



AGC-5265 Automatic Gain Control Unit

>>>> **USER HANDBOOK**



ACMA Supplier Code **N468**

ISO9001 Certified

Document G13212
Issue 1.2, 18/09/2014

FOR

Motorola Solutions Australia



Design Two Thousand Pty Ltd ABN: 45 005 014 639
9-11 Rose Street
Upper Ferntree Gully
Melbourne Victoria 3156 Australia
Telephone: +613 9758 5933 Facsimile: +613 9758 5560
Email: gen@design2000.com.au
Web Site: www.design2000.com.au

Fair Dealing Reserved,
Copyright © 2014, Design 2000 Pty Ltd

BLANK PAGE



USER HANDBOOK

Document Control

Document ID	G/13212		
Document Name	AGC-5265 User Handbook		
Security	Fair Dealing		
Circulation	Design 2000, Motorola Solutions Australia, Existing Customers, Prospective Customers		
Prepared By	Peter Zeug		
Reviewed By	David Hay, Gabriel Haines, John Girgis, Stephen Hole		
Approved By			
Version Control	Edition	Date	Notes
	Issue 1	29/07/2013	
	Issue 1.1	31/07/2013	
	Issue 1.2	18/09/2014	
			First edition for comment Circuit diagrams included Alignment procedure

Document Copyright

Australia: Fair Dealing
United States: Fair Use

© 2013 Design 2000 Pty Ltd. Fair Dealing reserved. No part of this publication may be reproduced in any other publication without the prior written permission of the copyright holder.

Limitations and exceptions to copyright

This document contains proprietary information of Design 2000 Pty Ltd. The purpose of this document is for Fair Dealing and may be distributed to existing and potential customers.

© Copyright 2014, Design 2000 Pty Ltd

Country of Manufacture

AUSTRALIA

Manufacturer's Contact Details

DESIGN TWO THOUSAND PTY LTD

ABN.: 45 005 014 639

design2000

Est. 1968

9-11 ROSE STREET
UPPER FERNTREE GULLY
MELBOURNE VICTORIA 3156
AUSTRALIA

Telephone: (03) 9758 5933 Facsimile: (03) 9758 5560
International Telephone: +613 9758 5933 International Facsimile: +613 9758 5560

Email: gen@design2000.com.au

Web Site: www.design2000.com.au

Contents

SECTION	SHEET	DESCRIPTION
1	6	AGC-5265 High Level Description
1.2	6	High Level AMU Architecture
1.3	7	Overview
2	8	AGC Connector Pinouts
2.1.1	8	Radio Input Jack 8P8C RJ45
2.1.2	8	Radio Output Jack 8P8C RJ45
2.1.3	8	Power Input Jack 8P2C RJ45
3	9	AGC Front Panel Recessed Controls
3.1.1	9	Alignment Set up
3.1.2	10	Adjusting the RADIO AGC
3.1.3	10	Adjusting the RADIO VOL
3.1.4	11	Adjusting the SPARE AGC
3.1.5	11	Adjusting the SPARE VOL
3.1.6	11	Selecting the Input/Output pairs on the SPARE channel
4	12	AGC Gain Measurements
5	13	Warranty
6	15	Specifications
7	16	Circuit Diagrams

1. Automatic Gain Control Unit

Model AGC-5265

1.1 High Level Description

The Automatic Gain Control Unit (AGC) is a dual channel audio leveling device that reduces the dynamic range of a line level audio input while still maintaining a clean sound.

Its purpose is to provide Operators with an overall constant receive volume by expanding and compressing varying incoming radio audio.

The AGC-5265 works by continually adjusting the signal level. It amplifies quiet voice and attenuates the louder voice, so that the received audio is leveled without excessive compression which would make the audio sound noisy and distorted.

This unit is based on the legendary TACT TA-7 compander circuit that has an excellent frequency response, 2:1 compression ratio, fast attack time, slower decay time and a downward expansion curve at very low input signal levels to reduce noise.

The AGC-5265 in conjunction with the AMU radio Rx Overload detect firmware provides unrivaled protection against acoustic shock while maintaining a natural sound at an even listening level.

1.2 High Level AMU/AGC Architecture

The AMU components are shown in grey and the AGC in red:

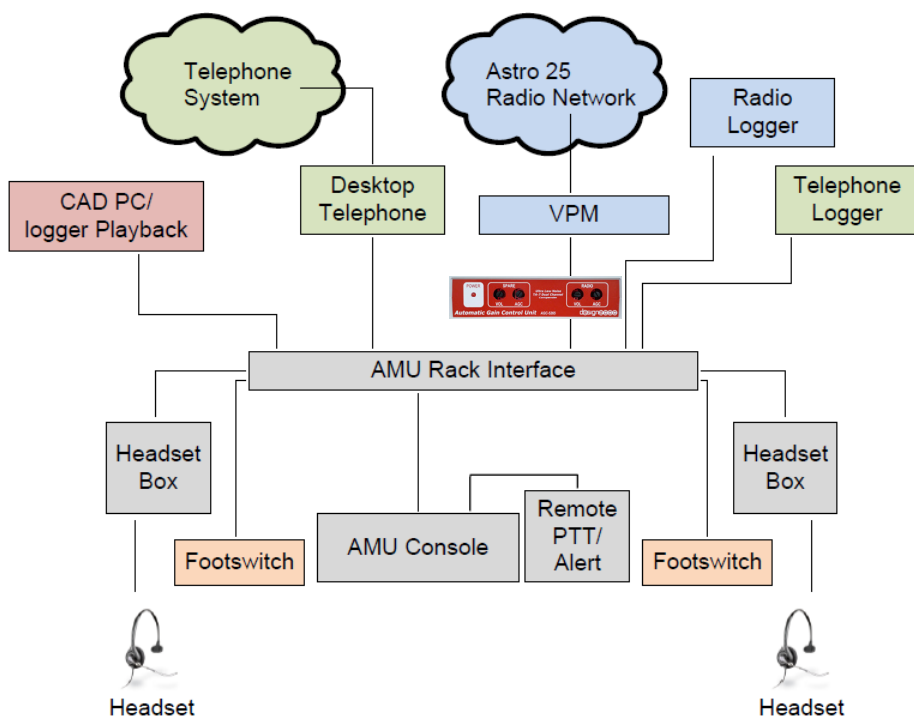


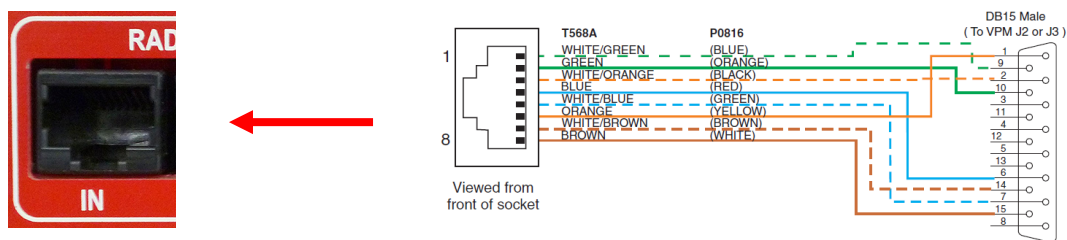
Figure 1.2.1 – AMU/AGC High Level Architecture

1.3 Overview

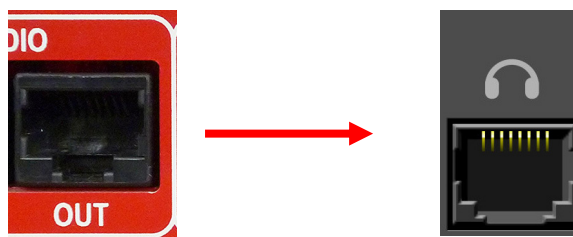
This document provides User instructions and basic Service information for the Automatic Gain Control Unit (AGC) interfaced to a Motorola MCC7500 Voice Processing Module (VPM) and the Audio Management Unit (AMU) Model AM-5230.

The AGC is simply connected between the VPM's radio audio output and the AMU's radio input using standard LAN (CAT5) patch cables.

The AGC Radio Input jack is connected to the VPM DB15 Headset Connector using a standard CAT5 patch lead and the RJ45 to DB15 adaptor.



The AGC Radio output jack is connected to the AMU VPM Headset jack using a standard CAT5 patch lead.



The AGC's volume control (VOL) and AGC level (AGC) is set up by a Service User and the controls are never made available to an Operator.



Physically the AGC is mounted on top of the AMU Rack Interface and hidden behind the AMU Console.

2. AGC Connector Pin-outs

2.1 AGC Rear Panel Connector Pin-outs

2.1.1 Radio Input Jack 8P8C RJ45

Pin Number	Description	Level / Sensitivity
1	Pass-through	—
2	Pass-through	—
3	Pass-through	—
4	Rx Audio return	0VA
5	Rx Audio from VPM	-10 dBm (693 mV p-p) (245 mV RMS) nom.
6	Pass-through	—
7	Pass-through	—
8	Pass-through	—



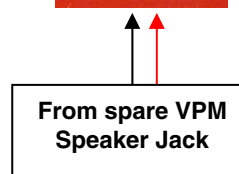
2.1.2 Radio Output Jack 8P8C RJ45

Pin Number	Description	Level / Sensitivity
1	Pass-through	—
2	Pass-through	—
3	Pass-through	—
4	Tx Audio return	0VA
5	Tx Audio to AMU	-10 dBm nom. AGC
6	Pass-through	—
7	Pass-through	—
8	Pass-through	—



2.1.3 Power Input Jack 8P2C RJ45

Pin Number	Description	Level / Sensitivity
1	NC	—
2	GND	0V, power return
3	NC	—
4	NC	—
5	NC	—
6	NC	—
7	+12V	Power +12V d.c., 50mA max.
8	NC	—



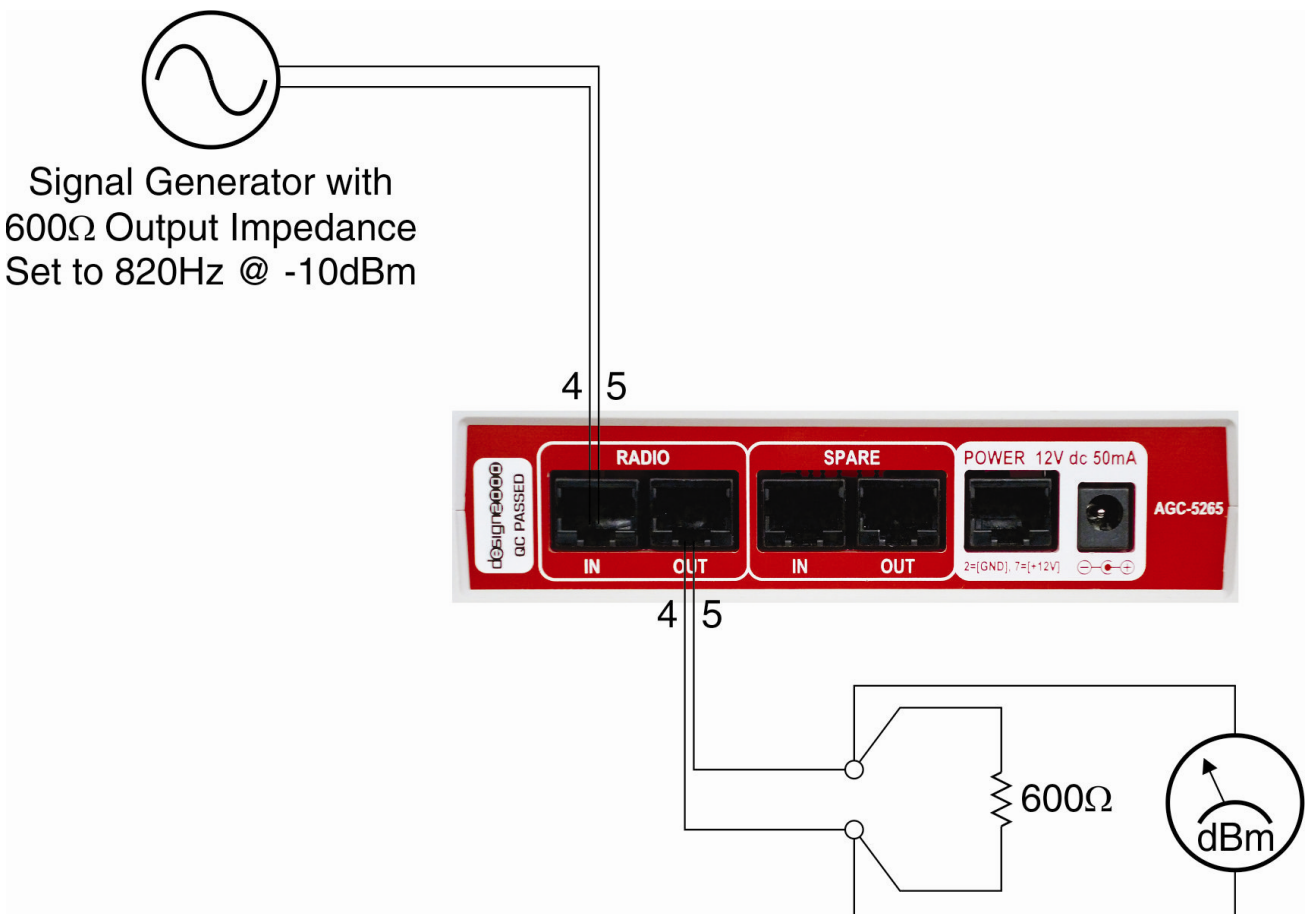
3. Front Panel Controls

3.1 AGC Front Panel Recessed Controls

The AGC-5265 has a Volume control (VOL) and an Automatic Gain control (AGC) for the RADIO channel and a SPARE channel. These are recessed potentiometers which are adjustable using a small flat bladed screw driver.



3.1.1 Alignment Set-up

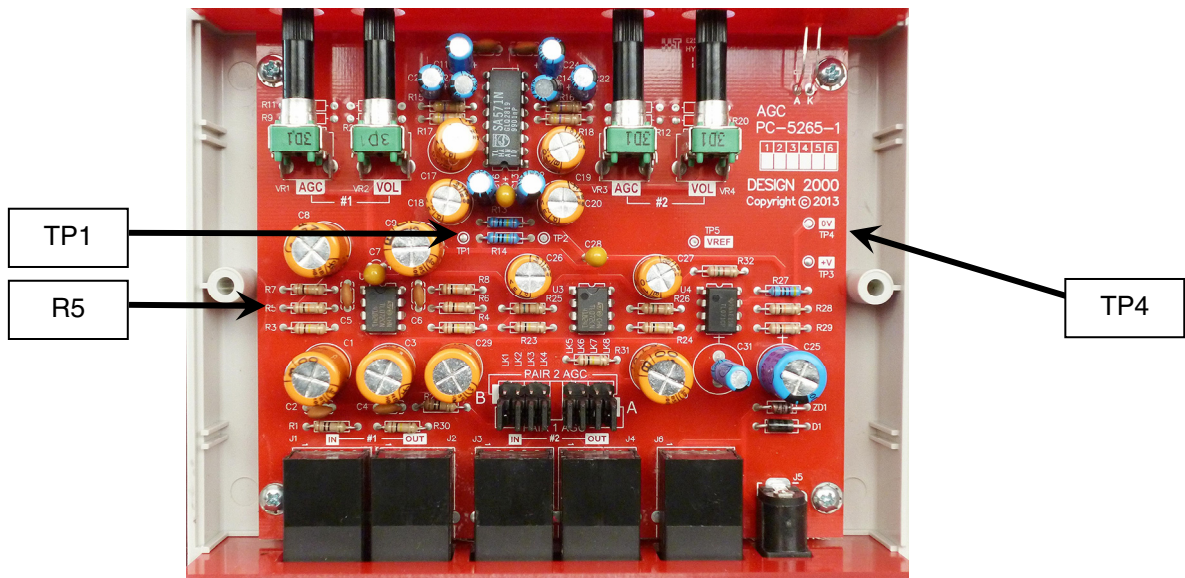


3.1.2 Adjusting the RADIO AGC

The AGC control can be turned fully clockwise as a starting point.

So that the compressor stage operates correctly (for the 2:1 compression ratio which halves the dynamic range of incoming radio audio), the AGC potentiometer should be adjusted so that there is 1.8V d.c. between TP1 and TP4 (OV) with a -10dBm 820 Hz sine wave applied to pins 4 & 5 of the AGC's radio input jack. Pins 4 & 5 of the AGC's radio output jack should be terminated into 600Ω to approximate the input impedance of the AMU's VPM jack.

If there is insufficient headroom to reach the 1.8V d.c. between TP1 and TP4, resistor R5 will need to be changed from 10K to 4k7.



3.1.3 Adjusting the RADIO VOL

The VOL control works the same as any logarithmic audio volume control. For an AMU **#RADRXVOL:150*** setting, the three quarter way mark for the VOL is a good starting point.

With a -10dBm 820 Hz sine wave applied to pins 4 & 5 of the AGC's radio input jack, adjust the VOL control until you read -10dBm on pins 4 and 5 of the AGC's radio output jack terminated into 600Ω.

3.1.4 Adjusting the SPARE AGC

This is the same as adjusting the RADIO AGC control but the 1.8V d.c. is measured between TP2 and TP4 (OV) with a -10dBm 820 Hz sine wave applied to the AGC's spare input jack.

If there is insufficient headroom to reach the 1.8V d.c. between TP2 and TP4, resistor R6 will need to be changed from 10K to 4k7.

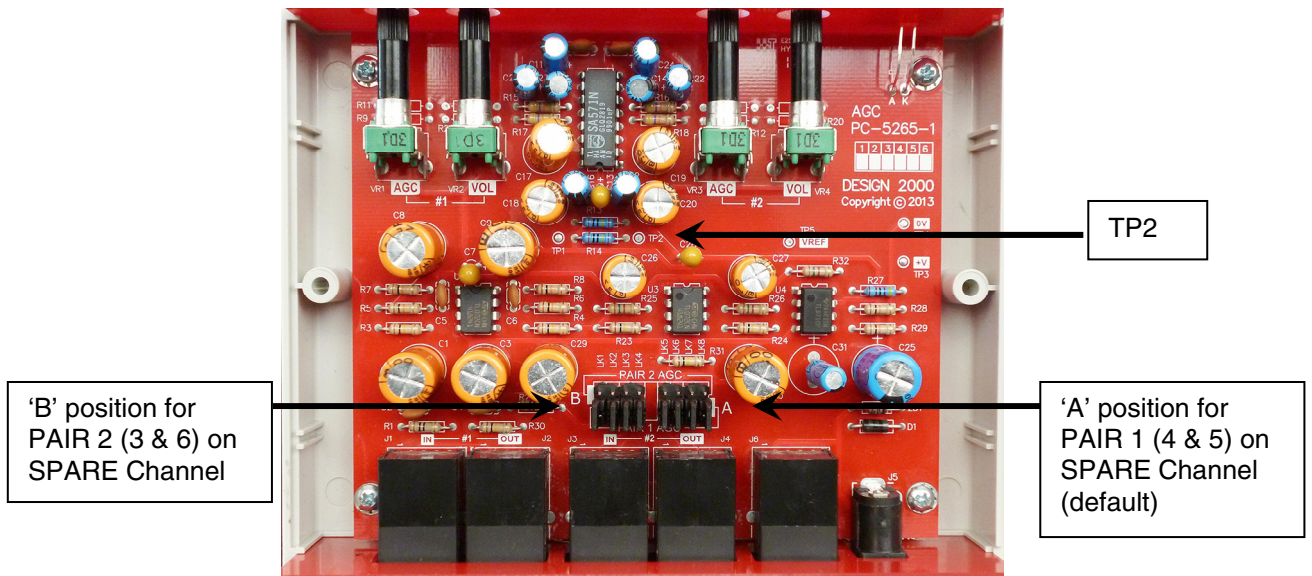
3.1.5 Adjusting the SPARE VOL

This is the same as adjusting the RADIO VOL control.



3.1.6 Selecting the Input/Output pairs on the SPARE channel

The SPARE channel has internal jumpers that enable you to select Pair 1 (pins 4 & 5) or Pair 2 (pins 3 & 6) as the signal path with pass-through on all other pins. This means that the AGC unit, using both the RADIO and SPARE channels, can be configured for two receive paths, or a Tx and Rx path.



4. AGC Gain Measurements

Gain/Attenuation measurements were taken at the factory to show the actual result on the Operator's Headset receive audio by having the AGC unit installed between the VPM's audio output and the AMU's radio audio input.

Comparison measurements without the AGC unit had not been taken at the time of writing

A reference 820Hz sine wave @ -10dBm was applied to the AGC-5265's radio input and the output was measured on the AMU's Headset speaker output. The AGC VOL was set to half and the AGC set to full. The AMU's headset volume knob was set to full. The AMU's Radio Rx gain was increased in steps of 10 and 5 with the following results:

AMU Radio Rx Gain Setting #RADRXXVOL: n*	Output to Headset(s) in dBm	Output to Headset(s) in mV RMS	Change in Output in mV RMS	Change in Output in dB
0	Noise floor	Noise Floor	—	—
10	-32.49	18.40	—	—
20	-29.65	25.5	7.1	2.84
30	-27.31	33.4	7.9	2.34
40	-25.40	41.6	8.2	1.91
50	-23.87	49.6	8.0	1.53
60	-22.56	57.7	8.1	1.31
70	-21.44	65.6	7.9	1.12
80	-20.46	73.5	7.9	0.98
90	-19.57	81.4	7.9	0.89
100	-18.75	89.5	8.1	0.82
110	-18.02	97.3	7.8	0.73
120	-17.32	105.4	8.1	0.70
130	-16.66	113.8	8.4	0.66
140	-16.03	122.3	8.5	0.63
150	-15.42	131.2	8.9	0.61
160	-14.83	140.5	9.3	0.59
170	-14.26	150.0	9.5	0.57
180	-13.70	160.0	10.0	0.56
190	-13.14	170.7	10.7	0.56
200	-12.58	182.1	11.4	0.56
210	-12.03	194.0	11.9	0.55
220	-11.46	207.1	13.1	0.57
230	-10.89	221.0	13.9	0.57
240	-10.32	236.0	15.0	0.57
250	-9.74	252.4	16.4	0.58
255	-9.45	261.0	—	—

5. Warranty

The AGC-5265s are original and brand new, manufactured by Design Two Thousand Pty Ltd to Quality Assurance Standard ISO 9001.

All equipment has a two-year warranty against defects in materials and workmanship from date of delivery.

The Warranty covers:

- Repair or replacement of faulty items returned to Design Two Thousand Pty Ltd.
- Return freight to Motorola, Lane Cove West, NSW.
- Help Desk telephone support.

The Warranty does not cover:

- On-site repair.
- Equipment subjected to misuse, accidental or lightning damage.
- Radio or Phone failure.

Failure within the Warranty Period

- Faulty item(s) are to be returned to Design Two Thousand Pty Ltd.
- Design Two Thousand Pty Ltd will cover return transportation costs to Motorola, Lane Cove West, NSW.
- Turnaround time at factory is anticipated to be no longer than 48 hours plus transit.
- The consignor is to accept liability for loss or damage during transit.

Failure after the Warranty Period

- Faulty item(s) are to be returned to Design Two Thousand Pty Ltd.
- Turnaround time at factory is anticipated to be no longer than 48 hours plus transit.
- Freight of equipment to and from Design Two Thousand Pty Ltd will be to Motorola's account.
- The consignor is to accept liability for loss or damage during transit.
- The cost of replacement depends on the component in need of replacement. This cost is not to exceed the price of a complete new unit.

Help Desk

Design Two Thousand Pty Ltd offers a 24-hour, 7-day per week help desk number for Motorola assigned test officers to call. The Help Desk number is:

03 9758 5933

Any return calls are not limited by geographical location, subject to network availability.

The response time to a support request will generally be immediate but shall be no longer than 15 hours.

The Test Officer, as a minimum, shall:

- Be able to identify the product by model and serial number.
- Verify that the AGC-5265 set appears to be properly installed.

After the warranty expires, Design Two Thousand Pty Ltd continues to offer a 24-hour, 7-day help desk number for Motorola test officers to call at nominal charges. The Help Desk number is:

03 9758 5933

Any return calls are not limited by geographical location, subject to network availability.

The response time to a support request will generally be immediate but shall be no longer than 15 hours.

The Test Officer, as a minimum, shall:

- Be able to identify the product by model and serial number.
- Verify that the AGC-5265 set appears to be properly installed.

After the warranty has expired, Design 2000 will continue to support the product for at least ten years.



6. Specifications

Input / Output Impedance:	600 Ohm compatible	
AGC Response at 2:1 Compression Ratio with Respect to 1V p-p	Input	Output
	-70dBm	-68dBm
	-60dBm	-50dBm
	-50dBm	-37dBm
	-40dBm	-28dBm
	-30dBm	-17dBm
	-20dBm	-11dBm
	-10dBm	-5dBm
	0dBm	0dBm
Input Level:	Up to 774mV RMS (2V p-p), 245 mV RMS (-10dBm) nom.	
Output Level:	Adjustable up to 774mV RMS (2V p-p) nom.	
Signal-To-Noise Ratio:	-75dB (20Hz - 20kHz filter) and -79dB "A" weighted with respect to 1V p-p in and 1V p-p out	
THD+N:	0.005% with compression disabled	
	0.007% @ 10kHz & 2:1 compression	
	0.17% @ 1kHz & 2:1 compression	
	1.6% @ 100Hz & 2:1 compression	
Channel Separation:	>68dB (unweighted)	
Frequency Response:	-1.5dB at 10Hz, -3dB at 33kHz	
Compression Ratio:	Typically 2:1 from +20dB to -20dB input with respect to 1V p-p at the compressor input	
Power Consumption:	17mA at 12Vd.c.	
Power Supply:	8 – 15Vd.c. (J5 centre Positive, J6 [RJ45] Pin 7 Positive Pin 2 Negative to match VPM Speaker outputs)	
Enclosure Material	Acrylonitrile butadiene styrene (ABS) and fiberglass	
Enclosure Dimensions	35 x 140 x 110 mm	
Displays	1 x 3mm POWER LED (red)	
Operating Temperature Range	-10 → 60 ° C	
Storage Temperature Range	-20 → 80 ° C ambient	
Humidity, Storage and Operating	To 98% non condensing	
Mean Time Between Failure:	> 20 years	
ACMA Supplier Code Number	N468	
Warranty	Two years	
Part Number	AGC-5265	

ACMA SUPPLIER CODE: N468

