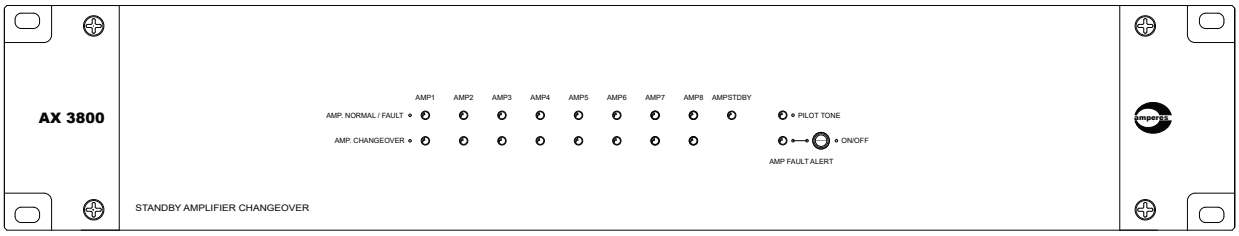
INSTRUCTION MANUAL

AX3800

8 Duty / 1 Auto Amplifier Fault Changeover

Ver.4



Thank you for choosing another quality product from Amperes Electronics.

AX3800 is now in version 4, which has been improved further to fulfil the demand from installers. Among the enhancements made are cascade connectivity, easier termination and improved circuitries to cater for different types of amplifiers, noticebly Class D power amplifiers.

AX3800 provides a medium for standby amplifier to overtake a failed duty unit automatically without human intervention to comply with various Codes of Practices such as BS, EN or SS. By means of pilot tone injection at intervals, it ensures power amplifiers are not loaded all the time to prevent fast aging of the power packs.

Please read through the manual to capture how AX3800 may serve your system diligently and efficiently. We are confident that you are getting a product of excellence.

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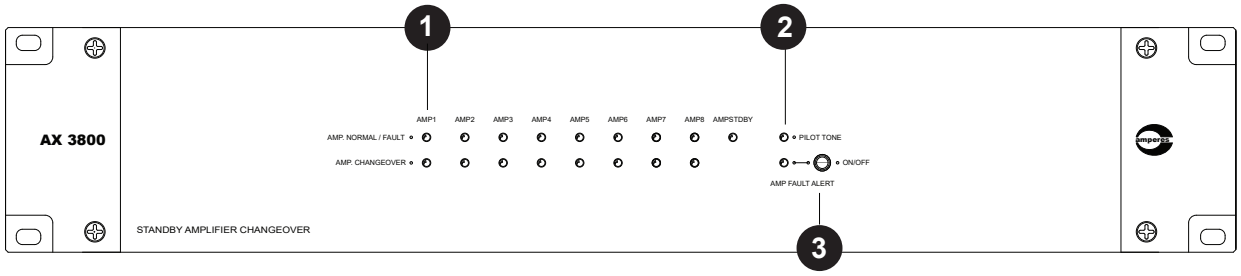
CE

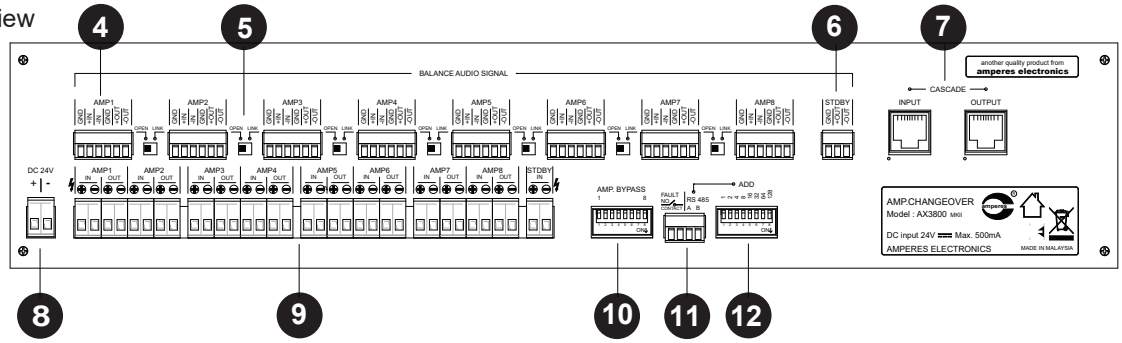
VER 4 / 2022

Parts Identification

Front View



Rear View



1. AMP STATUS LED & CHANGEOVER

LEDs show status of connected amplifier with :

AMP. NORMAL / FAULT LEDs :	Green	- normal operating
	Red	- amplifier faulty
	Off	- monitoring bypassed

AMP.CHANGEOVER LEDs : Green - faulty and standby amplifier overtake the position of failed duty unit.

2. PILOT TONE LED

Pilot tone indicator which will lit up when 20 kHz pilot tone is sent to all power amplifiers to detect any fault. PT is sent in intervals to reduce loading effect which may prolong service life of duty units.

3. FAULT ALERT LED AND BUZZER SWITCH

Whenever a fault is detected, it shall be indicated by this LED and a buzzer shall be activated. Use this switch to silence the buzzer. LED will still be lit even the buzzer is off and shall turn off after the fault is rectified.

4. SIGNAL INPUT / OUTPUT TERMINALS

Audio signal from mixer or matrix controller shall be connected to these terminals before being fed to power amplifiers. IN is for incoming while OUT is going to power amplifier input.

5. SIGNAL LINK SWITCH

If more than one channel / amplifiers are sharing the same input signal, slide the switch to LINK. This shall connect the input signal to adjacent channel to reduce hardwiring works.

Slide to OPEN if all channels / amplifiers have individual input, such as in Matrix system setup.

The output will still need to be connected to its corresponding amplifier inputs.

6. STANDBY AMPLIFIER INPUT TERMINAL

This terminal is to connect to standby unit's audio input. There is no incoming terminal as per other channels.

Parts Identifications (con't)

7. CASCADE LINK

Port to link more than one AX3800 to enable 1 standby to cater for up to 16 nos of amplifiers. Refer to section " Cascading AX3800 " for details.

8. POWER INPUT TERMINAL

AX3800 operates on 24V DC. Use PS9400 power supply unit or regulated power adaptor with 1 A rating.

9. AMPLIFIER INPUT AND OUTPUT TERMINALS

Outputs from amplifiers are terminated to the IN connectors and the OUT connectors going to zone selectors. Sensing of amplifier faults shall be at input terminals. For the channels not connected, it should be switched off at the DIP switch as per item 10.

Channel 1 shall have higher priority for standby takeover than subsequent channels. This is to ensure that amplifier serving highest priority shall be connected to channel with lower number.

10. DIP SWITCHES FOR UNUSED CHANNELS

When there are channels not connected, push to ON at this DIP switch to bypass the detection activity.

11. FAULT CONTACT AND DATA TEMINALS

A fault detected at any channel would trigger a relay to provide a dry contact. This contact can be used to link to external alarm, indication light, etc.

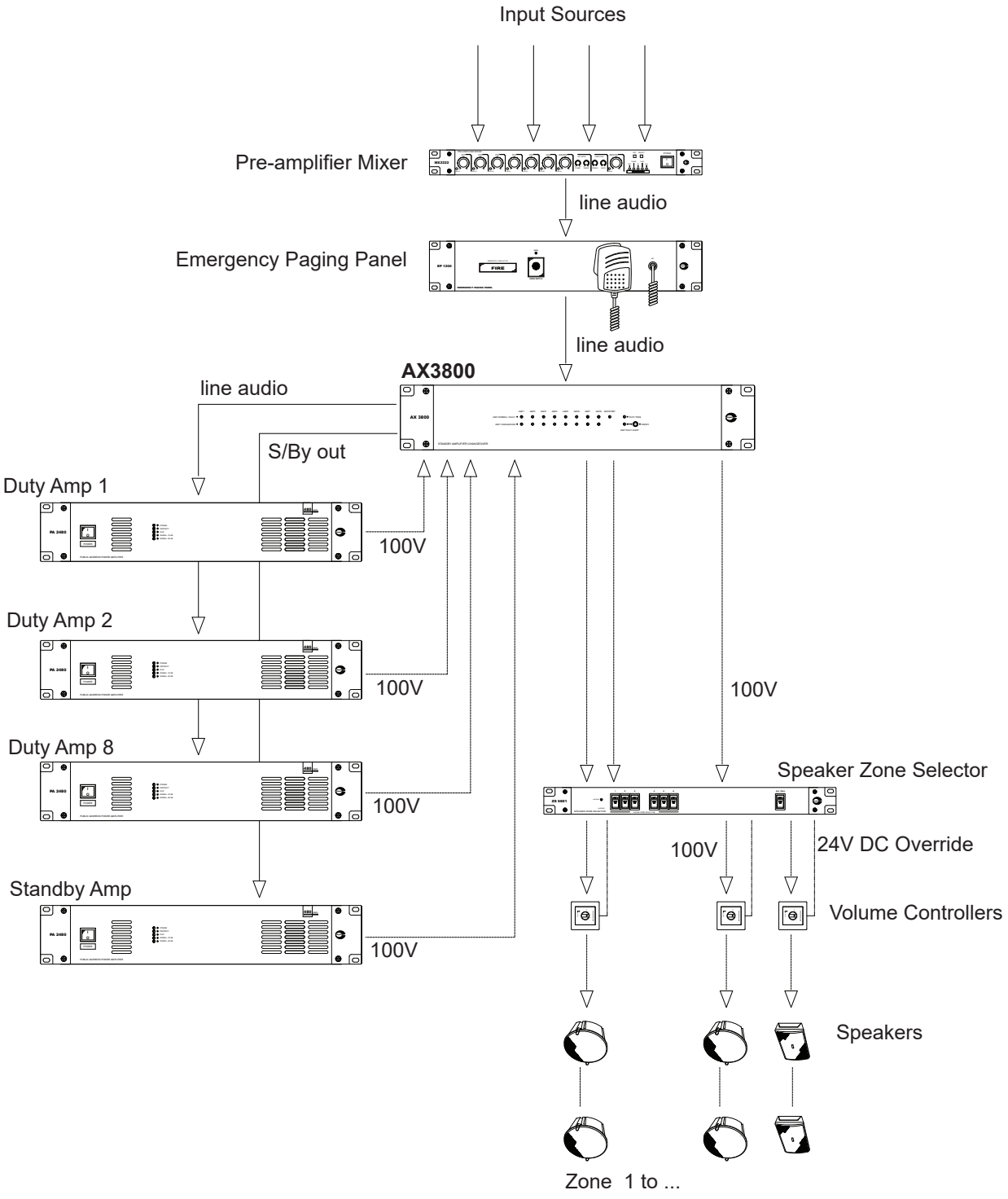
Corresponding RS485 data shall be sent out and can be monitored remotely, such as at PMX Lan through iPX5500 Comm Box. Refer to section " Remote Monitoring via PMX LAN "

12. ADDRESS SWITCH

For remote monitoring, it is required to address each AX3800 when there are more than one installed. Units are addressed using BCD code, as shown below :

Unit no.1	1000 0000
Unit no.2	0100 0000
Unit no.3	1100 0000
Unit no.4	0010 0000

General Schematic : Single Source Setup

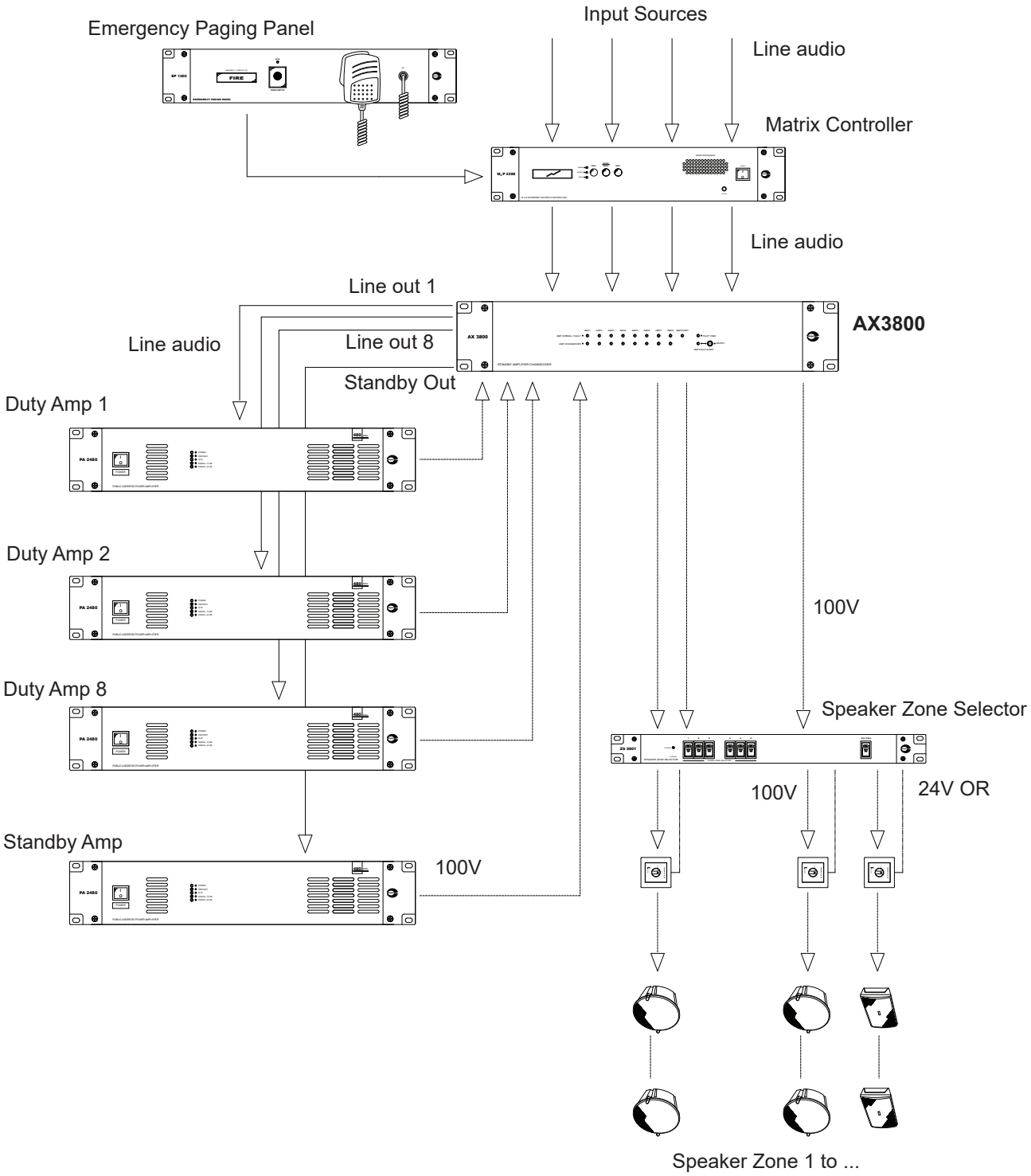


The above schematic is typical for single audio source application. For uninterrupted paging (2 audio sources), connect according to setup using Matrix.

Audio signal to Duty Amplifiers shall be looped., or can be fed separately from AX3800.

If more than 8 duty amplifiers to be served with 1 standby, cascade AX3800 accordingly.

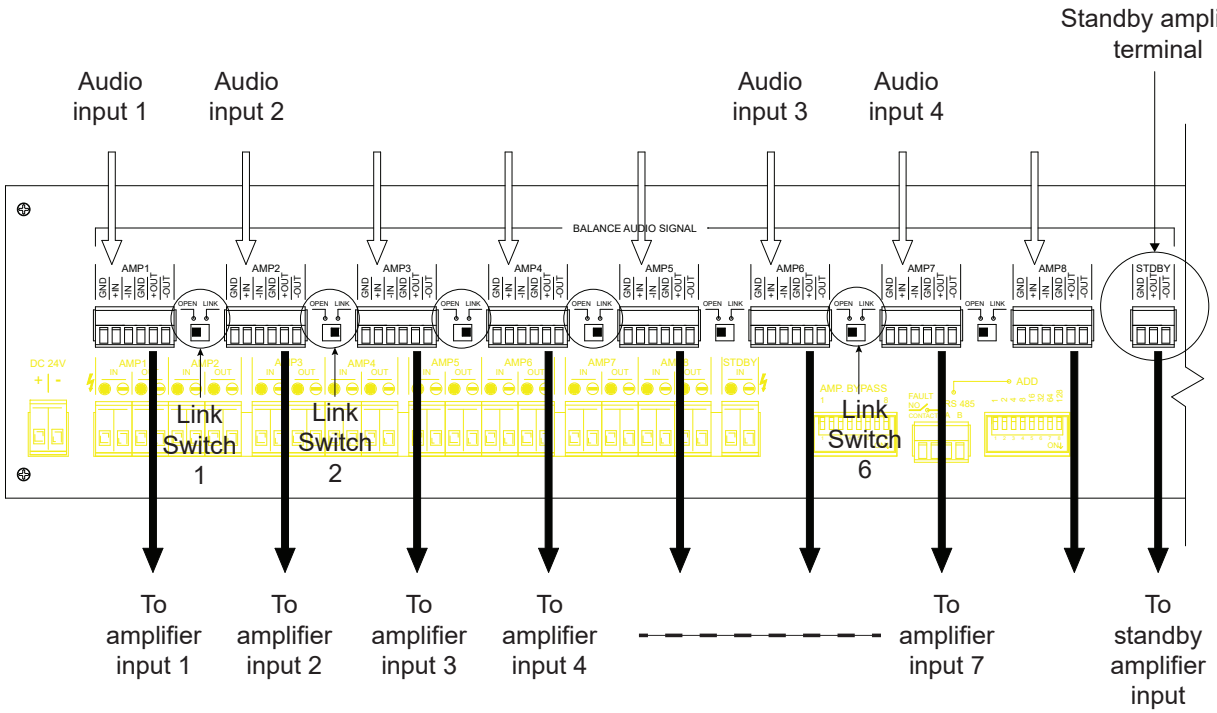
General Schematic : Matrix



The above schematic is a typical setup for multiple input sources / uninterrupted or matrix system. It is clearly noted that each amplifier input shall connect to individual output channel from AX3800.

Cascade AX3800 if one standby is to serve more than 8 power amplifiers.

Connecting the Unit - Audio Inputs & Outputs



The above connections illustrates connections between input signals from BGM sources such as Pre-amplifier mixer or Matrix controller to the inputs of power amplifiers.

Audio source 1 shall feed to amplifier 1 :
- Link switch 1 shall be switched to OPEN position

Audio source 2 shall feed to amplifier 2 - 5 :
- Link switch 2, 3 and 4 shall be switched to LINK position
- Link switch 1 and 5 shall be OPEN to for isolation from audio input 3

As power amplifier 6 does not share the same audio source from BGM 3 and 4, both link switch 5 and 6 shall be in OPEN position.

There is no incoming connection at the last connector for standby but the input at standby amplifier shall be connected to STANDBY terminal.

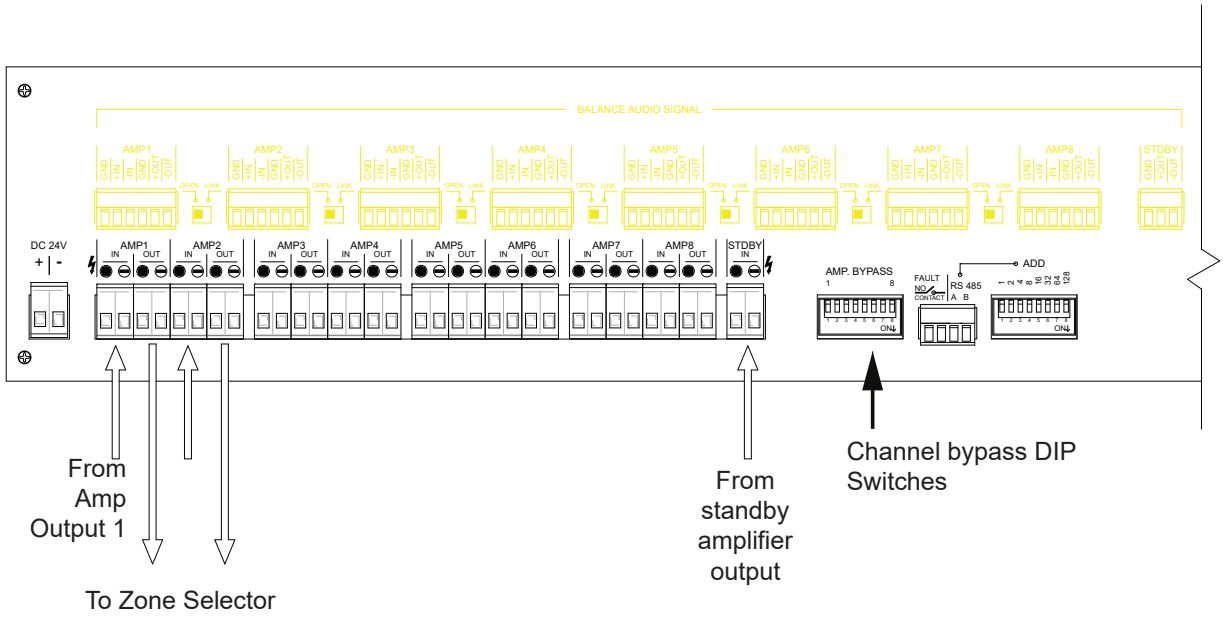
If only a single audio source is used to cater for all amplifiers :

In this case, only connect the input at terminal Amplifier 1 and switch to LINK at all link switches.

Input and output signals from AX3800 shall have unity gain. Every output to amplifiers has been buffered and therefore signal degradation due to multiple looping shall not occur from AX3800.

However, a single output from this terminal should not be fed to more than 6 amplifier to avoid signal drop. We recommend that all outgoing outputs are used.

Connecting the Unit - Amplifier Inputs - Outputs



When connecting amplifier outputs to 100V section at the terminals, ensure the polarity of termination is correct. This is to avoid short circuit which may damage the amplifier.

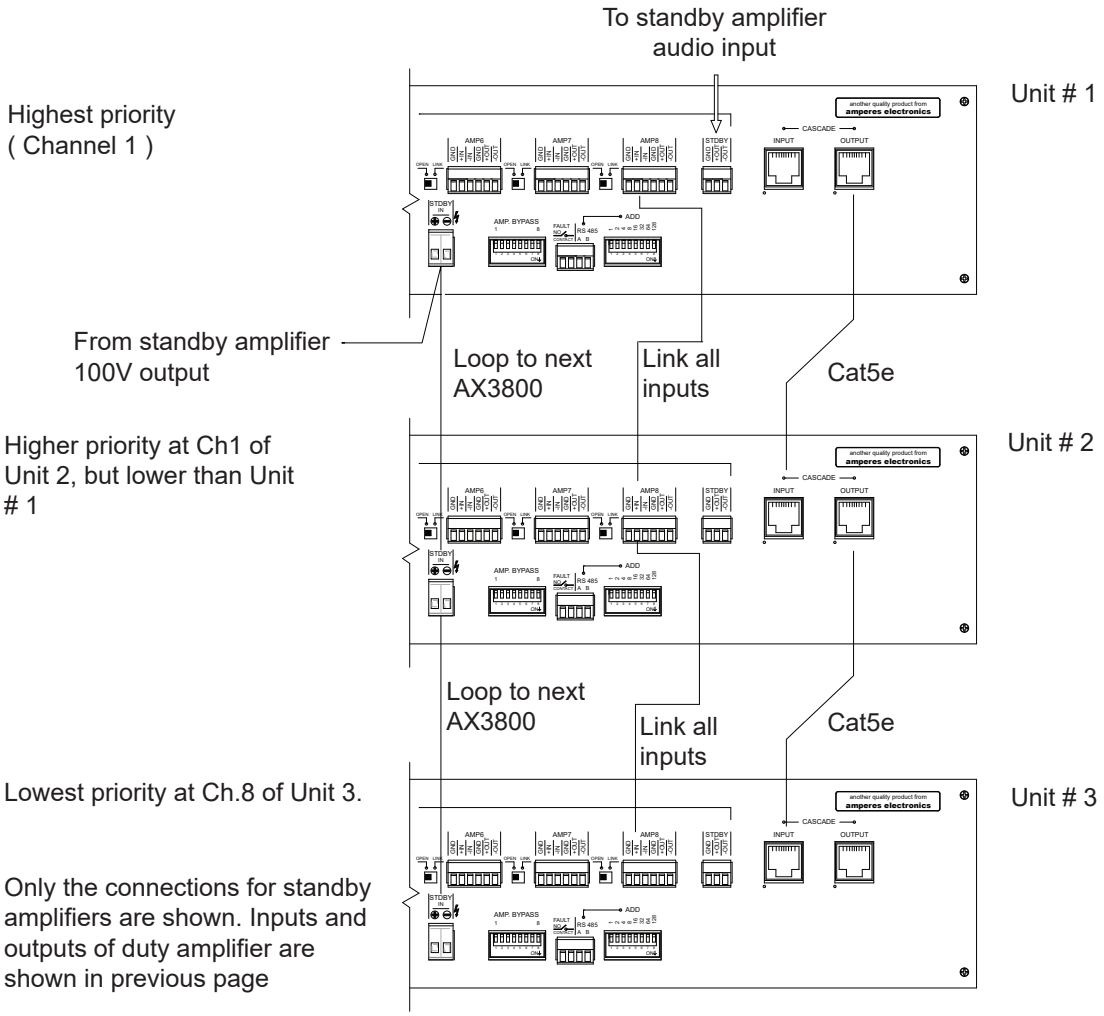
Amplifier output must be connected to IN terminals, and the outgoing to Zone Selector at OUT sections. Reversing them will cause AX3800 to treat the channel as failed.

Each output of the amplifier must be terminated for monitoring. A disconnected channel shall be deemed fail.

For unused channels :
It is quite common that not all channels will be utilised in a system. Switch off the unused channel with corresponding switch at DIP Switch.

Cascading AX3800

When it is required that one standby amplifier to serve more than 8 duty units, AX3800 will need to be stacked up or cascaded. The link between them has been made simpler using RJ45 connectors.

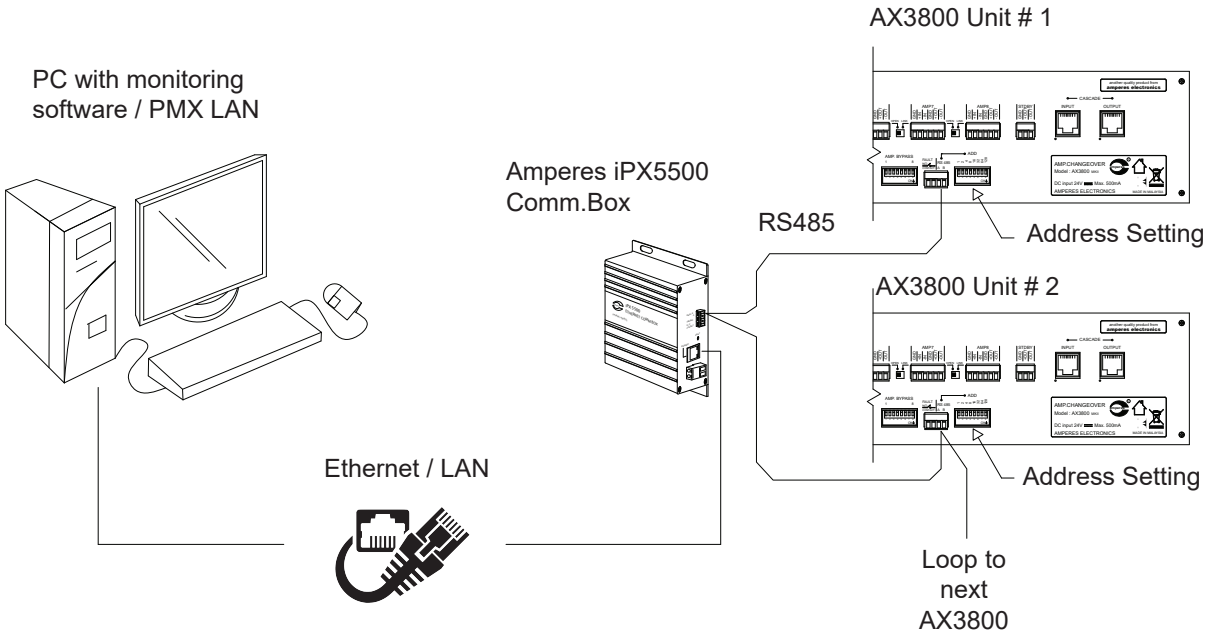


We do not recommend more than 3 AX3800 to be cascaded, which means a standby amplifier will need to cater for up to 24 duty amplifiers. This may interrupt the operation of overall system if more than one duty unit failed.

In cascade mode, Unit #1 shall have higher priority than Unit #2 and #3, while Unit #2 shall be on top of #3. This means Ch.1 at Unit #1 shall have highest priority and Ch.8 at Unit #3 shall have the lowest.

In the situation where more than 2 duty failed, with lower priority channel is required to operate, switch the DIP Switch at the one with higher priority to allow the lower unit to bypass.

Remote Monitoring / Data Transmission via LAN



AX3800 can be remotely monitored by external software to check condition of the amplifiers as well as notification whenever a duty amplifier failed.

RS485 data is provided which can be directly connected to local PC via RS485-232 converter or through network via Amperes iPX5500 Communication Box.

Application with iPX5500 can be from single or multiple locations. When there are several AX3800 connected, it is important to set the address correctly with each AX3800 assigned to a unique number.

API can be obtained for 3rd party software integration.

Fault Detection

Pilot Tones

AX3800 may work a little different from other auto standby amplifier fault changeover. It sends Pilot Tones of 20 kHz to amplifiers at intervals and shift from one channel to another to reduce loading strain. A slight delay in detection shall occur but is more beneficial in the long run, prolonging the life span of amplifiers.

Whenever Pilot Tone is sent out, a PT Active LED at front panel shall lit.

Fault Detection

AX3800 detects availability of returning Pilot Tones at every channel. Missing Pilot Tone shall be interpreted as faulty amplifier at that particular channel.

A minimum level of 50V signal must be presence to avoid unnecessary fault diagnosis. Thereby, it is recommended that all amplifiers' output levels be set to minimum 50%.

Fault Changeover and Indication

Any faulty channel shall be indicated by top row of LEDs (AMP.NORMAL / FAULT) to red. A fault shall be accompanied by AMP FAULT ALERT LED and also switchable buzzer switch. Concurrently, a data string shall be transmitted (RS485) along with activation of a dry contact.

As only one channel is allowed for changeover, which is to prevent overloading, only one LED shall lit at the second row of LEDs. (AMP. CHANGEOVER).

Testing the Installation

Follow the simple guidelines below to test the function of standby amplifier changeover when the duty amplifier failed.

Power up :

Connect 24V DC from centralised power supply unit, ie. Amperes PS9400. If the unit is to operate using power adaptor, use 24V DC type with 1 A rating. Usage of unregulated power supply may damage the equipment.

When AX3800 is powered up, it will take approximately 10 seconds to test all connected amplifiers. Green LED indicates that the amplifier is normal and red is the amplifier is faulty.

Test Detection Fault at Individual Channel

Switch OFF the power of amplifier at Ch. 1	When Pilot Tone LED lits, AMP 1 LED will turn red. AMP.CHANGEOVER LED will lit to indicate the amplifier connected is faulty. Press the buzzer button ON and OFF to ensure switch and the buzzer is working.
Switch ON the power amplifier at Ch.1	When the Pilot Tone LED lits again, AMP 1 LED will turn green. Buzzer will turn off.

Repeat the above steps for Ch.2 to 8

Test Priority Function

Channel 1 shall have the highest priority over others, so as Ch.2 over 3 and so forth. Thereby, always install amplifier with highest priority at lower numbered channel. To protect standby amplifier, only 1 failed duty amplifier is allowed for changeover at any one time.

Switch OFF the power amplifier at Ch. 8	When PT lits, AMP.8 LED will turn red and Changeover LED turn green, accompanied by buzzer.
Switch OFF the power amplifier at Ch. 7 while amplifier at Ch.8 still OFF	AMP.7 and AMP.8 LED will both turn red and Amp.Changeover LED at Ch.7 will lit and Ch.8 off. Standby replacement is now at Ch.7 since it has higher priority.
Switch OFF the power amplifier at Ch. 6 while amplifier at Ch.7 and 8 still OFF	AMP6, AMP.7 and AMP.8 LEDs will turn red. Amp.Changeover LED at Ch.6 will lit and Ch.7 and 8 off. Now, standby unit is replacing the duty amplifier position of Ch. 7 and 8.

Repeat the above process for other amplifiers and should observe the same pattern, each time with lower numbered channel connected to standby unit, replacing higher numbered ones.

Amplifier Recovery Function

Will all amplifiers at faulty state, here we shall recover these amplifiers one at a time and observe the LED response.

Switch On power amplifier at Ch.1, when Pilot Tone lits, AMP.1 LED shall turn green and AMP.CHANGEOVER LED 2 shall lit, to indicate that the standby changeover is now at Ch. 2.

Repeat the above steps for subsequent channels until all AMP.1 to AMP.8 LEDs are green and AMP.CHANGEOVER LEDs are Off.

Summary of Features

Cater for 8 duty and 1 standby

Expandable for 1 standby to cater for more than 8 duty amps.

Built in Pilot Tone generator, transmit in intervals and senses at sequence to protect amplifiers

Overloading protection by allowing only a single take over

Prioritised changeover where the lower numbered amplifier shall be preferred for take over if more than two units are down

Short fault detection time within 20 seconds

Changeover at input and output section simultaneously ; suitable for matrix system installations

Input link switch ; making connection of channels sharing the same source easier

Channel isolation switch for unused or un-monitored channel

Individual channel status indicators ; normal, fault and changeover status

Technical Specifications

Operating voltage	24V DC ; 1A
Power consumption	6.8 W (0.3 A)
Standby consumption	2.4 W (0.1 A)
	8 Ch balanced line signal
Input impedance	10 k Ohm
Audio output gain	Unity
Pilot tone interval	8 seconds / channel
Pilot tone frequency	20 KHz (+/- 5%) kHz
Detection line	70 / 100 V line
Detection level	50 V rms min
Failure detection time	20 seconds (max)
Failure recovery time	20 seconds (max)
Zone load rating	500W 100V line max (1000W on request)
Status indication LED	Normal ; Fault ; Changeover
Changeover alert	Buzzer with switch
Changeover section	Input and output simultaneously
Dimensions (W x H X D)	482 x 88 x 180 mm
Weight	3.15 kg

Warranty Conditions

Only Amperes Electronics Service Centres are allowed to make warranty repairs : a list of Amperes Electronics Service Centres may be asked for by the purchaser or send directly to Amperes Electronics Sdn Bhd at 70 Jalan Industri PBP 3, Tmn Perindustrian Pusat Bandar Puchong, 47100, Puchong, Selangor, Malaysia or its authorized dealers. This warranty is not valid if repairs are performed by unauthorized personnel or service centres.

This warranty covers only repairs and replacement of defective parts ; cost and risks of transportation as well as removal and installation of the product from the main system are for the account of the purchaser. This warranty shall not extend to the replacement of the unit.

This warranty does not cover damages caused by misuse, neglect, accident of the product as well as using the product with power supply voltage other than what is shown on the product, or any other power supply source / adaptor not recommended by the manufacturer.

This warranty does not cover damages caused by fire, earthquakes, floods, lightning and every other cause not directly related to the unit.

This warranty does not include any indemnity in favor of the purchaser or the dealer for the period of usage of the unit. The warranty also does not cover any damages which may inflict to people and things when using the product.

This warranty certificate is valid only for the described product, and is not valid if modifications are made on this certificate or on the identification label applied on the product.

This warranty covers all the material and manufacturing defects and is valid for a period of 36 months from the date of purchase or for a specified period in countries where it is stated by a national law. In this case, the extension is valid only in the country where the product is purchased.

Amperes Electronics Sdn Bhd is not obliged to modify previously manufactured products under warranty if the design changes or improvements are made.

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AMPERES series must only be used for the purpose they were intended by the manufacturer and in conjunction with this operating manual.

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