



VIGIL3 Voice Alarm

Overview, Architecture and Configuration



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Wealden Industrial Estate
Farningham Road
Crowborough
East Sussex
TN6 2JR
UK

Telephone: +44 (0)1892 664422

Email: hello@baldwinboxall.co.uk

Website: <http://www.baldwinboxall.co.uk>



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Failure to use the equipment in the manner described in the product literature will invalidate the conformity.

A “Declaration of Conformity” statement and a “Declaration of Performance” is available on request.

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AMENDMENT RECORD

Change Note Number	Nature of Amendment	Date of Amendment
N/A	Initial release: Issue 1	Feb 2020
ECR4494	Issue 2: Correct OSI and OS2 max distances	Dec 2021

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If Functional Testing, Maintenance, or Repair is to be completed with the Mains Power (and/or battery backup) connected then this should only be undertaken by personnel who are fully aware of the danger involved and who have taken adequate precautions and training.


This Manual contains Warnings, Cautions and Notes.

Warnings describe potential threats to health or life, e.g.

	<p>WARNING</p> <p>Before attempting to remove this component, ensure the Mains Power Supply and Battery Backup have been disconnected.</p>
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Cautions describe potential threats to the equipment, e.g.

	<p>CAUTION</p> <p>Notice must be taken of all cautions. If a Caution is ignored the equipment may be damaged.</p>
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Notes are statements that are useful to the user in the context of a particular section of the manual, e.g.



NOTE: Do not speak into the microphone until the "Speak Now" LED is illuminated.

COMMENTS

Comments regarding the content of this manual are welcome and should be addressed to hello@baldwinboxall.co.uk.

I Introduction

I.1 SCOPE

This document is an overview of a VIGIL3 EN54 Approved Voice Alarm System.

I.2 VIGIL3 VOICE ALARM FEATURES

The Vigil Voice Alarm System offers the following features;

- Up to 800 audio outputs
- Up to 400 audio inputs
- Up to 400 RS485 control ports
- 64 simultaneous site wide audio channels
- 254 fully monitored voice alarm messages (8GB storage in .wav format)
- Site wide configuration from a single location
- User customisable graphical touch screen control
- Rules based Cause & Effect / Phased Evacuation engine
- Fully modular and expandable
- Built in fault tolerant networking

- Up to 24 band parametric equalisation
- Up to 1s audio delay

1.3 VIGIL3 VOICE ALARM DESCRIPTION

The VIGIL3 Voice Alarm range consists of a family modules that when combined form a complete Voice Alarm and Public Address System.

The following VIGIL3 modules are available;

- Amplifiers
 - BV75D - 2 x 75W Amplifier Blocks
 - BV150D - 2 x 150W Amplifier Blocks
 - BV300D - 2 x 300W Amplifier Blocks
 - BV75Q - 4 x 75W Amplifier Blocks
 - BV150Q - 4 x 150W Amplifier Blocks
- Battery Charger
 - BVMBC - 10A battery charger
- Audio Routing
 - BV3AOM8 - 8 Way Audio Output Module
 - BV3AIM2 - 2 Way Audio Input Module
 - BV3AIM4 - 4 Way Audio Input Module
- Networking
 - BV3CIF - Copper Networking Interface
 - BV3FIFM - Multimode Fibre Networking Interface
 - BV3FIFS - Singlemode Fibre Networking Interface
- Interfacing
 - BV3FPI - BV3AOM8 Fire Panel Termination Interface
 - BVRDFPI - Fire Panel Interface
 - BVRDCI - General Purpose I/O Interface
- Speaker Line Monitoring

- BVRDACO - 10 way AC line monitoring module with changeover
- BVRDNCO - 10 way AC line monitoring module
- BVRDADC - 10 way DC line monitoring module with changeover
- BV3ADIM / BV3ADIS - Up to 10 way DC line monitoring modules with changeover and A/B isolation
- BVLAM - 8 Way Impedance Line monitoring module
- Cooling and Power Distribution
 - BV3MDPEFM - Exhaust Fan Module - required for all systems using mains distribution panels below
 - BV3MDP05F - 5 way mains distribution and fans, supports up to 5 VIGIL3 amplifiers (2 x main frames)
 - BV3MDP10F - 10 way mains distribution and fans, supports up to 10 VIGIL3 amplifiers (4 x main frames)
 - BV3EFM - Single main frame standalone cooling, no power distribution
- Microphones
 - BVRDTSM - Touchscreen voice alarm control microphone
 - BVRDTSMMON - External monitor for BVRDTSM allowing user customisation of graphical interface
 - BFM401-408 - Single to 8 way Fire Microphones
 - BDM401-416 - Single to 16 way Paging Microphones



NOTE: BVRD Microphones are not supported by VIGIL3 Systems.

Please refer to the individual Hardware Installation Guides for specific information about the above modules.

2 Architecture

2.1 VIGIL3 MODULE CONNECTIONS

The VIGIL3 Voice Alarm system is completely modular in nature. Audio Input and Output modules are connected together in a large Ethernet based loop (no switches required) to form a single Voice Alarm Control and Indicating (VACIE) system.

Amplifiers are connected to the Audio Outputs of the BV3AOM8 via CAT5 patch leads and audio inputs are connected to BV3AIM2 or BV3AIM4 modules.

BV3AOM8 modules are mounted within amplifier main frames so the fault indications are visible from the front and BV3AIM2/4 modules are mounted on DIN Rail at the rear of the rack for easy site wiring termination.



NOTE: BV3AOM8 and BVMBC modules do not need to be located within the cooling air flow and can be mounted in separate mainframes to the amplifiers if required.

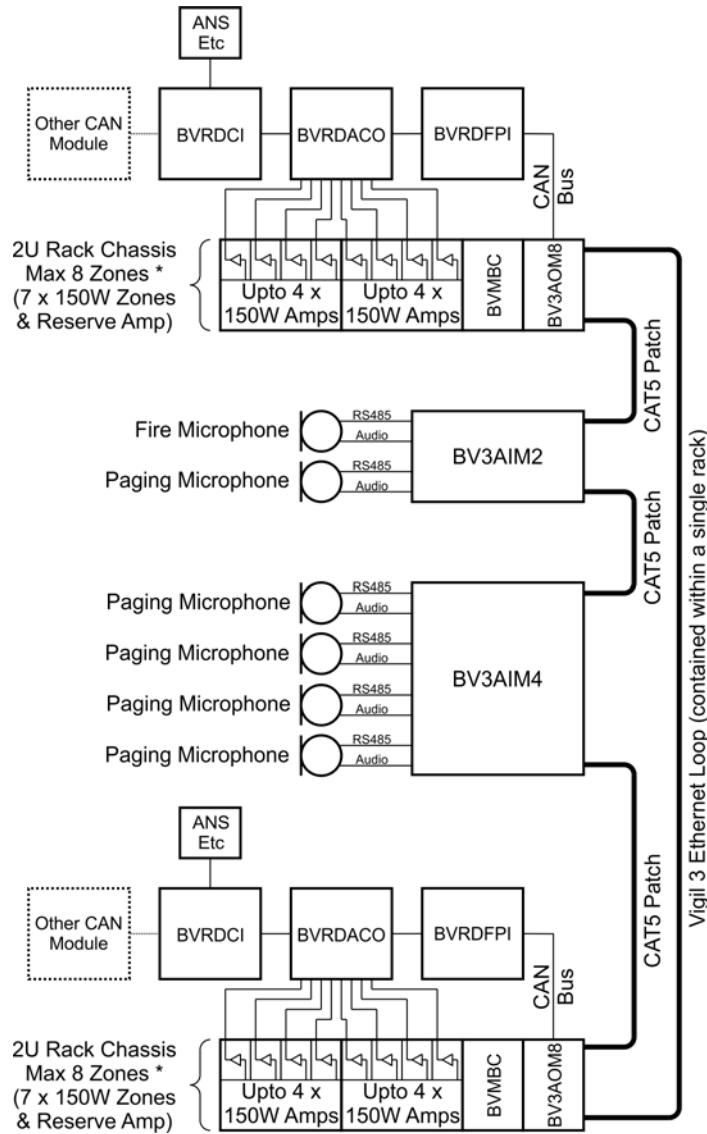
CAN Bus Modules (BVRDCI, BVRDACO, BV3MDP10F etc.) are connected in a daisy chain configuration to a BV3AOM8.



NOTE: Speaker line monitoring CAN bus modules (BVRDACO, BVRDNCO etc) must be connected to the BV3AOM8 serving those speaker circuits.

Please see a typical single rack VIGIL3 Voice Alarm System Block Diagram below.

Figure 2.1 — Typical single rack VIGIL3 system



2.2 CENTRALISED VS DISTRIBUTED / NETWORKED SYSTEMS

VIGIL3 systems can be realised as centralised (single rack) or decentralised (networked systems).

For centralised systems the Ethernet loop is completed using CAT5 patch leads. For networked systems VIGIL3 networking modules are used for rack to rack connections;

- BV3CIF - Copper connections, CAT5 fire rated connection, Max 100m
- BV3FIFM - Multimode fibre connections, Duplex SC Termination, fire rated fibre, Max 2KM
- BV3FIFS - Singlemode fibre connections, Duplex SC Termination, fire rated fibre, maximum distance for OS1 is 2KM, and for OS2 is 4KM

Please see the VIGIL3 Networking Installation Manual for more information regarding these modules.

Regardless of the type of system all VIGIL3 Audio modules are connected in a single fault tolerant Ethernet loop.



NOTE: It is important to maintain the Network Out -> Network In convention throughout a VIGIL3 system. Connecting a Network In to a Network in or a Network Out to a Network Out will result in a non-operable system.

2.3 AUDIO INPUT AND OUTPUT NUMBERING

VIGIL3 systems can be realised up to a maximum of 800 outputs and 400 inputs. Input and output numbering is dependent on the ID of the BV3AOM8 or BV3AIM2/4 module. The following tables illustrate the input and output numbering conventions used in a VIGIL3 system;

Table 2.1 — VIGIL3 Output Numbering

Unit ID	Outputs
00	1-8
01	9-16
02	17-24
	etc

Table 2.2 — VIGIL3 Input Numbering

Unit ID	Inputs
00	1-4
01	5-8
02	9-12
	etc



NOTE: VIGIL3 inputs are grouped in 4's, if BV3AIM2 modules are used some inputs will not be available e.g. BV3AIM2 (ID00) will have inputs 1&2 and BV3AIM2 (ID01) will have inputs 5&6

Please see the BV3AOM8 and BV3AIM2/4 installation manuals for details of ID setting.

2.4 MICROPHONES

VIGIL3 supports both native VIGIL3 microphones (BVRDTSM) and legacy Vigil 2 (BDM & BFM) microphones.

Each BV3AIM2/4 audio input has a corresponding RS485 control port which must be configured correctly (Protocol in use, BAUD rates etc.)

For BVRDTSM microphones the mapping of buttons on the screen to system audio outputs is performed via the BVRDTSM configuration.

For BDM/BFM microphones the mapping of button to output is performed in the VIGIL3 Configuration (BDM/BFM Access Profile). The configuration of the physical microphone is identical meaning that Vigil 2 microphones can be replaced without altering any configuration settings.

In both cases any button can correspond to any combination of outputs between 1 and 800.



NOTE: Vigil 2 16 way microphones require 2 x RS485 ports in order access all 16 buttons. Therefore a BV3AIM4 can only support 2 x Vigil 2 16 way microphones.

Please see below for a table of the required BDM/BFM Microphone configuration (stored in the BDM/BFM microphone).

Table 2.3 — Vigil 2 BDM/BFM required configuration

Config Item	Required Setting
Speak Now Delay	As required to allow chime to finish
Microphone Address	5
Audio Input Channel	Input 5a
Number of routers	1
Mic Surveillance	Mic Capsule/Audio/Data ^{*1}
Message Mode	All Call
Protocol Type	Type 3 ^{*2}
Poll Rate	1.0
Baud Rate	9600 ^{*2}
Microphone Type	As required depending on microphone type Single Zone, 4/8 Zone or 16 Zone
Repeat Transmission	2
Busy Disable (from)	10
Busy Disable (to)	11
VA Input Active	Input 1a to 2a
VA Message Active	Message 1 to 2



NOTE: ^{*1} If fault buzzer is not required the Mic Surveillance can be set to Mic Capsule/Audio/Data/No Buzzer



NOTE: ^{*2} Matching configuration must be present in the BV3AIM2/4 module.

2.5 AUDIO PRIORITIES

VIGIL3 systems support a total of 254 priorities that can be allocated to audio inputs and DVA messages. Priority 1 is the highest and 254 is the lowest. A higher priority input will override a lower priority input.

If 2 inputs with the same priority are attempted to be routed to the same output the system operates on a first come first served basis.

Each audio input has 2 priorities associated with it that correspond to key turned (Emergency Mode) or key not turned (Paging) modes.

2.6 VOICE ALARM (VA) ACTIVE INDICATION

VA Active indication is performed based on priority. Any input or message routed to any output with a Priority between 1 and 64 will cause all system VA Active indicators to illuminate.

2.7 FIRE PANEL INPUTS

Fire panel inputs in a VIGIL3 system can be connected to either BVRDFPI CAN bus Fire Panel Interface modules or to BV3FPI Fire Panel Interface Modules.

Facilities are provided for the connection of Fire Panel specific EOL resistors to enable the fire panel to monitor the connection to the VIGIL3 System.

Fire Panel inputs can be either continuous or pulsing to indicate Alert and Evacuate conditions.

2.8 CAUSE AND EFFECT RULE ENGINE

All external triggering (i.e. by a Fire Panel) of message playback or route setting is controlled by the VIGIL3 Cause and Effect engine.

The Cause and Effect engine is made up a series of configurable rules which have a “Cause” (e.g. FPI Input) and an “Effect” (e.g. Start message playback). Rules act upon Output Sets each of which can contain any combination of outputs from 1-800.

Each BV3AOM8 can manage up to;

- 200 Individual Rules
- 50 Output Sets

Rules can be triggered by;

- A message being triggered or removed from an output
- A route being triggered or removed from an output
- A BVRDCI Control Output Changing State
- A BVRDFPI or BV3FPI input
- A BVRDCI Control Input
- By a countdown timer started by another Rule
- At a specific time
 - Hourly
 - Daily
 - Weekdays only
 - Weekends only
 - Weekly
 - Monthly
 - Annually

The effect of a rule being triggered can be;

- Set a volume control
- Start or Stop a message to an Output Set
- Set a route or clear a route from an Input to an Output Set
- Set or Clear a BVRDCI Control Output
- Adjust the system time
- Start a countdown timer that then triggers another Rule on expiry

Cause and Effect rules should be created in order to push “Effects” out to other BV3AOM8 modules. This will ensure that in the event of catastrophic system failure (i.e. due to fire damage) the remaining system will continue to function as expected.

2.9 POWER DISTRIBUTION

VIGIL3 implements a propriety Power Over Ethernet (POE) mechanism in order to simplify cabling during rack design and build.

Power is carried on spare conductors of the Ethernet cable meaning that not all modules require a separate power connection.

Sources of Power In a VIGIL3 System

- A BVMBC connected to a BV3AOM8
- 24V DC connected to a BV3AIM2/4 Audio Input Module



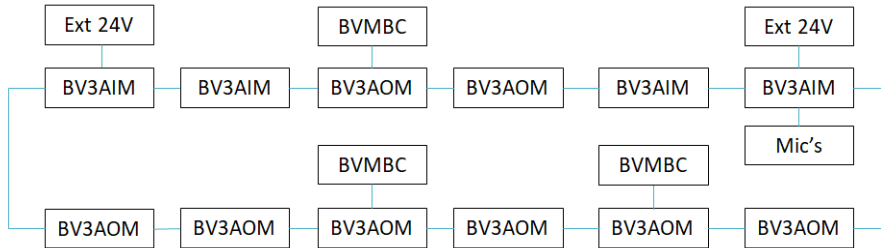
NOTE: If power consuming equipment i.e. Microphones are connected to a BV3AIM2/4 module then Power must be connected to that BV3AIM2/4 module. Site equipment cannot be powered via POE



NOTE: 24V DC can be as high as 32V when the system is connected to AC Mains and tracks the battery voltage when running on batteries

A device which is connected to Power Source can provide power to up to 2 devices on each network connection therefore as a rule of thumb there must be a power source connected as shown in the diagram below;

Figure 2.2 — VIGIL3 Power Distribution



NOTE: If a BV3AOM8 is to have a VIGIL3 fan controller connected to it via CAN Bus then this unit must also be connected to a BVMBC due to the power demands of the fans.

2.10 REAL TIME CLOCK

The VIGIL3 system has a highly accurate RTC subsystem used for Timed Cause and Effect rules and Time and Date stamping fault logs hectic.

The time is maintained by all BV3AOM8 modules and is set via the VIGIL3 Configurator Application.



NOTE: The VIGIL3 system will maintain the time and date as long as it is powered (either via mains or the backup batteries). If the system is completely powered down the time and date will need to be set again.

3 Fault Indication

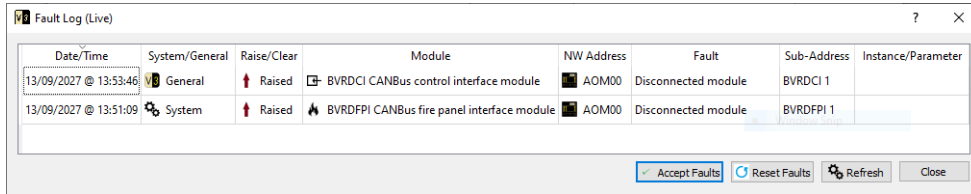
Faults in a VIGIL3 system are global, each BV3AOM8 module maintains both a fault log and a list of active faults. Assuming there are no “islanded” modules (due to 2 x network cabling failures) all fault logs / lists should be identical.

Regulatory fault indications are represented by BV3AOM8 LEDs.

Other more detailed fault information is available via VIGIL3 BVRDTSM microphones or via the V3 Configuration Software.

Faults in a VIGIL3 System are self describing and contain several elements as shown in the screen shot from the Live Faults Display in the VIGIL3 configuration software below;

Figure 3.1 — VIGIL3 Configuration Live Faults View



The elements shown are described below;

Element	Description
Date/Time	The date and time that the fault was raised
System/General	Whether the fault is a General or EN54 System Fault ^{*1}
Raise/Clear	Used when analysing fault logs
Module	The module type raising the fault
NW Address	The ID of the BV3AIM2/4 or BV3AOM8 module raising the fault. For CAN Bus faults the NW Address is the ID of the BV3AOM8 module that the CAN bus device is connected to
Fault	Self describing fault description
Sub-Address	Varies depending on Fault type ^{*2}
Instance/Parameter	Varies depending on Fault type ^{*2}



NOTE: ^{*1} All EN54 System faults cause the System Fault LED's to illuminate and must be manually reset



NOTE: ^{*2} Example for a BVRDACO, Sub-Address indicates BVRDACO 1 or 2 and Instance/Parameter indicates the line number against which the fault is raised.

4 Configuration

The following is an introduction into how the configuration tools in VIGIL3 operate. It is not intended as in depth instruction on how to configure a VIGIL3 system.

Configuration data and Voice Alarm Messages are stored within every BV3AOM8 module.

Configuration changes and message upload are performed by connecting a PC to any BV3AOM8 module over USB and running the VIGIL3 Configurator PC application. Once the changes are made they are uploaded to the local module and then automatically replicated to every BV3AOM8.

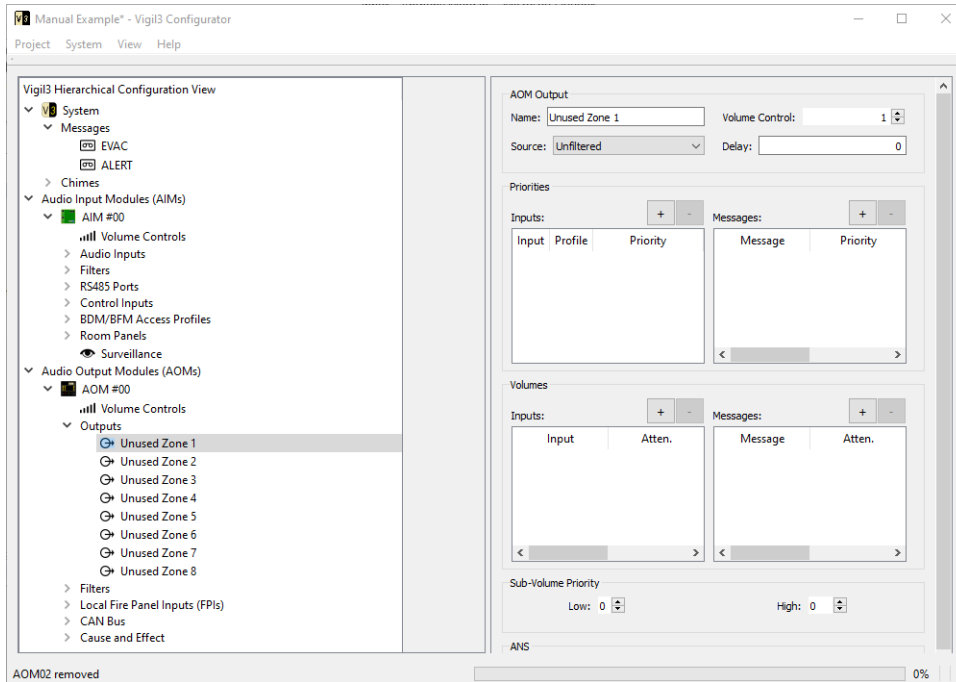
Configuration in a VIGIL3 system is hierarchical and consists of sections for;

- System - including system wide settings, messages and chimes
- Audio Input Modules - including RS485 port configuration, Access profiles, VOX settings etc.
- Audio Output Modules - including volumes, audio priorities per output etc.

New modules, messages, chimes etc. can be added by right clicking and the configuration changed by expanding the tree view under each section.

Please see below for a screen shot of the VIGIL3 Configurator PC application;

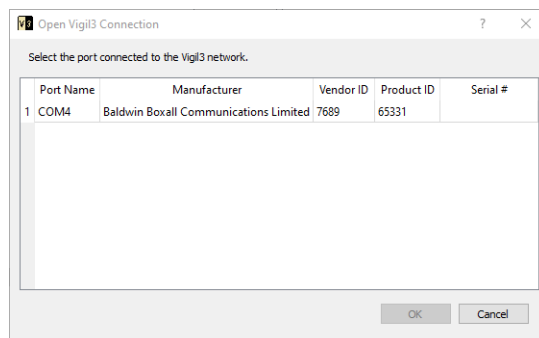
Figure 4.1 — VIGIL3 Configurator PC Application



Once a configuration is ready it must be uploaded over USB via the System Menu the steps to upload a configuration are as follows;

1. System / Connect to a VIGIL3Network
2. Select the COM port number that the VIGIL3 system has installed against and press OK e.g.

Figure 4.2 — Connection Dialogue



3. System / Enter Pin - Default 5555

At this point it is then possible to access Live Faults and Events, upload configurations etc. from the System Menu.