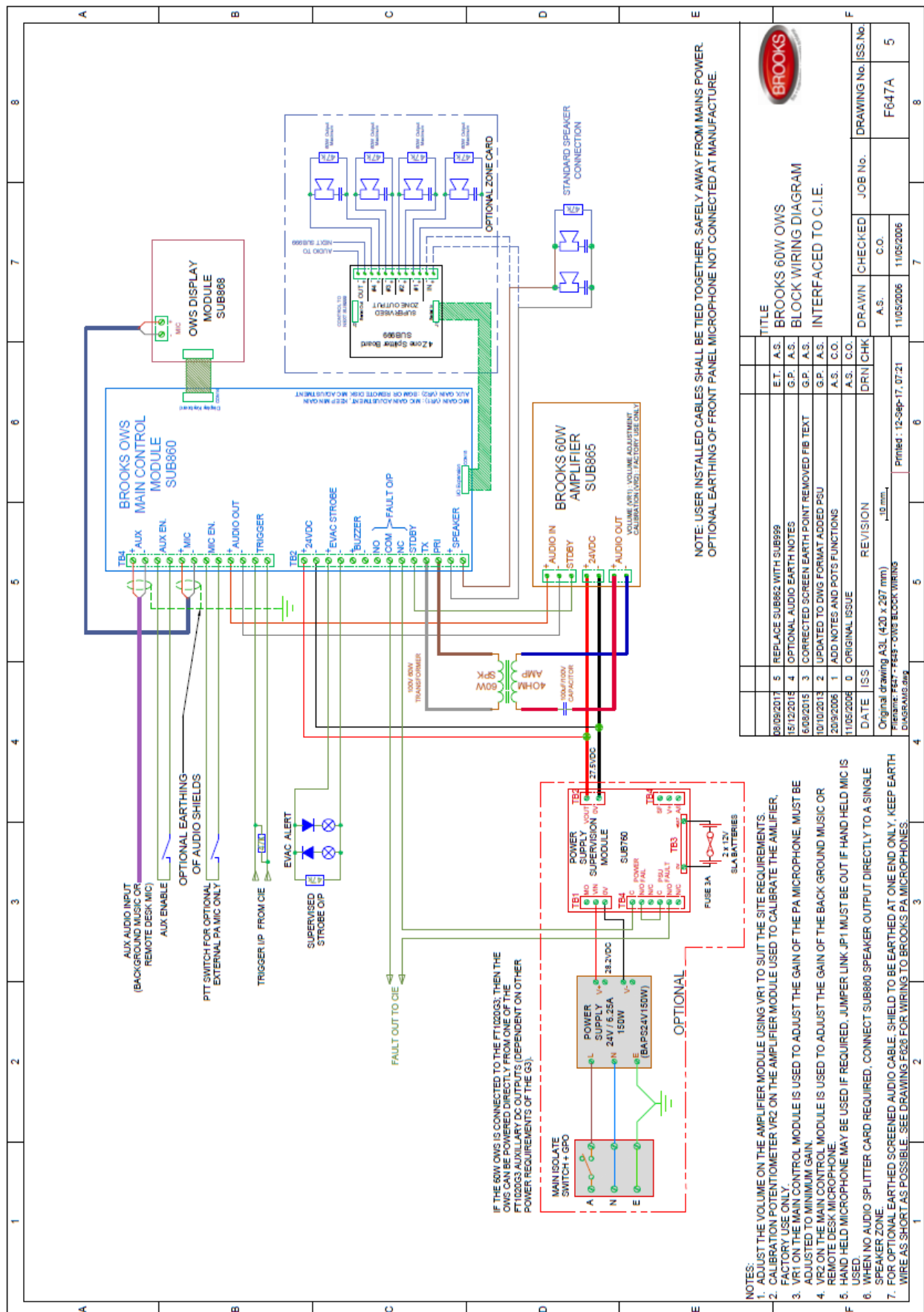


Figure 13 F647A Iss5 - OWS 60W Interfaced to CIE

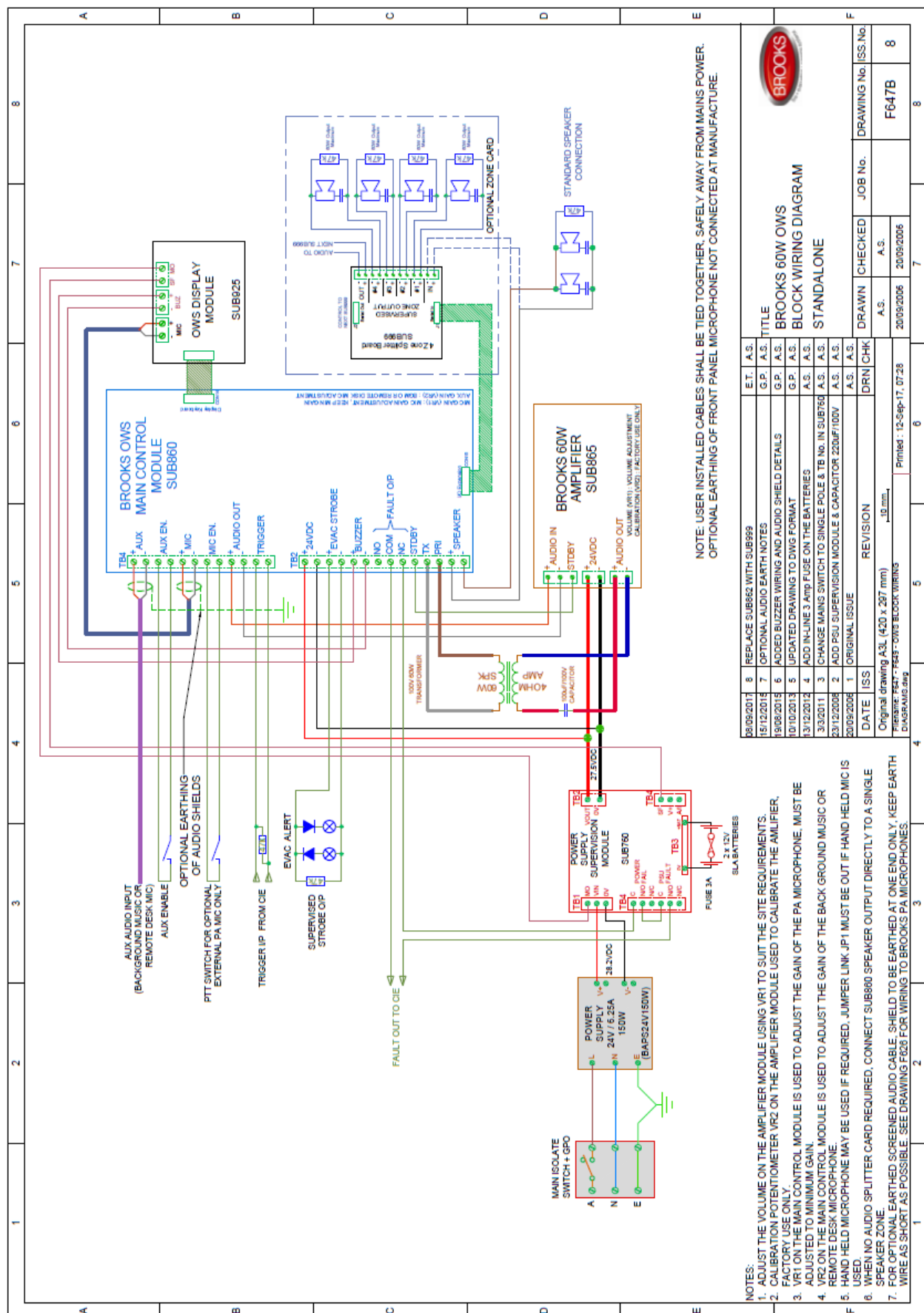


Figure 14 F647B Iss8 - OWS 60W Standalone

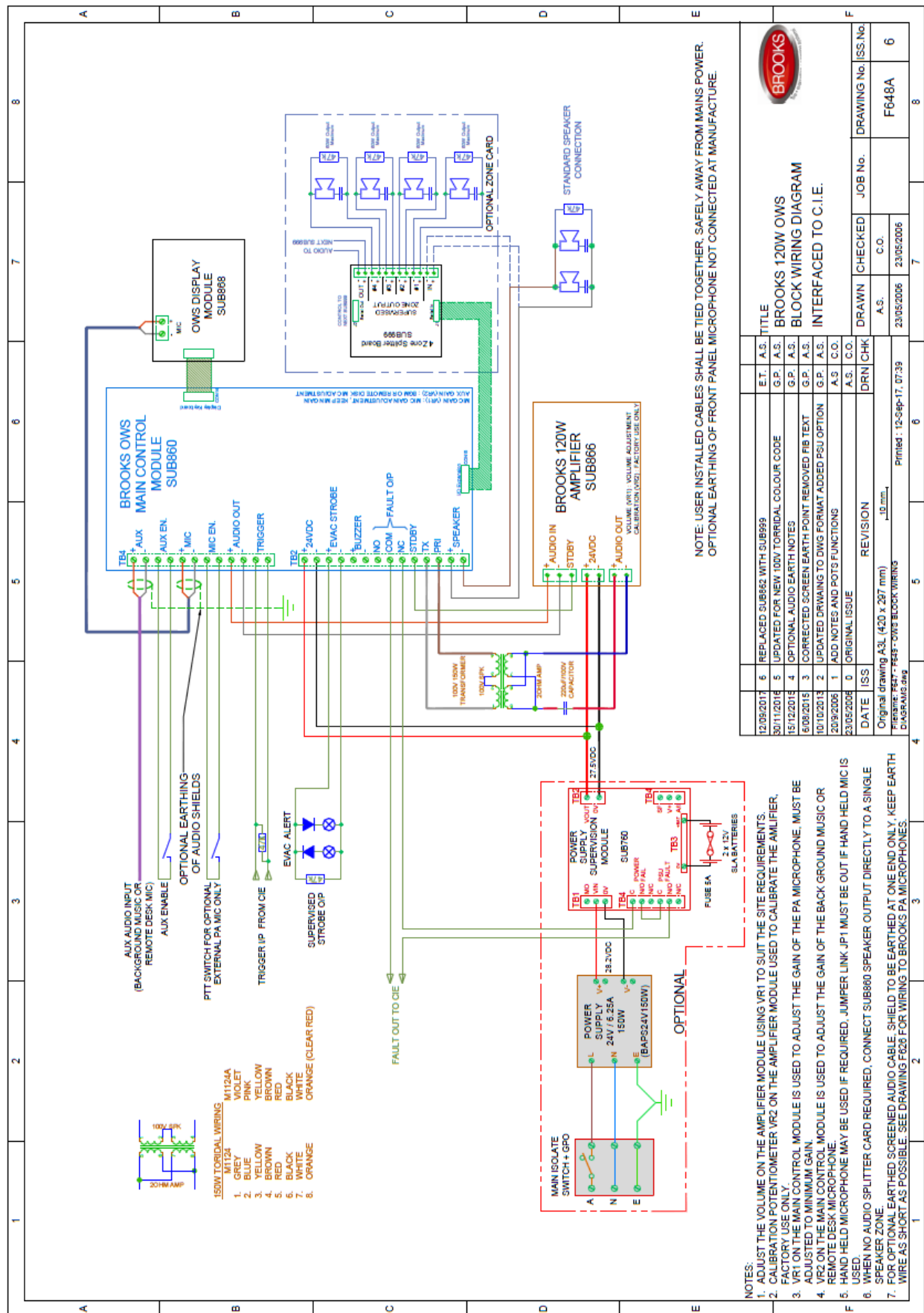


Figure 15 F648A Iss6 - OWS 120W Interfaced to CIE

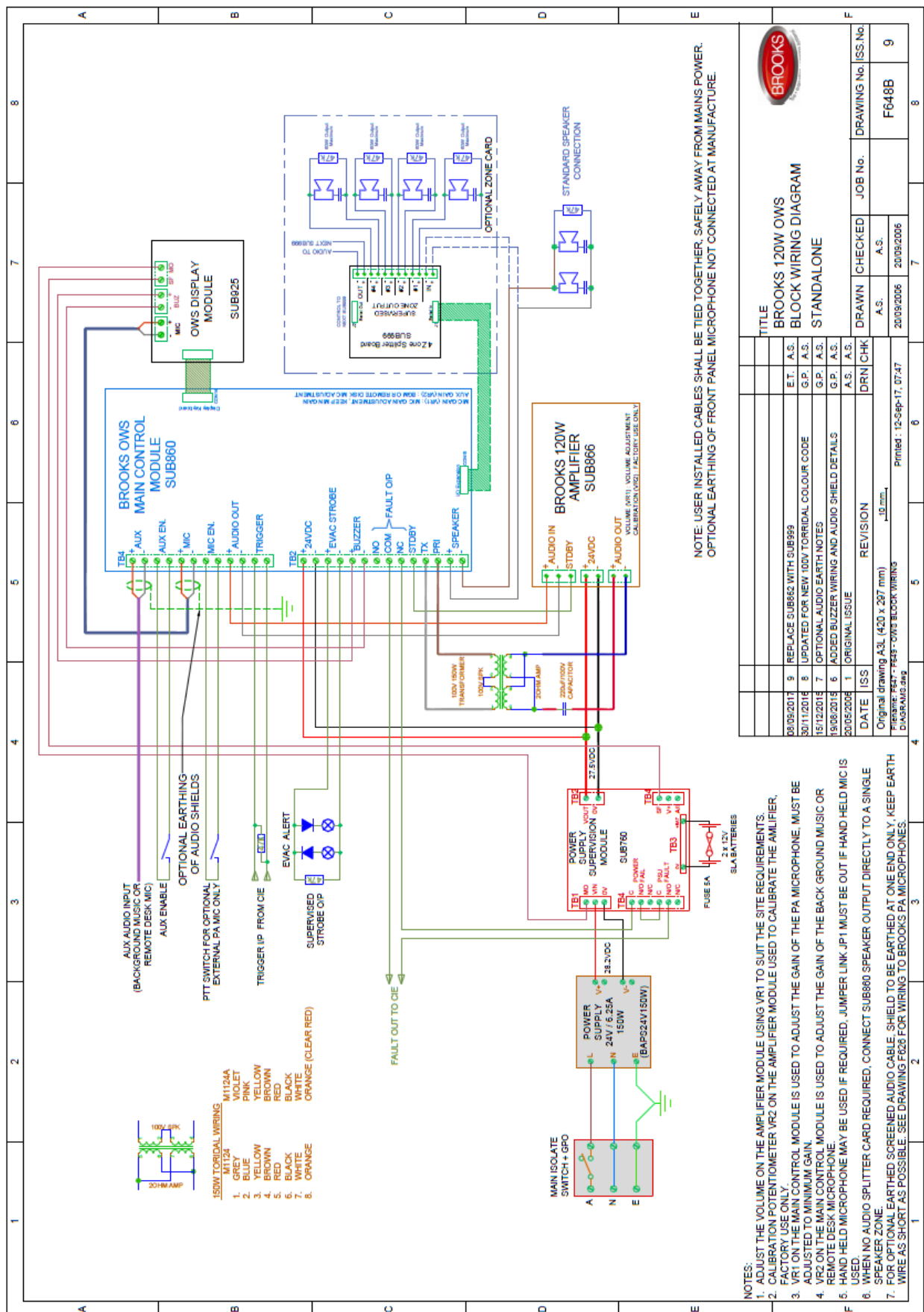


Figure 16 F648B Iss9 - OWS 120W Standalone

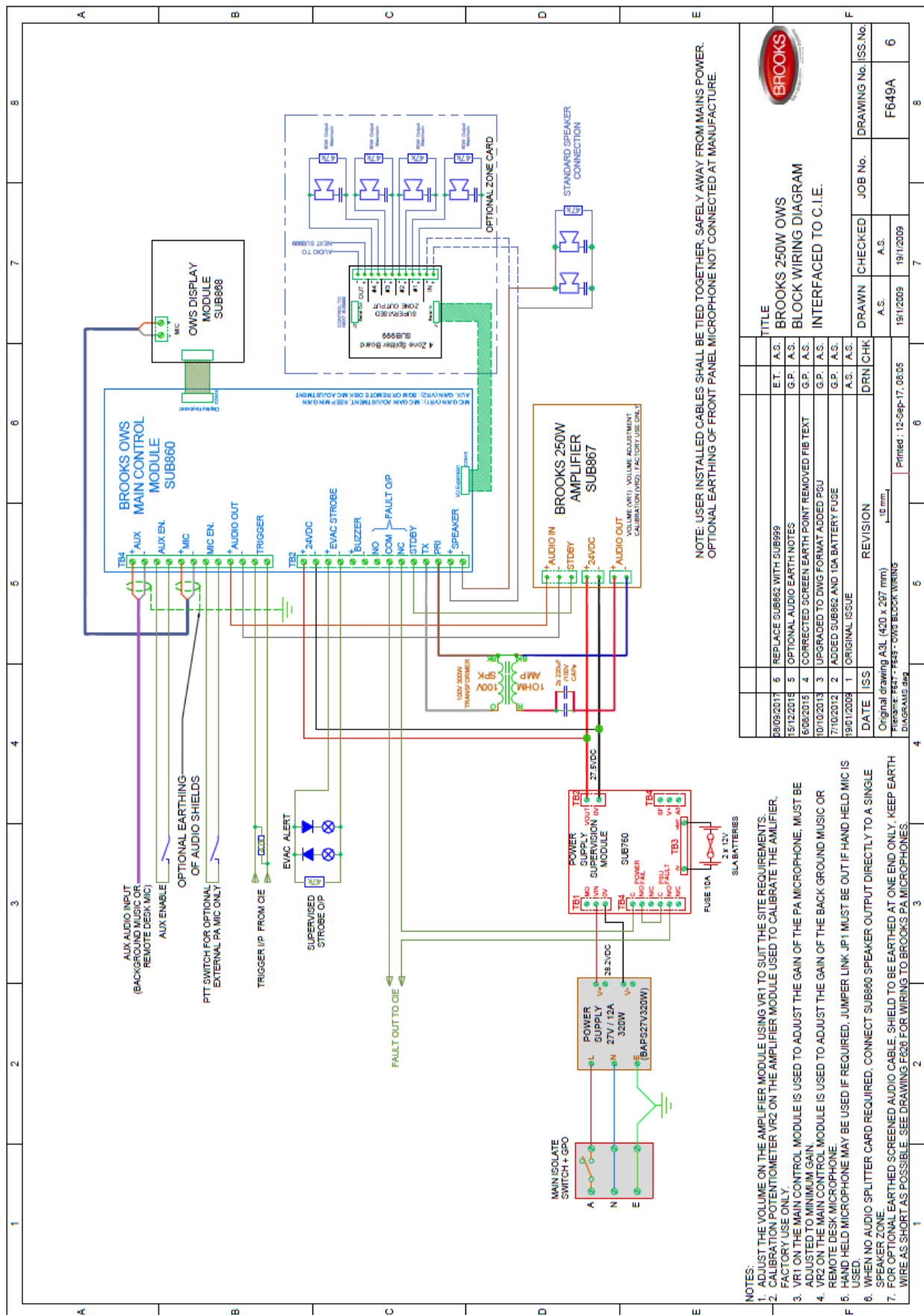
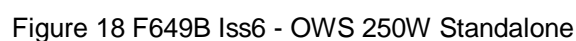


Figure 17 F649A Iss6 - OWS 250W Interfaced to CIE





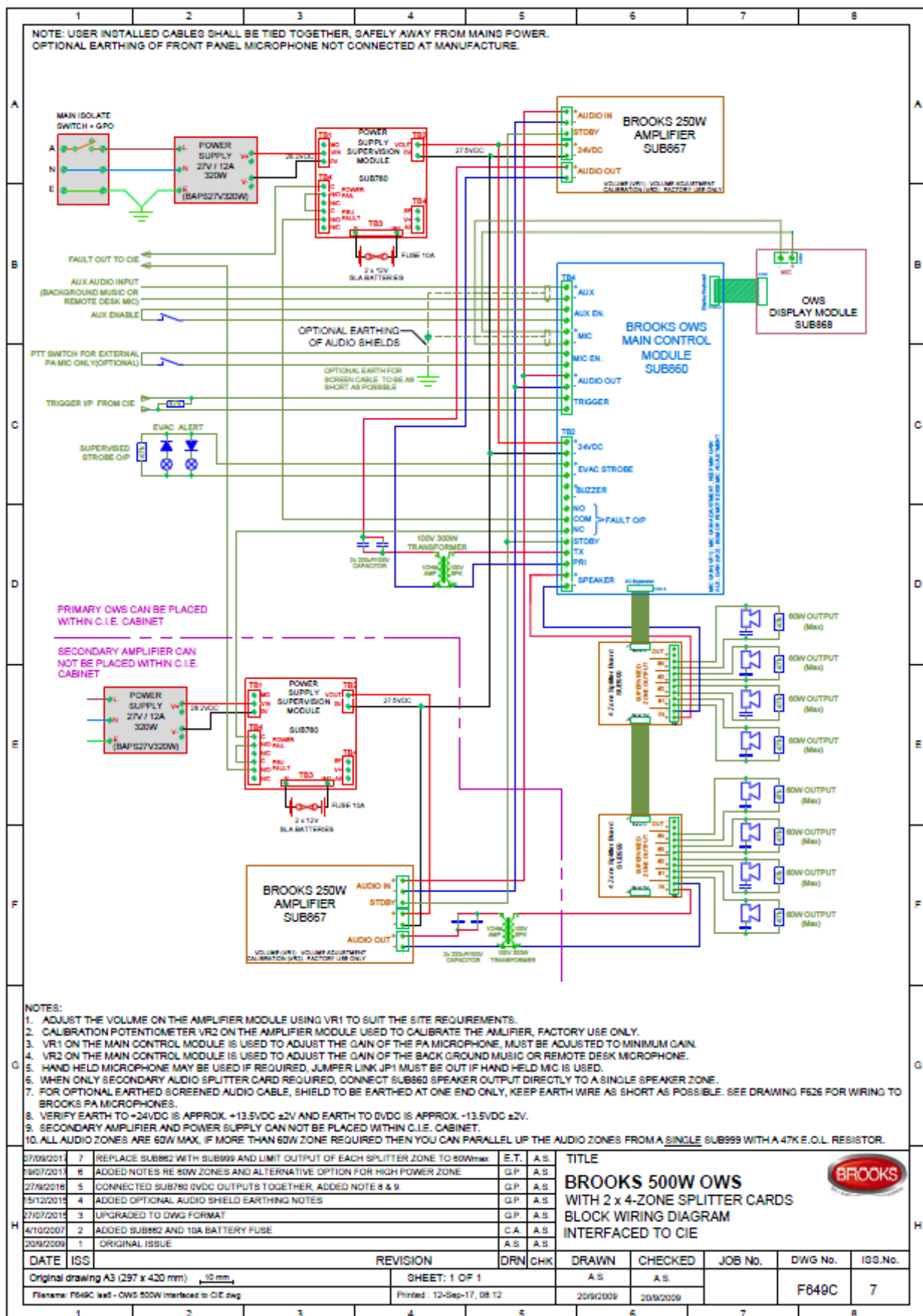


Figure 19 F649C Iss7 - OWS 500W Interfaced to CIE

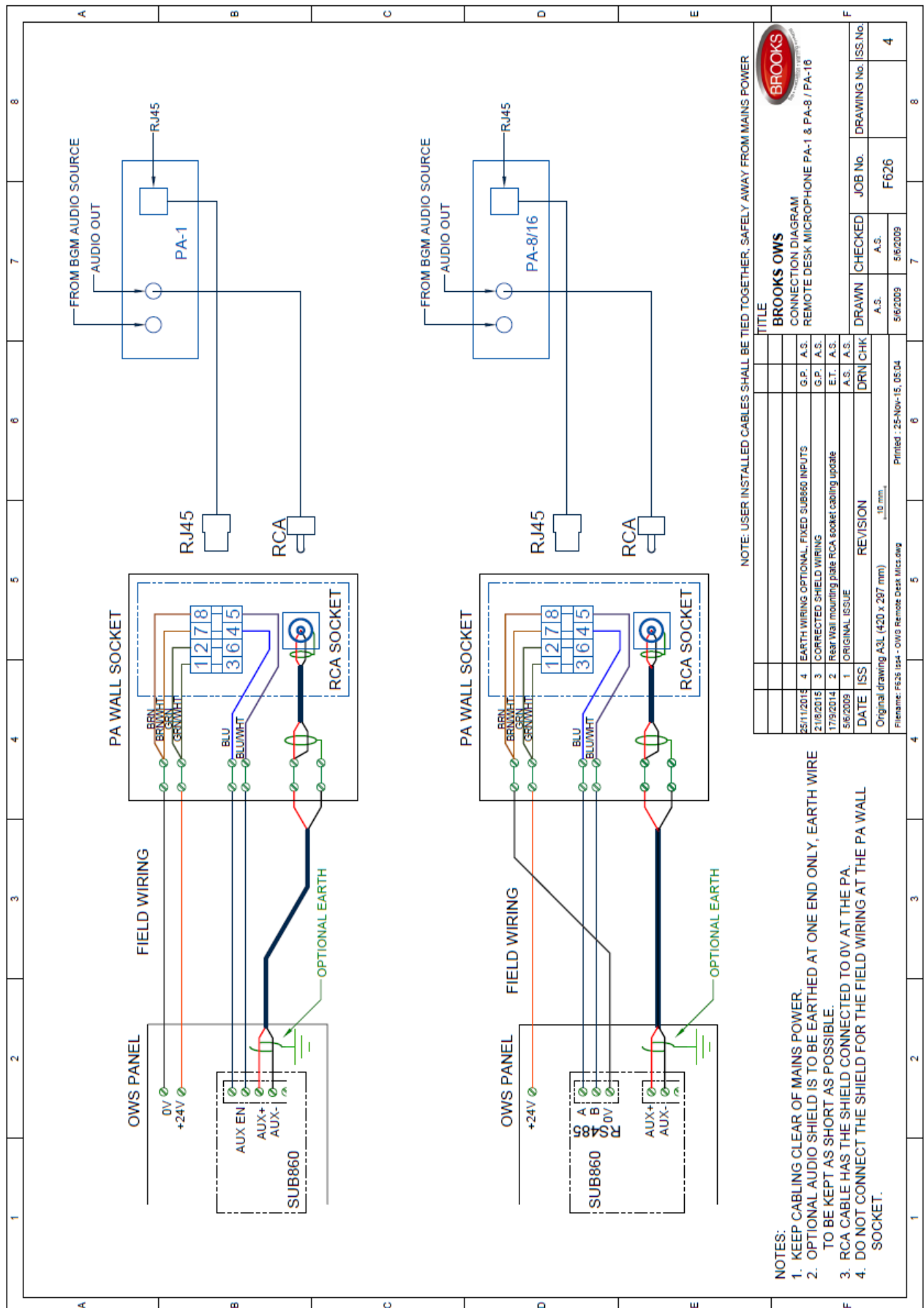


Figure 20 Remote Desktop Microphone PA-1, PA-8 and PA-16 F626 Issue 4





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