

# MCX-600

## PowerCode通讯无线中继器



## 安装说明

### 1. 产品介绍

MCX-600是一款由微电脑控制的无线中继器，用于在无线的PowerCode信号发射器与目标接收器之间传输信号。当无线发射器发出的信号超过目标接收器所能接受的范围时，则需要用到中继器(见图1)。

若发射器与目标接收器之间的距离太远，只用一只中继器还不够，则可以在传输路径上布置几只辅助性的中继器。通过这种方式来创建多级别的网络(见图2)。

信息发射器与目标接收器之间最多可连接16只中继器，每一只中继器都必须注册到相应的级别包中，使系统正确运行。

最接近目标接收器的中继器级别设置为0，每添加一个中继器，则会相应提高一个级别，最大的级别数为15。

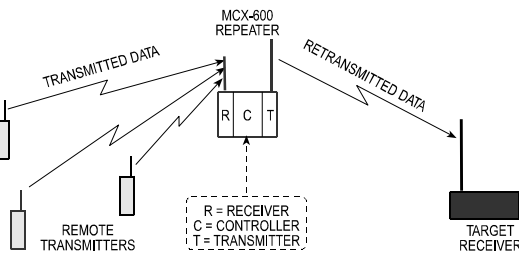
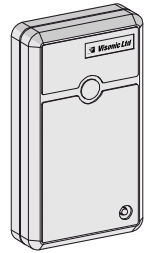


图 1. 单级别的中继器结构图示

每个MCX-600包括有一个接收器模块，一个发射模块和一个控制器的主机板，整个外观小巧，安装简单方便。

发射器和接收器都采用了小巧的外挂式天线，MCX-600由13V~20V直流电，11V~16V交流电，或9V镍镉可充电电池进行供电。电池可以通过内置的充电器进行充电。



一个充电完全状态下的电池(120 mAh)可持续工作2~5小时(在1:1接收/发射比例下，详情请见第2部分)。

**MCX-600与CodeSecure™设备不相兼容。**

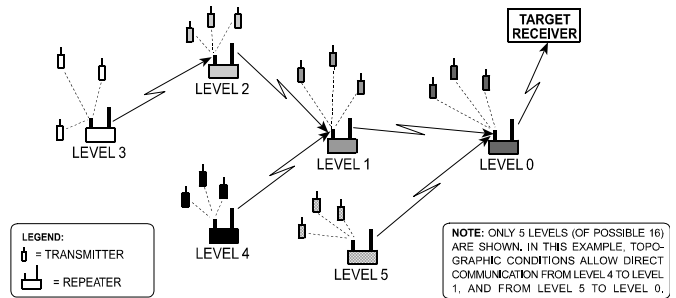


图 2. 多级别的中继器结构图示

### 2. 技术参数

操作频率: 315, 433.9, 868.95和869.2625 MHz, 或其他符合当地标准的频率。

接收器类型: Super-regenerative.

模块类型: 100% ASK.

PowerCode ID: 24位编码, 16,000,000个组的可能。

电源输入范围: 13 - 20 VDC, 或 11 - 16 VAC, 最小100 mA.

后备电源: 9 V可充电Ni-Cd或Ni-MH电池。

电流损耗 @14 VDC:

频率 (MHz)	315 & 433	868.95	869.2625
带可充电电池	17.5 mA	30 mA	40 mA

不带可充电电池	5.5 mA	17.5 mA	27.5 mA
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注: 接收状态与发射状态下电流损耗一致。

后备电池持续时间(电池在完全充电状态下120 mA/h及1:1的待机/发射的比例):

5 小时 (315 及 433.92 MHz 单位)

2.5 小时 (868.95 MHz 单位)

2 小时 (869.2625 MHz 单位)

LED 指示灯: 在发射过程中亮灯。

符合标准: 符合FCC条款第15部分, MPT 1340及1999/5/EC

工作温度: 0°C ~ 49°C (32°F ~ 120°F).

体积 (H x W x D): 110 x 63 x 25 mm (4-5/16 x 2-1/2 x 1 in.).

重量: 73 g (2.6 oz).

### 3. 构造与功能

#### 3.1 中继器的ID

PowerCode发射器采用24位的ID编码, 从16,000,000种组和可能中选择出来。当激活PowerCode发射器时, 其编码首先被中继器所接受, 再通过中继器将信号重新发送至目标接受器上。

每个MCX-600中继器都有其独一无二的24位ID编码, 用于发送该中继器的服务信息(见3.4)。

#### 3.2 单一的中继器的连接

在很多情况下, 只需安装一只中继器即可保证其目标接受器与发射器之间信号传输通畅。在单一的中继器的安装环境下, 需将控制面板中的DIP开关的级别选择器设置为OFF状态—即级别0。

级别为0的中继器只是简单的将收到的信息转发出去, 而不加入自身的级别信息(但在多级网络中级别信息却是最重要的, 参阅3.3节)。参阅第4部分了解更多详细的信息通讯过程。

#### 3.3 多中继器网络

##### A. 多中继器网络概述

添加到信号传输路径上的中继器可将高级别中继器信号转发到任一

低级别中继器上, 同时也可以直接将在它覆盖范围内的发射器信号转发出去(表2)。

信号从最高级别的中继器开始, 通过中间的中继器链传送到最低级别中继器(0级别), 最后到达目标接收器。

通过区分信号格式和级别信息, 每个多级网络中的中继器可以区分出收到的信号是从就近的发射器传过来的, 还是从更高或更低级别的中继器传过来, 中继器即根据这些不同做出相应反应。

除0级别以外, 各级别中继器会将收到的信息存储起来, 直到将其成功转发出去。

##### B. 选择级别

中继器主板上的四位DIP跳线可使安装人员设置相应级别, 共有16个级别设置, 见表3。

所有中继器级别跳线出厂设置均为off(0级别)

#### 3.4 维护信息

三种事件代码和中继器的24位ID共同组成一个维护信息码:

λ 掉电/低电压 (power failure/low battery) λ 防拆 (Tamper)

λ每小时自检报告(Hourly test report).

掉电/低电压 (power failure/low battery) 信息会在掉电 (AC或DC) 30分钟后发射出去。一旦掉电, 充电即停止, 备用电池开始工作。可以想象, 如外接电源始终未工作, 电池会逐渐消耗, 从而系统可能报告低压 (low)。

LEVEL	Switch Settings	LEVEL	Switch Settings	LEVEL	Switch Settings	LEVEL	Switch Settings
LEVEL 0		LEVEL 4		LEVEL 8		LEVEL 12	
LEVEL 1		LEVEL 5		LEVEL 9		LEVEL 13	
LEVEL 2		LEVEL 6		LEVEL 10		LEVEL 14	
LEVEL 3		LEVEL 7		LEVEL 11		LEVEL 15	

Figure 3. 级别设置

供电/电池恢复 (Power / battery restore) 只和测试信息一起报告, 防拆复位 (Tamper restore) 在发生后立即报告, 如果防拆tamper和掉电power failure持续时间很长, 则在每次测试信息时会分别产生警报。

维护信息中的中继器ID可使接收器区别信息来源, 服务人员可由此准确判断故障所在。

## 4. 信号处理过程

一旦中继器加电, 它的接收部分会立即启动准备接收信息, 但发射部分并未启动。

A. 所有各级别中继器均会收集并存储在其接收范围内的发射器信号或那些比它级别高的中继器发射的信号。那些不包含24位ID码或未经过校验的信息则不包含在内。

B. 有效信息会存储在信息缓存内, 在传送条件允许的情况下会立即转发出去。

**注意:** 在转发前, 中继器会检查RF通道是否畅通, -它只在通道未堵塞的情况下进行转发。不过, 一旦发生信号突或收到不间断的信号, 中继器会暂停收集信号30秒, 将缓存中的信号全部转发出去, 然后再恢复到接收状态。

C. 一旦发射条件允许, 缓存中的信息会全部转发出去, 顺序是先入

先出。

**注意:** 为防止不同级别中继器引起的信息冲突, 在每个级别中均设置有不同的发射间隔, 在设置中继器级别时, 该间隔即已自动设置完毕。

D. 转发以后, 信息即被目标接收器收到 (如果系统中仅有一个中继器), 或被另一离目标接收器更近的低级别中继器接收。

E. 如果级别为1或更高的中继器收到一个比自己级别低的中继器转发来的信号, 并发现它是自己曾发射过的信号, 它会停止重复转发并将该信息从缓冲区中清除。

F. 如未收到低级别中继器发回的确认信息, 该高级别中继器会在发射间隔 (由级别确定) 后再次转发该信息。在停止发射或继续下一个信号发射前, 中继器最多尝试发射8次该信号。

## 5. 安装

### 5.1 中继器位置选择

A. 在只有一个中继器的系统中, 需将其安装在确认能与目标接收器通讯良好, 且其范围覆盖发射器的位置。在多个中继器系统中, 必须确认发射器能与中继器通讯良好, 且该中继器与上下级中继器通讯良好。

B. 不要按最大接收范围使用中继器, 因为这样可能会使通讯链不可靠。

C. 将中继器安装在离地面尽可能高的地方, 远离金属屏蔽物。大的金属网, 金属门或钢筋混凝土墙都会减小接收范围。

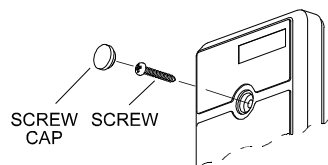


Figure 4. Front cover Assembly

### 5.2 安装过程

A. 拧开螺丝, 打开上盖 (表4), 螺丝的塑料盖在小尼龙袋内。

B. 用预留安装孔将基盖 (安装电路板的部分) 固定在选定位置 (表5)。

C. 确认天线垂直 (不要绞缠在一起), 如果需要, 则用胶带固定住。

D. 将电池接口紧扣在电池上, 并放置在电路板上方空隙处。

E. 将AC变压器接收交流电源上, 将输出部分接到中继器14V输入端子。

**说明:** 各种提供12V交流或直流的标准电源或变压器都可使用 (参看第二部分电源参数)

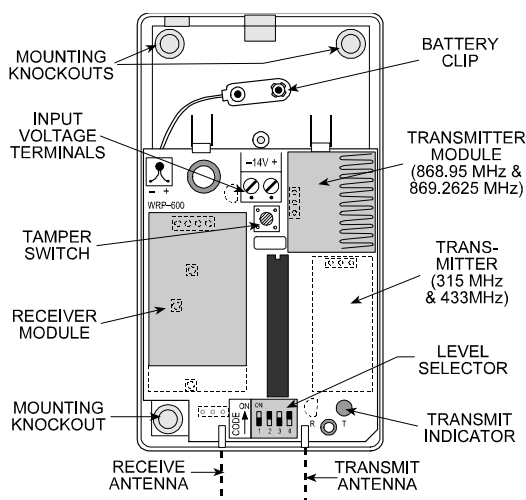


Figure 5. MCX-600, Cover Removed

## 6. 准备

### 6.1 注册中继器ID

MCX-600原样转发收到的发射器信息, 使用和原发射器一样的ID。但是由中继器引发的维护信息则使用中继器本身的ID。因此, 接收器必须注册系统中所有的发射器ID信息, 包括中继器ID (已经内置在发射模块中)。

参阅目标接收器的安装手册的“注册操作”章节, 在这项操作中, 必须从发射器触发一个信号以便将ID注册到接收器上。

**警告!** 确认中继器的级别设置为0级 (出厂默认设置, 见表3), 注册期间如未这样做, 则中继器不能注册。您可在注册结束后将中继器设置到相应级别 (见6.2节)。

使中继器发射一个信号非常简单-您可使它发射下列信号中的任一种：防拆 **tamper**, 或防拆恢复 **tamper restore**, 或一个自检信号 **supervision message**.

- 防拆 **tamper**信号在前盖打开时立即发出；
  - 防拆恢复 **tamper restore**信号在中继器防拆开关压下时发出；
- 自检 **Supervision**信号会在加电五分钟后发出。

## 6.2 级别设定

用四个拨码开关设置中继器的级别(表 3 和 5):

如系统中仅有一个中继器MCX-600, 则务必将所有拨码开关设置在OFF状态, 即为级别0;

如该中继器是多中继器网络中的一个, 请参看3.3B节设置合适的级别。

## 6.3 测试

- 对照指示灯孔位置盖好上盖, 拧好螺丝并盖上塑料帽。(见图 4).
- 参阅使用的发射器和接收器手册, 测试接收器对系统中每一个发射器信号接收范围和准确性。
- 确认接收器对中继器转发过来的发射器信号作出了正确反应(或通过中继器链路)。
- 如果信号接收有问题, 则需调整发射器、中继器或接收器的安装位置以改善接收效果。
- 切断外接电源, 检测中继器在电池供电的情况下也可正常工作。
- 接通外接电源, 取掉备用电池, 检测中继器在外接电源供电情况下工作是否正常。
- 重新装好备用电池, 测试结束。

## 7. 说明及警告

### 7.1 产品局限性

Visonic 公司的无线系统具有较高的可靠性并经过高标准测试。尽管如此, 由于发射低功率、小范围的限制(由FCC或其他权威机构要求)的原因, 有一些局限性必须考虑:

- 接收器可能因周围其他无线频率干扰等原因而错过对信号的接收;
- 一个中继器在一个时间内只能对一个发射器的信号作出反应;
- 无线设备应定期进行测试以确认信号是否正常。

### 7.2 相应标准

The 315 MHz version of this device complies with FCC Rules Part 15. Operation is subject to two conditions: (1) This device may not cause harmful interference, and (2) this device must accept any interference that may be received or that may cause undesired operation.

**WARNING!** Changes or modifications to this unit not expressly approved by the party responsible for compliance could void the user's authority to operate the equipment.

The digital circuitry of this device has been tested and found to comply with the limits for a Class B digital device, pursuant to Part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference in residential installations. This equipment generates, uses and can radiate radio frequency

energy and, if not installed and used in accordance with the instructions, may cause harmful interference to radio and television reception. However, there is no guarantee that interference will not occur in a particular installation. If this device does cause such interference, which can be verified by turning the device off and on, the user is encouraged to eliminate the interference by one or more of the following measures:

- Re-orient or re-locate the receiving antenna.
- Increase the distance between the device and the receiver.
- Connect the device to an outlet on a circuit different from the one which supplies power to the receiver.
- Consult the dealer or an experienced radio/TV technician.

This device complies with the essential requirements and provisions of Directive 1999/5/EC of the European Parliament and of the Council of 9 March 1999 on radio and telecommunications terminal equipment.

### 7.3 欧州无线频率分配

- **433.92 MHz** has no restriction in any EU member state.
- **418 MHz** is allowed in the UK only.
- **315 MHz** is not allowed in any EU member state
- **868.95 MHz (wide band)** is allowed in all EU member states.
- **869.025 MHz and 869.2625 MHz (narrow band)** are not restricted in any EU member state.

## WARRANTY

Visonic Ltd. and/or its subsidiaries and its affiliates ("the Manufacturer") warrants its products hereinafter referred to as "the Product" or "Products" to be in conformance with its own plans and specifications and to be free of defects in materials and workmanship under normal use and service for a period of twelve months from the date of shipment by the Manufacturer. The Manufacturer's obligations shall be limited within the warranty period, at its option, to repair or replace the product or any part thereof. The Manufacturer shall not be responsible for dismantling and/or reinstallation charges. To exercise the warranty the product must be returned to the Manufacturer freight prepaid and insured.

**This warranty does not apply in the following cases:** improper installation, misuse, failure to follow installation and operating instructions, alteration, abuse, accident or tampering, and repair by anyone other than the Manufacturer.

This warranty is exclusive and expressly in lieu of all other warranties, obligations or liabilities, whether written, oral, express or implied, including any warranty of merchantability or fitness for a particular purpose, or otherwise. In no case shall the Manufacturer be liable to anyone for any consequential or incidental damages for breach of this warranty or any other warranties whatsoever, as aforesaid.

This warranty shall not be modified, varied or extended, and the Manufacturer does not authorize any person to act on its behalf in the modification, variation or extension of this warranty. This warranty shall apply to the Product only. All products, accessories or attachments of others used in conjunction with the Product, including batteries, shall be covered solely by their own warranty, if any. The Manufacturer shall not be liable for any damage or loss whatsoever, whether directly, indirectly, incidentally, consequentially or otherwise, caused by the malfunction of the Product due to products, accessories, or attachments of others, including batteries, used in conjunction with the Products.

The Manufacturer does not represent that its Product may not be compromised and/or circumvented, or that the Product will prevent any death, personal and/or bodily injury and/or damage to property resulting from burglary, robbery, fire or otherwise, or that the Product will in all cases provide adequate warning or protection. User understands that a properly installed and maintained alarm may only reduce the risk of events such as burglary, robbery, and fire without warning, but it is not insurance or a guarantee that such will not occur or that there will be no death, personal damage and/or damage to property as a result.

**The Manufacturer shall have no liability for any death, personal and/or bodily injury and/or damage to property or other loss whether direct, indirect, incidental, consequential or otherwise, based on a claim that the Product failed to function.** However, if the Manufacturer is held liable, whether directly or indirectly, for any loss or damage arising under this limited warranty or otherwise, regardless of cause or origin, the Manufacturer's maximum liability shall not in any case exceed the purchase price of the Product, which shall be fixed as liquidated damages and not as a penalty, and shall be the complete and exclusive remedy against the Manufacturer.

**Warning:** The user should follow the installation and operation instructions and among other things test the Product and the whole system at least once a week. For various reasons, including, but not limited to, changes in environmental conditions, electric or electronic disruptions and tampering, the Product may not perform as expected. The user is advised to take all necessary precautions for his/her safety and the protection of his/her property.  
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