

# C-MARK®

PROFESSIONAL SOUND SYSTEM

## OWNER'S MANUAL

**T3500**

**T2650**

**T1450**

***T***

**SERIES**

***Digital Power Amplifier***

## Important



**CAUTION:** To reduce the risk of electric shock, do not remove the cover. No user-serviceable parts inside. Refer servicing to qualified service personnel.

**WARNING:** To prevent fire or electric shock, do not expose this equipment to rain or moisture.

**SAFEGUARDS:** Electrical energy can perform many useful functions. This unit has been engineered and manufactured to assure your personal safety. Improper use can result in potential electric shock or fire hazards. In order not to defeat the safeguards, observe the following instructions for its installation, use and servicing.

## Warning Notices

### Location

Install the amplifier in a well-ventilated location where it will not be exposed to high temperature or humidity.

Do not install the amplifier in a location that is exposed to direct rays of the sun, or near to hot appliances or radiators. Excessive heat can adversely affect the cabinet and internal components. Installation of the amplifier in a damp or dusty environment may result in malfunction or accident.

### Precautions regarding installation

Placing and using the amplifier for long periods on heat-generation sources will affect performances. Avoid placing the amplifier on heat-generation sources. Install this amplifier as far as possible from tuners and TV sets. An amplifier installed in close proximity to such equipment may cause noise or degradation of the picture.

## Safety rules

This device must be powered exclusively by earth connected mains sockets.

It is absolutely necessary to verify this fundamental requirement of safety and, in case of doubt, require an accurate check by a qualified person.

The constructor cannot be considered responsible for eventual damages caused to persons, things or data for the missing of accurate earth link.

Before powering this device verify that the amplifier is supplied with the correct voltage rating.

Do not spill water or other liquids into it on the unit.

Do not use this unit if the electrical power cord is frayed or broken,

Do not remove the cover. Removing the cover will expose you to potentially dangerous voltage.

Naked flame sources such like lighted candles should not be placed on the amplifier.

Contact the authorized center for ordinary and extraordinary maintenance.

## Speaker Damage

C-MARK Digital Amplifier should use suitable loudspeaker in a sensible way that will not cause damage because of its big power.

C-MARK will not be responsible for damaged speakers. Consult the speaker manufacturer for power handling recommendation.

Even if you reduce the gain using the amplifier front panel attenuation controls, it is still possible to reach full output power if the input signal level is high enough.

A single high-power crescendo can damage high-frequency drivers almost instantaneously, while low-frequency drivers can usually withstand very high, continuous power levels for a few seconds before they fail. Reduce power immediately if you hear any speaker bottoming out - harsh pops or cracking distortion that indicate that the speaker voice coil or is striking the magnet assembly.

C-MARK recommends that you use amplifiers of this power range for more headroom (cleaner sound) rather than for increased volume.

## Speaker output shock hazard

A C-MARK amplifier is capable of producing hazardous output voltages. To avoid electric shock, do not touch any exposed speaker wiring while the amplifier is operating. This manual contains important information on operation of your C-MARK amplifier correctly and safely. Please read it carefully before being operated your amplifier.

## Introduction

Thanks to amazing reductions in heat output along with reduction in weight and the characteristic high output power, C-MARK Digital Amplifier can be used in an unlimited range of applications such as concert touring, opera houses, theatres, churches, cinema, theme parks, television sound stages and industrial applications.

### More sound and less weight

Compared to a conventional amplifier, C-MARK Digital Amplifier technology offers very high efficiency and delivers more power to the loudspeakers with much reduced heat dissipation. This greater efficiency enables dimensions, weight and power consumption to be reduced. The output stages of the amplifier typically run at 95% efficiency, dissipating only 5% of the input energy as heat.

One of the most interesting characteristics is that C-MARK Digital Amplifier's efficiency is almost independent of output level. Conventional amplifiers achieve their best efficiency only at full rated power output. Since standard music has an average power density of 40% of the maximum level, conventional amplifiers can easily generate 10 times more heat than C-MARK Digital Amplifier for the same volume of sound.

### Superior Sound-Sonic accuracy

Crystal-clear high, and a tight, well-defined low end: the most accurate reproduction of an audio signal. Patented design features that ensure very high performance are parameters such as distortion, frequency response, slew rate, power bandwidth and dumping factor.

### Totally Digital with High Reliability

The C-MARK Digital Amplifier series are based on PWM technology that has been used for 30 years or more in power supplies and inverters. PWM provides high reliability, small size, low weight and high efficiency. A PWM converter works as a high frequency sampler, converting the variable amplitude (audio) signal into an impulse sequence with average value equal to the audio input.

C-MARK Digital Amplifier use very high sampling frequencies to obtain high performances across the audio band.

### The Show Always Goes On

C-MARK Digital Amplifier is completely protected against every possible error in operation and is designed to work under every condition. It gives you maximum power with maximum safety and increases long-term reliability.

## Installation and Operation

### Unpacking

Carefully open the shipping carton and check for any noticeable damage. Every C-MARK Amplifier is completely tested and inspected before leaving the factory and should arrive in perfect condition. If you find any damage, notify the shipping company immediately. Be sure to save the carton and all packing materials for the carrier's inspection.

### Operating Precautions

Make sure the AC mains voltage is correct and is the same as that printed on the rear of the amplifier. Damage caused by connection of the amplifier to improper AC voltage is not covered by the warranty. Make sure the power switch is off before making any input or output connections.

Whether you buy them or make them, use good-quality input and speaker cables. Most intermittent problems are caused by faulty cables. Use good-quality connectors and wire, along with good soldering technique, to ensure troublefree reliability.

### Mounting

All C-MARK amplifiers will mount in a standard 19" rack. Four front panel mounting holes are provided. Your amplifier uses a forced-air cooling system to maintain a low, ever operating temperature. Drawn by an internal fan, air enters through the slots in the front panel and courses over which is controlled by heat sink temperature sensing circuits: the fan speed will increase only when the temperature of either heat sink requires it, which keeps fan noise to minimum and helps cut dust the heat sinks. If either heat sink gets too hot, its sensing circuit will reduce the output gain. If the amplifier overheats, another sensing circuit shuts down its circuit to cut off power until it cools to a safe temperature. The exhaust cooling air is forced out through the rear of the chassis, so make sure there is enough space around the sides of the amplifier to allow the air to escape. If it is rack mounted, make sure the exhaust air can flow without resistance. If you are using a rack with closed back, there must be at least one stacked directly on top of each other (no space needed between units), starting from the bottom of the rack.

### Connecting Inputs

Input connecting are made via the 3-pin XLR-female type connectors on the rear side of the amplifier. The inputs are actively balanced, with polarity as shown in figure.

### Connecting Outputs

Output connectors are made via neutrik speakon connectors. Consult the wire gauge chart to find a suitable wire gauge to minimize power and damping factor losses in the speaker cables. For each device the 1+ and 1- pins (2+ and 2- pins) of speaker connector have to be considered the positive and the negative output of a single channel.

## Controls

### Input attenuators

The four inputs attenuator controls, located on the front panel adjust gain for their respective amplifier channels in all modes. With the attenuator fully clockwise at 32 dB on the silk screen ( minimum attenuation), the amplifier gain will be set to 32dB (40X). The silk screen scale is calibrated on 2 dB increasing attenuation, and a step by step detent on potentiometer helps for calibration, except for the last three positions (- , 4,14 dB).

## Led indicators and controls

### Led indicators

C-MARK digital amplifier has LED indicators on the front panel. “READY” and “TEMP” led are common to both channels on each device and the other “SIGNAL” and “PROTECT” led are present for each channel. Each channel has an 5-segment LED bar for the output signal. Each segment will be lightened every 3 dB. The green segments will be lightened during normal working. The yellow LEDs of the bar will be lightened at -3dB. If the level of the audio signal exceeds the channels output capability, it clips, triggering the red LED.

### Front panel controls

The power switch, gain controls and LED indicators are on the front panel.

- 1) Power switch
- 2) Gain
- 3) Protection LED(PROTECT)

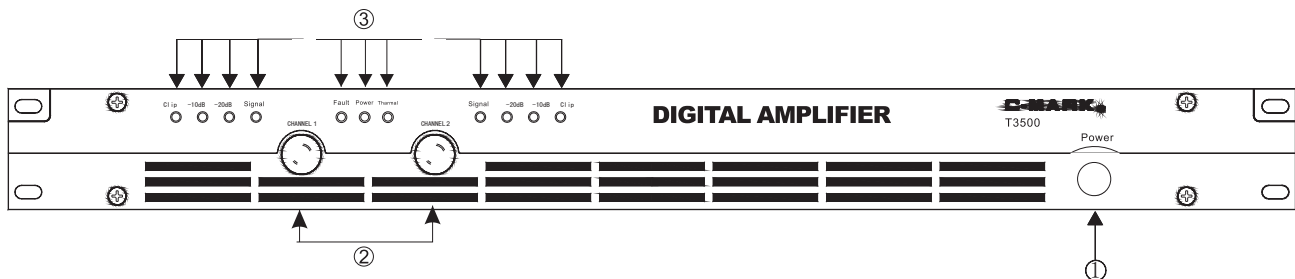


Fig. 1: Front panel

The gain control uses a logarithmic scale between -00 and +32 dB.

## Rear panel controls

- 1) Female Neutrik Speakon connectors for audio output for each channel(2+ / 2-for Bridge Mode)
- 2) Female Cannon XLR connectors or Jack stereo (COMBO) for input signal for each channel
- 3) AC main cord
- 4) Cooling fan outlet
- 5) Amplifier gain choice
- 6) Power output of left and right channel

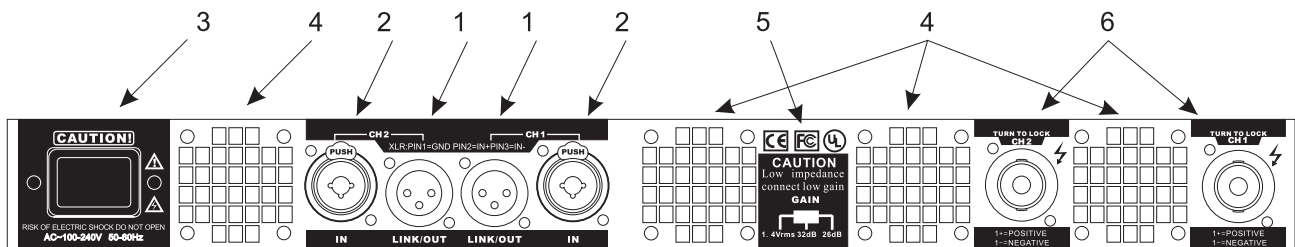


Fig. 2:Rear panel

## Protection

### Turn-On/Turn-Off Muting

For about four seconds after turn-on, and immediately at turn-off, the amplifier outputs are muted.

### Short circuit protection

A short circuit protection system safeguards the amplifier's output transistors under short circuit and other stressful loads. It is completely inaudible when inactive. In case of short circuit, the PROTECTION LED will be lightened. Turn OFF/ON the amplifier to reset protection mode status.

### Thermal protection

C-MARK Digital Amplifier uses a continuously variable speed fan to assist cooling (the fan speed changes in response to the amplifier's cooling needs).

### DC fault protection

If DC or excessive subsonic energy appears at a channel output, an instantaneous protection circuit will inhibit the power supply for all channels. Power supply shutdown is used in lieu of speaker relays, thereby improving the damping factor and reliability.

### Input/output protection

An ultrasonic network decouples RF from the outputs and keeps the amplifier stable with reactive loads.

## User maintenance

**Cleaning :** Disconnect the amplifier from the AC main source first; use a soft cloth and mild non-abrasive solution to clean the faceplate and chassis.

**Dust removal:** Especially in a dusty environment, the heat sink may clog with dust after prolonged use, which will interfere with cooling. You may use compressed air to remove the dust; severe cases, though, should be referred to qualified service personnel for a thorough cleaning with the top cover removed.

## Technical assistance and service

Servicing your unit requires a trained technician capable of performing the type of service you need. There are no user serviceable components inside your unit and the danger of electric shock exists. Additionally, some of the components in your unit are C-MARK specific parts that require C-MARK replacements.

### Technical assistance

If you suspect that your amplifier is defective, check your system configuration and amplifier settings to determine the origin of the problem. In many cases, incorrect audio interfacing, poor cabling. Or other system level impairments are the cause of problems in audio systems. For technical assistance beyond the information given in this manual, the C-MARK technical services department may be contacted.

## Product Return Guidelines

1. Pack the product well for protection during shipment.
2. Include a copy of the sales receipt, your name, return address, phone number, and defect description with your return correspondence.
3. Call the C-MARK Technical Authorization Services department for an outside of the packaging.
4. Ship the product prepaid to C-MARK.

## Power Factor Correction

The C-MARK amplifier has an automatic power factor correction system for a perfect main network interface. The amplifier is a resistive load for the main network, minimizing the reactive power and the harmonic distortion on the current. The system allows performance to be maintained even in circumstances of varying the mains voltage.

## Attention

1. The amplifier could not be used at bridge output mode.



## Input & output Specifications

Power rate: **OUTPOWER**

<b>Model</b> <b>Impedance</b>	T1450	T2650	T3500
8 $\Omega$	450W	650W	1000W
4 $\Omega$	900W	1300W	2000W
2 $\Omega$	1000W	1500W	2300W

S/N:

105dB (A-weighted)

GAIN:

1. 4Vrms-26dB-32dB Selectable

(T series digital amplifiers provide three gain selection for connection of different load usage. Low impedance connects low gain to prevent exceptional protection.)

Frequency response:

20Hz-20KHz (+1/-2dB)

Damping factor:

300@1KHz

Phase differences: ( Typical value )

Frequency	20Hz	1kHz	20kHz
Phase ( ° )	+11°	-6°	-137°

CMRR (common mode rejection rate): ( Typical value )

Frequency	100Hz	1kHz	20kHz
CMRR (dB)	71dB	66dB	66dB

Input impedance:

15K $\Omega$  balanced

Cross-talk attenuation: (Typical value)

Frequency	20Hz	1kHz	20kHz
CTC (dB)	85dB	80dB	65dB

THD(total harmonic distortion): ( Typical value)

Frequency	100Hz	1kHz	10kHz
THD+N@10%Rated Power	0.08%	0.08%	0.05%

IMD (Intermodulation distortion): ( Typical value)

Power	1 Watt
DIM100 (dB)	0.05%
SMPTE60/7K (dB)	0.05%

### Power supply Specifications:

Voltage AC100V–240V 50/60Hz

Electric current @220 VAC

1/8 rated power

Model Impedance	T1450	T2650	T3500
8 Ω	1A	1. 4A	2A
4 Ω	1. 7A	2. 3A	3. 4A
2 Ω	1. 9A	2. 6A	3. 8A

1/3 rated power

Model Impedance	T1450	T2650	T3500
8 Ω	2. 2A	3A	4. 2A
4 Ω	3. 9A	5. 4A	8A
2 Ω	4. 2A	6A	9A

### Other Specifications:

Cooling mode: compulsive cooling (4 Temperature control fan speed machine)

Input connector: balanced XLR

Output connector: SPEAKON connector

Control: 2 channels volume control (front panel), Gain selection (rear panel)

LED indicator: level indicator, malfunction indicator, overheat indicator

Dimensions: 483\*400\*44 mm W\*D\*H

Weight: 9.8 kg

## 重要性



注意：为避免受到电击，请勿移开(底)盖，如遇到问题，亦不要尝试私自修理，请委托合格的维修人员修理。

警告：为避免电击事故，请不要将该产品淋雨或置于潮湿处。

安全：该产品的设计和制造可以保证您的安全，使用不当将导致潜在的电击及事故。为了使用的安全，请遵守以下安装、使用和售后服务说明。

## 警告

## 安装位置

安装此功放于良好通风处，不能装在高温或潮湿的地方。不能直接暴露于太阳照射，靠近热电器或辐射器，过多的热量将影响机箱及内部零件。在潮湿或多尘的环境中安装此功放也可能导致机器故障。

## 安装注意事项

长时间在热源附近使用功放会影响性能。请不要在热源附近使用功放。安装时尽量远离调频器和电视，因安装得太近可能导致噪声或电视机图象不稳定。

## 安全事项

功放必须连接有接地的插座。

必须确认要安全接地，如有疑问请咨询专业人员。

若因没有接地导致的人员损伤或物品、数据等的损坏，概不负责。

在连接电源之前，请确认正确的电压值。

请不要向功放泼水或其它液体。

请不要使用已磨损或裂开的电线。

请不要移开盖板，移开盖板将有潜在危险电压。

暴露的火源如点燃的蜡烛不应该置于功放上。

如遇到普通的或特别的故障，都请联系授权的维修中心。

## 音响损坏

C-MARK 数字功放会因输出负载匹配不当，造成损坏。请适当连接匹配的音箱，以免损坏功放。

C-MARK 不承担音箱损坏的责任。建议联系供应商关于连线的问题。

调节前面板上的音量按钮可调整增益，以便达到所需的功率输出。

一个强的大信号输入几乎可以瞬间损坏高频喇叭，低频喇叭损坏之前往往可以承受几秒钟。当听到刺耳的声音或音质失真时，表明喇叭音圈正在撞击磁铁。

C-MARK 建议调节此功放至悦耳的音量而不是最大音量。

## 音响输出电击危险

C-MARK 功放可能产生危险的电压。为避免电击，当功放运行时，请不要触动暴露的接线。此说明书中有正确使用和安全操作C-MARK功放的具体事项。在操作功放时请仔细阅读。

## 说明

此功放特点是散热少、重量轻和输出功率大。**C-MARK**数字功放适用于各种场合：如剧院、演播厅、教堂、影院等。

## 更大声音，更小重量

与其它普通功放相比，**C-MARK**数字功放输出给音响更大的功率、更高的效率和更好的散热性能。很大程度上降低了尺寸、重量和功率消耗。功率输出有效率达95%，只有5%的热损耗。

**C-MARK**数字功放最大特色之一是效率几乎独立于输出电平，普通功放只有最大功率输出时才有最大的效率。因通常音乐在最大时有40%的平均功率密度，普通功放在相同音量下比**C-MARK**数字功放多产生10倍的热量。

## 声音的精确性

水晶般清澈的高音，紧凑有力的良好的低音，最精确的声音信号再造，专利设计保证高性能的参数如失真、频响、转换率、电源带宽和阻尼系数。

## 全数字化，高可靠性

**C-MARK**数字功放系列是基于30年来电源和转换器领域的脉宽调制技术上（PWM）。脉宽调制提供可靠性，小尺寸，低重量和高效率。脉宽调制转换器工作时如同高频信号取样器，将可变的振幅（声音）信号转换成等值的脉冲声音信号输出。**C-MARK**数字功放使用很高的频率转换来获取声音的高性能。

## 长久性

**C-MARK**数字功放运行中将纠正每一个可能产生的错误，在各种条件下都可以工作。给您的音响系统提供最大的功率及最安全的保证并增加最长久的可靠性。

## 安装和操作

### 开箱

虽然C-MARK功放在出厂前都经过彻底的检测，到货时应完好无损。请打开外箱后细心检查是否有损坏。若您发现任何损坏，请保存好外箱和所有包装材料并尽快联系运输公司查明损坏原因。

### 操作注意事项

请确保电源电压同功放后部的标注相同。由于电源电压错误造成的损坏不在保修范围内。连接输入、输出线之前请断掉电源。

请使用质量好的音响输入连线，因时断时续的声音是由于劣质连线产生的。请使用高质量的连接头和连线以及良好的焊接技术，以确保您更高的可靠性。

### 安装

所有C-MARK功放安装在标准19英寸机架上。前面板有四个安装孔。此功放使用热度控制系统来获得低的和正常的机箱温度。散热感应电路控制内部风扇调节速度：风扇只有在散热电路需要时才加快其运转的速度，以使风扇噪音最低也可以减少灰尘。若功放散热片太热，其感应电路还将减少输出增益。若功放散热片过热，另一感应电路也将断掉电源，直到冷却到安全的温度。多余的热气将冲出底板后部，所以安装时应有足够的空间留于功放两侧。若装于架子上，请确保空气可以无阻挡的排出。

### 输入端口

输入端口为功放后部的3针卡侬母插口，输入自动平衡，其极性在图中显示。COMBO卡侬母插口以及卡侬公插口并接输出。

### 输出端口

输出用Neutrik Speakon 连接头。查询连线尺寸图，选择功率和阻尼系数损失最小的音响连线。注意音箱连接头的1+，1-针应为单声道的正负输出。

## 控制

### 输入旋钮

前面板的二个输入控制旋钮分别调节功放A、B声道的增益。顺时针旋转旋钮可将功放增益由-00dB逐渐增加到最大的32dB（40X），逆时针转动旋钮则逐渐减少功放增益。

### 显示和控制

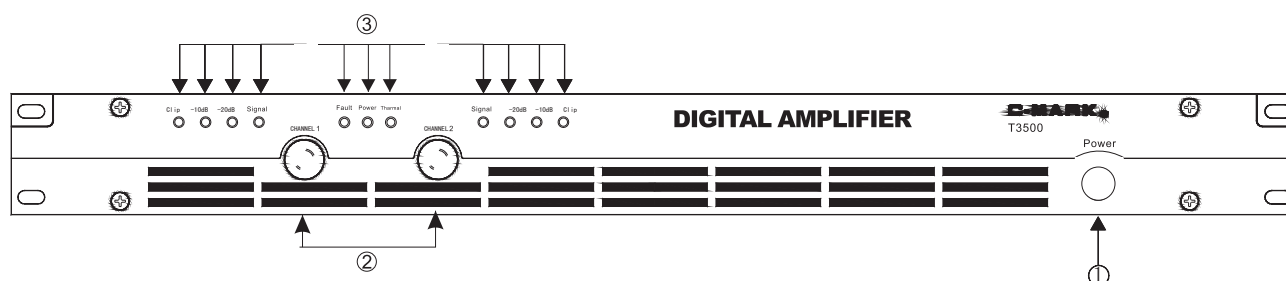
“Power”主要显示上电指示为绿色二极管，“Fault”和“Thermal”两颗黄色发光二极管用于故障和过热保护的显示，各声道有输出信号电平指示灯，分别为“Signal”、“-20dB”、“-10dB”、“Clip”，除“Clip”为红色发光二极管外，其余都为绿色发光二极管。

### 显示灯

#### 前面板控制

前面板有电源开关，增益控制旋钮和LED指示灯。

- 1) 电源开关
- 2) 增益旋钮
- 3) 用LED状态指示灯

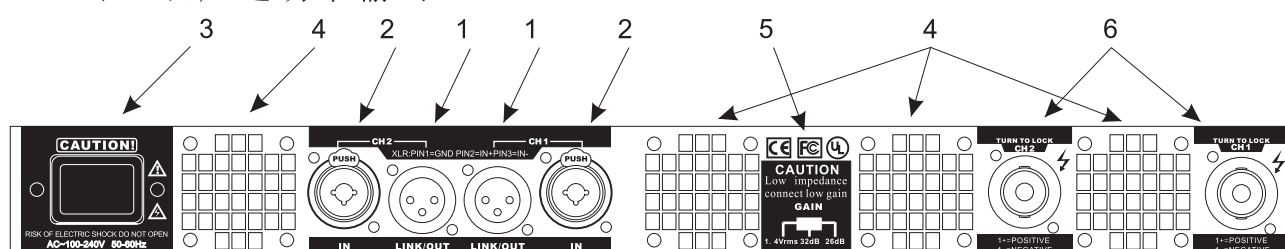


图一：前面板

增益控制在-00dB到+32dB之间使用对数

## 后面板控制

- 1) 各声道声音信号输出为Neutrik Speakon插座。
- 2) 各声道输入信号卡侬座XLR或立体声（组合）插头。
- 3) 交流电源插口
- 4) 散热风扇出口
- 5) 功放增益选择
- 6) 左右声道功率输出



图二:后面板

## 过载保护

### 开关

开机后约四秒，功放机正常运行。

## 短路保护

当短路和超负载使用时候,短路保护将保护功放、此时前面板Fault灯将点亮

## 温度保护

C-MARK 数字功放通过不断变动风扇的速度来散热（风扇速度按照功放的需求来变动）。温度过高会降低输出功率,若超过功放可承受温度,功放将过温保护,这时候前面板Thermal灯将点亮

## 直流出错保护

若直流或过多的滤波在声道输出端出现，瞬间保护电路将断开所有声道的电源。

## 输入/输出保护

通过专用电路来降低输入超过功放所能承受的大幅度信号的增益  
增益控制开关

T系列数字功放提供三档增益选择，以供接不同负载使用，低阻抗接低增益，以防止出现异常保护。



## 维修说明

清洁：首先断开交流电源，用一个柔软的，无腐蚀的布来清洁面板和底座。

除尘：特别是在多尘的环境中，经过长时间使用后散热片将有很多灰尘。可以将灰尘吸掉。要将上盖移开清洁时，应该咨询专业人员。

## 技术支持及服务

维护此产品需要专业受过培训的人员，机器内没有供维修用的零件。机器内存在电击危险，另外标有C-MARK字样的部件要用C-MARK的零件代替。

## 技术支持

若您认为产品有问题，请检查系统配置和功放设置，以找出问题所在，通常问题出现在错误的信号连接、劣质电缆、或其他系统损坏。若技术支持超出此说明书，请联系C-MARK技术支持部。

## 退货方法

- 1)将产品包装好以免运输中损坏。
- 2)随一份购买收据，您的名字、退货地址、联系电话和损坏描述。
- 3)关于外包装，也可以联系C-MARK授权的技术服务部。
- 4)费用预付，运到C-MARK。

## 功率系数调节

C-MARK 功放有一个自动功率调节系统。功放是整个网络的负载，最小化冲击电源和危险电流的失真。系统允许在变动电压的情况下运行。

## 注意：

- 一、此功放机不可桥接输出使用。

## 输入输出指标:

功率等级: OUTPOWER

负载 \ 型号	T1450	T2650	T3500
8 Ω	450W	650W	1000W
4 Ω	900W	1300W	2000W
2 Ω	1000W	1500W	2300W

信噪比 S/N:

105dB (A-weighted典型值)

整机增益 GAIN:

1. 4Vrms-26dB-32dB可选

(T系列数字功放提供三档增益选择, 以供接不同负载使用, 低阻抗接低增益, 以防止出现异常保护。)

频率响应: Frequency respond

20Hz-20kHz (+1/-2dB)

阻尼系数: Damping factor

300 @ 1kHz

有效频率范围内相位差:(Phase differences) (典型值)

频 率	20Hz	1kHz	20kHz
相 位 ( ° )	+11°	-6°	-137°

输入共模抑制: CMRR (common mode rejection rate) (典型值)

频 率	100Hz	1kHz	20kHz
CMRR (dB)	71dB	66dB	66dB

输入阻抗: (Input impedance)

15kΩ 平衡

通道隔离度: (Cross-talk attenuation) (典型值)

频 率	20Hz	1kHz	20kHz
CTC (dB)	85dB	80dB	65dB

总谐波失真: THD (total harmonic distortion) (典型值)

频 率	100Hz	1kHz	10kHz
THD+N@10%Rated Power	0.08%	0.08%	0.05%

互调失真: IMD(Intermodulation distortion) (典型值)

功率	1 Watt
DIM100 (dB)	0.05%
SMPTE60/7K (dB)	0.05%

## 电源指标:

电压AC100V-240V 50/60Hz

电流@220VAC

1/8额定功率

负载 \ 型号	T1450	T2650	T3500
8 $\Omega$	1A	1.4A	2A
4 $\Omega$	1.7A	2.3A	3.4A
2 $\Omega$	1.9A	2.6A	3.8A

1/3额定功率

负载 \ 型号	T1450	T2650	T3500
8 $\Omega$	2.2A	3A	4.2A
4 $\Omega$	3.9A	5.4A	8A
2 $\Omega$	4.2A	6A	9A

## 其他指标:

散热方式: 强迫风冷 (4个温控变速风机)

输入连接器: 平衡XLR

输出连接器: SPEAKON连接器

控制: 两路音量控制器 (前面板), 增益选择 (后面板)

LED指示: 电平指示、故障指示、过热指示

体积: 483\*400\*44mm W\*D\*H

重量: 9.8kg

## 备注:

本手册所提供的产品规格参数仅供参考, 如有变更, 恕不另行通知, 可随时查阅我公司网站

<http://www.c-markaudio.com>。