



**MUSTANG**  
**COMMUNICATIONS**

## **ZC RANGE LOUDSPEAKER ZONE CONTROLS INSTALLATION & MAINTENANCE HANDBOOK**

### **Issue No.3**

#### **SCOPE OF THIS ISSUE:**

ZC.5  
ZC.10

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Electromagnetic compatibility (EMC) directive 89/336/EEC and amendment directive 92/31/EEC  
This equipment has been designed and manufactured to the highest standards. If connected and operated as set out in this manual, there should be no Electromagnetic Compatibility problems. If any aspect of operation gives rise to concern, then please contact the manufacturer for advice.

## INTRODUCTION

Thank you for purchasing this unit. We are confident that you have made a wise decision, and that you will have many years of trouble-free operation. Considerable care has been taken during the design and manufacturing processes to ensure your entire satisfaction and naturally, we would hope that the unit will perform to our design expectations, though this will be possible only if the installation is in line with professionally accepted standards and techniques. This manual is intended, therefore, to ensure that both the installer and operator have all the necessary information to enable them to install, commission, and operate the unit in the most effective manner. We hope you will find the manual helpful, and easy to read.

### The Company and its quality statement

Mustang Communications, is the manufacturing mark of equipment manufactured by Mustang Communications Limited, of Scarborough, England. The company is independent, wholly British, and dedicated to the manufacture and distribution of high-reliability, high performance public address and associated control equipment. Mustang Communications was first registered in 1966, in England.

The Company undertakes to manufacture equipment to the highest standards of workmanship and performance. Our Quality Assurance scheme operates to, or exceeds, the standards set out in British Standard BS.5750 part 2, or European standard ISO.9000. If you have cause to doubt at any time that the design, manufacture, or distribution does not comply, then you are invited to write to us with your comments, which will be most welcome.

Please address your correspondence to The Managing Director.

### The equipment and its applications

The ZC range of loudspeaker circuit zone controls are designed to provide all the necessary switching facilities that might be required by a typical paging system incorporation background music. The ZC.5 enables five loudspeaker circuits to be treated as paging zones. Each zone may be paged individually or in groups, using a suitable microphone/amplifier combination. Similarly, background music from the amplification system can be programmed using the front panel controls to direct music to selected zones. Upon making a paging call, the music to the paged zone(s) is suspended. Dependent upon the amplification configuration, music pre-selected to other zones which are not being paged may continue.

Switching facilities and DC power are provided in the ZC units to enable a remote volume control with restoration circuit to be triggered to restore loudspeaker output to full volume for the duration of the paging call.

All input control circuitry operates at very low power levels so that control wiring can use minimal conductor sizes.

The unit can operate from standard 220/240V AC mains or 24V DC enabling it to operate as part of a simple emergency paging system, and the internal PSU is stabilised. Both AC and DC fuses are available at the back panel.

Units in the range are available either as rack mounting versions or free-standing cased versions. The latter are fitted with plastic feet on the bottom and the cases are easily removable for initial setting up and maintenance.

In use the controllers will give trouble free and accurate performance, and any failure or partial failure is likely to be a result of external problems with loudspeaker or control cabling etc. The following pages will provide a guide to installation, setting up, operation and maintenance of the unit, but in case of difficulty it would be advisable to consult a qualified dealer or the manufacturer.

## GENERAL SPECIFICATIONS

	ZC.5	ZC.10
Output zones	5	10
Power handling capacity per zone	500W	500W
Power input capacity	800 Watts paging + 800 Watts music	
Input circuits	One 100V line paging (may include background music material) One 100V line Background music programme	
Paging control inputs	5 & All Call	10 & All Call
Control configuration	Taking control to 0V operates zone	
Control current	1mA per zone - from 24V internal source	
Restoration switching capacity	2A per zone. Contacts free of Earth.	
Auxiliary DC output	Nominally +24V. Maximum 1A total load	
AC supply requirement	200 - 260V AC 50-60Hz 25VA	
DC supply requirement	200mA	400mA plus Aux DC load
DC supply limits	19 - 28V	

## FRONT PANEL CONTROLS AND INDICATORS

Each zone is equipped with a front panel music selector key, which, when depressed, routes and Background Music (if available) to the corresponding output zone.

An illuminated front panel mains switch controls AC power to the internal circuitry. If the unit is operating from a DC source then this switch neither illuminates, nor controls the on-off function.

## MODES OF OPERATION

The ZC controller may be operated in two distinct modes which are designated Mode A and Mode B. It is supplied from the factory already fitted with the necessary link to operate the ZC unit in Mode A. This link is located on the rear terminals and should be removed/disconnected to operate in Mode B. All the necessary internal switching re-configuration is controlled by this one link.

**Mode A** A simple form of amplification system would provide for one amplifier unit to amplify both a paging announcement, and at other times, provide a source of background music. Priority control circuitry within the amplifier would take care of these two signal priorities whereby the music would be muted during paging calls. Mode A operation ensures that any zones which have been programmed to receive background music, will not receive paging calls unless they are specifically selected for paging. This will also mean that such a zone will inevitably lose the music for the duration of the call.

**Mode B** A more sophisticated system will provide separate amplifiers to amplify priority paging calls, and background music simultaneously. Zones, selected to receive background music will therefore continue to receive the music unless specifically paged.

The Mode A type of amplifier should be connected to the two input terminals marked "PAGE 100V IN". For Mode B, connect the paging amplifier to these terminals, but connect the dedicated music amplifier to the terminals marked "MUSIC 100V IN".

## USE OF SEVERAL AMPLIFIERS

In line with good engineering practice, it is not usually advisable to directly combine the 100V line outputs of two or more amplifiers. Some high powered systems will require the use of more than one amplifier for the paging requirement. The ZC range in its standard form is designed for a single paging amplifier/music amplifier input, but spare terminals are provided on the rear panel, and the internal PCB bus-bars can be re-configured to accommodate extra amplifiers. If such special facilities are incorporated at manufacture, then the accompanying documentation will clearly identify the designation of the terminals, etc. However, all the functions described in this manual will still be relevant and the unit will operate in Mode B configuration only.

Under no circumstances attempt to combine switched outputs from the ZC unit. Damage will occur to the internal circuitry, or the amplification, or both.

## LOW IMPEDANCE LOUDSPEAKERS

There is no reason why low impedance loudspeakers, or 50V line loudspeakers may not be used with the ZC units, providing that the current ratings are not exceeded. Low impedance loudspeaker systems should not exceed the following:

Maximum 8 Amps for the input circuitry  
Maximum 5 Amps per output zone.

For a 4 ohm loudspeaker load this will effectively mean a maximum 100 Watt amplifier.

Similarly, for 50 Volt line systems, limit the total collective loudspeaker load to 400 Watts, and individual zone loading to 250 Watts maximum.

## ZONE SWITCHING OUTPUTS

Simultaneous with the changing over of each of the 100V loudspeaker lines, a switching pair operates. These are normally open contacts with a switching limit of 2 Amps and are completely free of Earth, or voltage.

By linking these terminals with the Auxiliary DC Output terminals, as required, the system designer may incorporate additional features into the loudspeaker network. These may include a combination of

1. Loudspeaker volume restoration controls
2. Muting relays (for loudspeakers adjacent to a paging microphone)
3. Remote switching of a satellite amplifier priority system
4. An indicator lamp (to identify at a remote system, the origination of a paging call for example).
5. To operate a show-relay loudspeaker changeover relay system
6. Remote loudspeaker snatch relays.

## AUXILIARY DC OUTPUT

A variety of uses may be made of this facility, including the above, and the powering of odd system ancillaries. Output is not fully regulated or smoothed but when the ZC is mains operated, or when the DC supply exceeds approximately 25 volts, the output will be relatively stable at approximately 23V DC and therefore perfectly adequate for use with 24V relays.

It is important to limit the total current drain from the rear terminals (and/or the D connector pins) to 1 Amp. A rear panel fuse offers basic protection of the Auxiliary DC circuitry.

## THE CONTROL INPUT CONNECTOR

A single 25 pin female D connector is provided on the rear panel for the connection of auxiliary DC outputs and input control circuits.

CONNECTION PIN	FUNCTION
1	Zone 1 paging control input
2	Zone 2 paging control input
3	Zone 3 paging control input
4	Zone 4 paging control input
5	Zone 5 paging control input
6	Zone 6 paging control input
7	Zone 7 paging control input
8	Zone 8 paging control input
9	Zone 9 paging control input
10	Zone 10 paging control input
11	0V for general purpose
12	+ 24V stabilised DC auxiliary output
13	NC
14	NC
15	NC
16	NC
17	NC
18	NC
19	NC
20	NC
21	NC
22	NC
23	NC
24	All zones No. 1
25	All zones No. 2

To operate any zone, the corresponding pin should be taken to 0V. Each input is diode isolated. Two diode isolated inputs to operate "all zones" are provided for maximum system versatility.

## AC MAINS POWER INPUT

The power requirement for the controller, even when fully triggered, is minimal and should be taken from the AC mains supply via a 3 core flexible cable. It is vital that the connections to the mains input line socket are made to the correct terminals and that a suitable earth connection is available. The connections are:-

L	Live
N	Neutral
E	Earth

DO NOT OPERATE THE UNIT UNDER ANY CIRCUMSTANCES WITHOUT AN ELECTRICAL EARTH CONNECTED VIA THE MAINS CONNECTION.

## INSTALLATION

### Selection of loudspeaker cables

Use of an appropriate cable for the connection of loudspeakers to the controller will ensure that a minimum amount of audio power is lost during transmission to the loudspeaker network. The loss will depend upon several factors - loudspeaker loadings, size of cable conductor, length of cable, etc.

As a general rule, for any particular loudspeaker system, the longer and the thinner the cable, the greater will be the loss. We therefore recommend, that the system is planned such that the amplifier and controller are as near as possible to the loudspeakers, and that the cable used is as large as practicable. Either solid or flexible conductor cables may be used, or a combination of both.

### Siting

The position chosen for installation of the ZC unit will depend upon many individual factors outside the scope of this manual. There is no technical reason why the unit should not be mounted adjacent to the amplification - for example in a reception area where full control of background music facilities may be necessary.

## REPAIRS AND MAINTENANCE

Should components be required for replacement purposes, these may be supplied by the dealer or from the address on the cover of this manual. It would be preferable to use original specification components rather than improvise or modify the amplifier.

The ZC range of controllers has been planned so that servicing and maintenance is extremely uncomplicated. All main potential sources of failure are either pluggable or accessible from the top of the main circuit board. It is unlikely that the main board will ever need to be removed except for the removal of spilled liquid, or broken mechanical parts. The following information is a procedural guide to assist with the most likely problems.

### Free-standing case removal

Free standing cased amplifiers are dispatched with the case fitted and to make any internal adjustments or module changes it will be necessary to remove it. Turn the unit upside-down on a clean soft surface to avoid scratching and remove the four outer cross-point headed screws. Revert the amplifier and using strong finger pressure, push out the bottom flanges at both sides of the case, and slide it upwards over the chassis. Replacement is a reversal of this process. Line up the holes in case and chassis before attempting to re-fit the screws. Use the correct size of Pozidrive screwdriver.

The case is manufactured from PVC clad aluminium and therefore, whilst being washable it will not withstand any direct heat i.e. cigarettes, soldering irons etc.

### Relay replacement

The most susceptible components in the ZC unit will be the zone relays and the mode relay. To facilitate inspection or replacement, these relays are all plug-in types. Firm pressure is required, whilst supporting the PCB to prevent stress.

### Fuses

The three fuses to be found on the rear panel should be replaced as a matter of routine every year if in regular use. If one of these fuses blows repeatedly, an internal or external fault is indicated. It is unrealistic in these circumstances to suggest a "weak fuse". Do not attempt to force the unit by fitting fuses of a higher rating. Ensure that the rear fuse holders are tightened adequately.

## WARRANTY

This unit should operate successfully for many years if installed correctly. However, should any fault occur within 24 months of installation, irrespective of usage or application, the manufacturer undertakes to replace parts, or the whole unit, at their discretion, free of all labour or parts charges. However, should investigation of such a fault indicate operation of the unit outside its specification, then the manufacturer reserves the right to levy an appropriate repair charge.

Should a fault be suspected, your dealer should be notified in the first instance. All returns should be made via your dealer, forward carriage paid, and be accompanied by details of:

- 1 the reported symptoms
- 2 brief details of the installation.
- 3 details of the circumstances of failure

Following the routine warranty period, Mustang amplifiers may be returned via your dealer, to the manufacturer for any necessary repairs or refurbishing. Details of the work required/reported fault must accompany the unit, and nominal charges will be levied.





