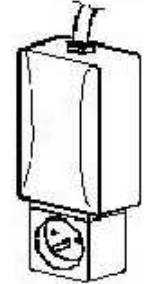


XM10 Two - way PLC interface for OEM* applications

Designed for OEMs where the controller manufacturer implements their applications using X10 PLC control. The functionality of the PLC control is decided by the manufacturer and implemented in the controller panel. The document " X10 protocol for OEM controller" (ask the dealer/distributor or visit www.X10-SA-home.com) defines the interface protocol that a manufacturer will need for implementing X10 control. With a control panel which has been designed to interface with X10 PLC, the installation is simple. Just connect the flying lead to the 230V power supply, connect the telephone cable to both the RJ11 socket on the XM10 and the control panel with the cable provided (*termination can differ per application, ask your installer for the correct lead). There is a red LED on the XM10 which is ON to indicate power. It will flash when X10 signals are being received or transmitted.



The XM10 is a transmitter-receiver that plugs into a regular AC outlet and connects to the controller via a modular RJ 11 telephone jack. Alternatively, the XM10 may be fitted inside the controller cabinet, connected to the 230 V AC supply before the power transformer. (This would be a typical installation with most security panels.)

It provides an opto-coupled 50 Hz. Square wave, synchronized to the zero crossing point of the AC line. The controller generates X10 compatible codes synchronized to this zero crossing point. The XM10 then couples the X10 codes onto the AC line.

Two - Way transmission available

The XM10 transmits and receives X10 codes. It enables an O.E.M. to develop a system to control X10 Modules, and receive X10 signals from remote sensors (P.I.R. motion detectors for example)

X10 Code transmission

To transmit X10 signals the controller must supply 1 ms "envelopes" to the TX input of the interface with respect to common. These envelopes must be as close as possible to the zero crossing point of the AC line (see timing diagrams). An opto-coupled output representing the zero crossing point of the power line is provided for the controller to which X10 codes are to be synchronised.

X10 Code reception

The XM10 uses a custom proprietary I.C. to read X10 codes from the power line. This takes a lot of burden off the microprocessor in the controller as it does not have to continuously monitor the power line and check all in coming signals (and noise) for validity. Any signals applied to the controller are error-checked, valid X10 codes. When a valid X10 code is received, it is stored in the custom I.C. and applied (in envelope form) to the controller. This output is coincident with the second X10 transmission. (X10 codes are always transmitted in groups of two, except for Bright and Dim.)

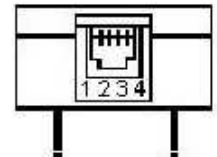
Data sent to the controller is valid X10 data. The start Code (1110) can be used to alert the controller that an X10 Code will follow. A "1" bit from the XM10 appears as a negative going pulse 1.1 ms long, beginning approximately 100 µs after zero crossing. The controller should sample this data between 500 and 700 µs after zero crossing.

The L.E.D. on the XM10 gives a visual indication that X10 codes are being received. The L.E.D. is illuminated when AC power is applied to the XM10 and blinks off when X10 codes are received. The XM10 will also receive the codes it transmits, therefore the L.E.D. will also give an indication of codes being transmitted.

*O.E.M Original Equipment Manufacturer.

Connection between the controller is via a standard modular phone jack, the connections for which are as follows:

- | | | |
|----|---|---|
| 1. | B | Zero crossing detect output (with respect to 2). |
| 2. | R | Common. |
| 3. | G | X10 received envelope output (with respect to 2). |
| 4. | Y | X10 transmit envelope input (with respect to 2). |



The ability to read X10 codes from its own output also allows the controller to incorporate data collision detection. If the code received differs from the code transmitted, the code can be assumed to have been corrupted by noise (or another transmission) on the power line.

The line Monitor capability of the XM10 allows the controller to ensure that the power line is free from X10 signals before starting a transmission. This means that in a multi-transmitter system the controller can minimise contention between transmitters. For example, if after detecting that the line is free, a transmitter waits for a random number of power line half cycles before transmitting, the chance of collision is reduced. A different priority can be assigned to each transmitter by including a fixed delay before the random delay. The shorter the fixed delay, the higher the priority.

Important Safety Notice

**0 V in this product is directly connected to one side of the AC line.
Therefore, for safety, an ISOLATING power transformer MUST be used when attempting any internal measurements.**

The power supply in the XM10 are capacitively derived from, and directly referenced to, the 230V AC power line . Care should be taken when monitoring any internal circuitry with an oscilloscope, **as the OV reference in the XM10 are NOT isolated from 230 volts.**

Technical details:

Supply voltage: 230 V +10% -15% 50 Hz

Ambient temperature: - 10° C to + 40° C (operation) / - 20° C to + 70° C (storage)

DC Characteristics:

Serial data input: Min. logic "1": 4 V input will sink approx 2,5 mA Max. logic "1": 20 V input will sink approx 18 mA
Max. logic "0": 0.8 V will sink approx 0,1 mA Voltages and currents with respect to terminal 2

Note: this output is an open collector transistor. Therefore, the logic "1" voltage is quoted as a reference for defining the output leakage current. An output pull-up resistor is required to generate a logic level. The pull-up can be returned to any voltage up to 20 V with respect to terminal 2.

AC characteristics:

HF output to AC power line: 60 mW average into 5W Conforms to Class 116 of EN50065-1: load (2,5 V pk-pk instant.) Carrier frequency: 120 kHz ± 2 kHz

Max. phase delay between 0 crossing point of AC power line and 0 crossing detect output (either transition): 100 msec

Max. allowable delay between transitions on 0 crossing detect output and serial data input "0" - "1" transition: 50 msec

Max. delay between serial input envelope "0" - "1" transition and carrier burst reaching 90 %: 50 msec

Width of X-10 envelope : 1 ms +100 msec -50msec

Isolation voltage : 4 kV rms 50Hz for 1 min.

X10-SA HOME and X10 Europe hereby declares that the devices XM10 complies with the essential requirements and other applicable provisions of the R&TTE 1999/5/EC directive. Product category: general consumer (category 3).

PORTUGUES: INTERFACE PLC BIDIRECCIONAL XM10

Interface Bidireccional para fazer a ligação entre o sistema X10 e os aparelhos. Permite-lhe controlar aparelhos através de comandos X10 que são enviados pela corrente eléctrica. Converte sinais TTL/CMOS em sinais X10 pela rede eléctrica e vice-versa. Entrada e saída isolada da rede eléctrica. Interface para sistemas de alarme, termóstatos, ecrãs tácteis, etc., com uma porta interface X10.

APLICAÇÕES

O Interface XM10 foi concebido para ser incorporado em produtos OEM. Vem também com um cabo de apenas 15 cm e uma ficha para depois ligar à corrente.

O XM10 tem uma saída e entrada TTL/CMOS. O aparelho que estiver conectado à interface, pode ser controlado através de comandos X10. Se tiver aparelhos que tenham a capacidade de gerar sinais X10, é possível controlar módulos X10. Poderá obter mais informações consultando o "Protocolo X10".

O indicador luminoso LED, que se encontra na parte da frente da interface, liga quando um sinal X10 é recebido ou transmitido.

Aplicações OEM podem ser ligadas à interface utilizando um conector RJ11. A entrada do conector é isolada da rede eléctrica, por isso pode ligar a interface PLC a um PC ou a outro equipamento informático sem qualquer problema.

**ESPAÑOL: MÓDULO BIDIRECCIONAL XM10**

Este módulo es el encargado de inyectar señales eléctricas en la corriente eléctrica, a la vez que está constantemente escuchando la corriente eléctrica para registrar lo que por ella circule. Es la interfaz de productos compatibles X10 con la corriente portadora.

FUNCIONAMIENTO

El módulo bidireccional XM10 realiza la función de interface, por lo que es el módulo encargado de inyectar en la red eléctrica las señales X10 que le indica el sistema domótico. La señal X10 que genera e inyecta en la portadora tiene las siguientes características :

Nivel Lógico "1"	4V ~ 20V
Nivel Lógico "0"	0V ~ 4 V
RF a la red eléctrica	60mV – 5 O.
Cumple con la clase 116 de EN50065-1	5Vpp
Frecuencia de portadora	120 Khz +- 2Khz
Máximo retraso entre fase y paso por cero	100 µs.
Máximo retraso entre detección de salida y entrada de datos serie	50 µs.
Anchura señal X10	1 ms

Por otro lado, el XM10 está diseñado para registrar todas las señales X10 que circulan por la red.

MODO DE INSTALACION

1. Colocar en la clavija RJ11 que posee el módulo bidireccional el cable dispuesto para ello.
2. Colocar el otro extremo del cable RJ11 en el interfaz OEM, compatible con X10.
3. Conectar a un enchufe.

ADVERTENCIA: No olviden desconectar los magnetotérmicos correspondientes antes de realizar la conexión del módulo.