the excelPTZ range

Installation and Operation Manual

RS485 Distributor Instructions

Models covered

PTZ750

Version 1

For updates to these instructions visit www.excelPTZ.com

Please read this operation manual carefully
before installing and using this unit !!!!

Please read the following:

1. Please read the operation manual carefully before installing and operating the product.

2. The PTZ750 RS485 Distributor requires a **12v DC** regulated power supply at 50mA.

3. Do not attempt to disassemble this unit. In order to prevent electric shock, do not remove screws or covers. There are no user-serviceable parts inside this unit.

4. Always use and adhere to current electrical safety standards to install and use the RS485 Distributor. The RS-485 cables should be kept way from high voltage equipment such as mains cables and electromagnetic fields. Using an anti-surge protection device is recommended to prevent damage to this unit from lightning and mains surges. Damage caused by lightning or mains voltage surges is not covered under the PTZ750's warranty.

The excelPTZ range –

RS485 Distributor

When incorporating a number of PTZ domes in a system, the installer may experience problems with corrupted RS485 signals due to cabling methods and the setting of the 120Ω termination resistor. The RS485 Distributor takes the guesswork out of the installation and provides an amplified control signal from the control keypad or DVR and distributes it evenly across four separate spurs that can each support up to four PTZ domes. This means that you can have four individual spurs of over 1000 metres each, controlling a maximum of sixteen PTZ domes in total.

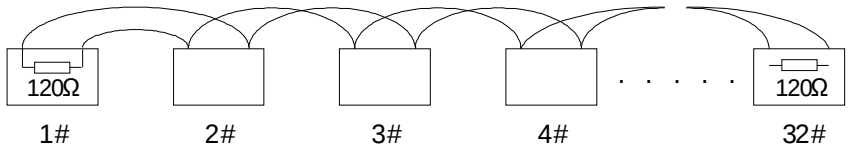
RS485 Connection methods

METHOD 1 – ***DAISY CHAIN CONNECTION.***
The general RS485 standard recommends a "daisy chain" connection of equipment that is to be controlled. This means that the control cable is looped out of the one dome to the next dome and so on. The last dome in the line is then fitted with what is known as a "termination resistor". This has a value of 120Ω. The resistor is built into the PTZ domes and is activated by moving the appropriate "jumper" in the dome. Note that some PTZ domes use one of the dipswitches rather than a jumper but this has the same function.

The keyboard itself generally has a built-in 120Ω resistor. These termination resistors help make the signal more stable and give the system better reliability so the domes function as expected. A common mistake installer's make is not making sure the 120Ω resistor is switched ON in the LAST dome. Also installers often select the resistor to ON in another dome in the chain; these errors will make control of the dome unpredictable.

A simplified Daisy chain is shown below.

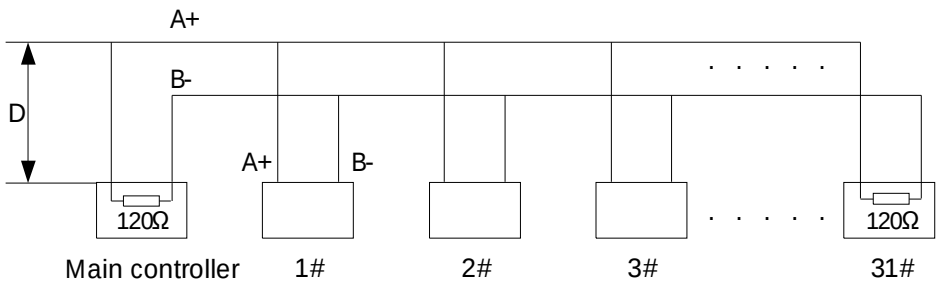
This first diagram shows the cables looping in one dome and out of another:



Standard Daisy-Chain connection for the RS485 PTZ control signal

(Only the last dome only has the 120Ω resistor set to on. The first device is the keyboard and has the 120Ω built in as default)

This next diagram is a slight variation on the Daisy Chain arrangement. Again it's one cable going out to all the domes but instead of the cable going into each dome then back out to the next one, a junction box is used to "Spur-Off" to each dome. Whilst this can be done THE SPUR LENGTH (D) must be NO MORE THAN 10 metres!!!!!!!!!!!! The overall cable length between the Controller and the last dome is limited to around 300 metres in such an arrangement.



Daisy-Chain connection WITH SHORT SPURS for the RS485 PTZ control signal

(one main radial with very short spurs to each dome off it, keeping the spurs to less than 10 metres)

In some circumstances you may need to adopt a star configuration for practical purposes. For instance, all the domes may be so scattered on a large site that running out separate spurs to each dome in a “STAR” array is the only practical solution.

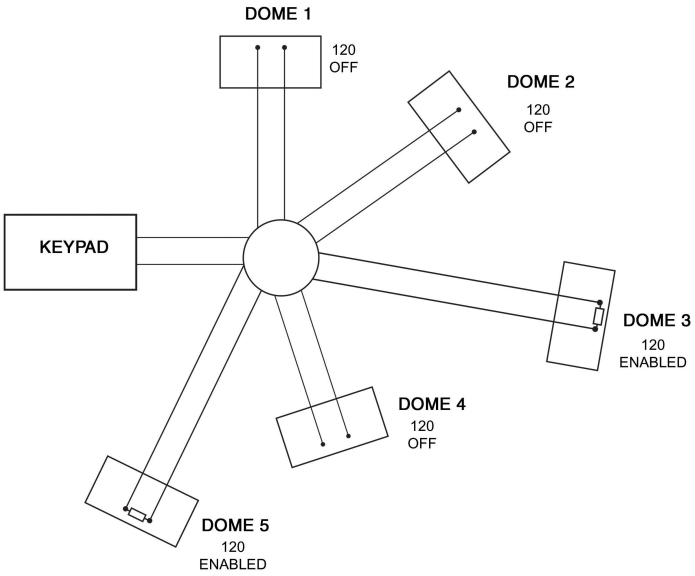
So how do you do this in practice?

The termination resistors must be connected to the two domes that are farthest away from each other, such as domes 3 and 5 in the following “Star diagram”. Note that all the other domes do not have the 120Ω resistor connected. The resistors are already fitted to the domes PCB but by default are not in circuit. To put them in circuit you must move the small “jumper” as previously indicated.

As the star configuration is not in conformity with the requirements of RS485 standards, problems such as signal reflections may arise, especially when there are long cable connections. The results are that control signals are decreased and the dome may not respond to, or just responds intermittently to the controller.

If your STAR circuit is not too extensive with each spur in the region of 20-50 metres you can expect quite good reliable performance using this technique. If you experience any problems though, the RS485 Distributor PTZ750 will help to overcome any problems.

The Star circuit for wiring PTZ’s.
The two furthest domes need the 120Ω resistors enabling, by moving the “Jumper”
In this example it’s domes 3 &5.



The Star Diagram

Overcoming RS485 data loss using an RS485 distributor

In the real world not everything always works exactly as it’s expected to!

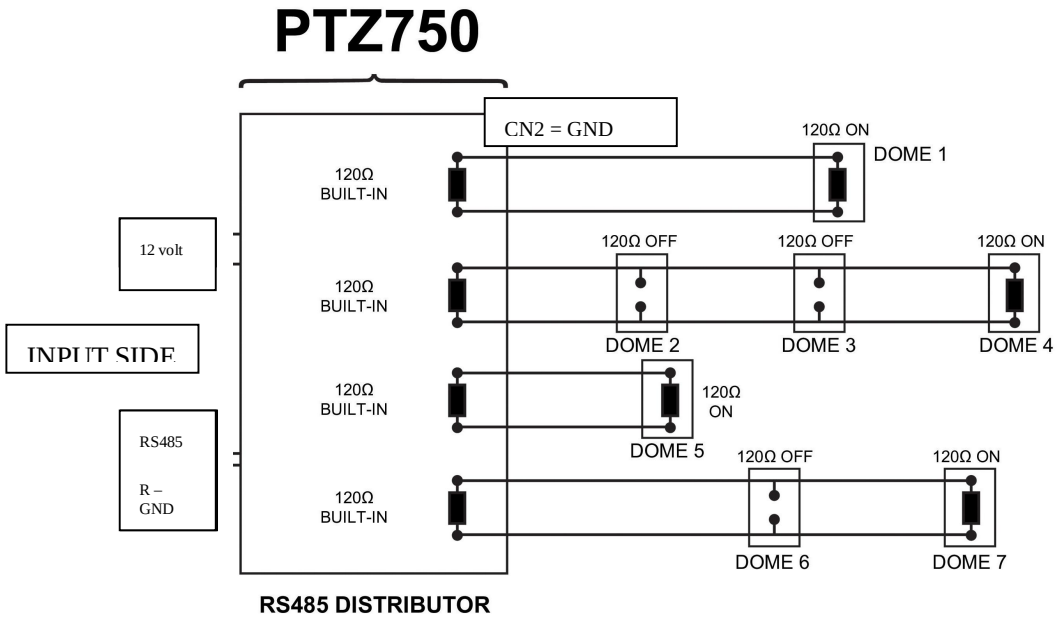
RS485 data signals that control the domes’ movements are tiny signals that can get corrupted for many reasons. Poor cable quality, not using a PAIR of cores from a CAT5 but using one core from TWO separate pairs, running the CAT5 cable near mains equipment such as florescent lighting all will have a detrimental effect on the signal. These are things that you can correct with good installation practices.

Where you wish to run several separate CAT5 cables out to send the RS485 data signal out to the domes you are in effect correcting the STAR method of RS485 data distribution. As previously mentioned the problem with the Star method is that it is not actually designed for RS485 but generally works okay if you follow the previous notes on getting the 120Ω resistor setting right, as per the previous notes.

One way that takes the guesswork out of installing the Star method is to utilise an RS485 distributor. This has the advantage that the RS485 signal is correctly distributed to the domes so that they behave as expected. You can create up to 4 spurs to the domes and put up to 4 domes on each spur. Just like the Daisy chain method the end dome on each spur needs to have the 120Ω resistor enabled. Although the RS485 distributor is a small additional expense, it takes some of the guess work out of the installation design and gives a more flexible approach to cabling which itself can save time and money on the installation. Not forgetting you get more predictable results!

The RS485 distributor (PTZ750) amplifies the RS485 control signal and distributes it evenly to 4 separate spurs, each spur can have up to 4 domes. This means that you could theoretically have up to 4 individual spurs of over 1000mtrs each to control up to 16 PTZ domes in total. Ideally you would put just one dome on each spur from the PTZ750 but up to 4 domes is generally acceptable. The following diagram shows a typical use of the PTZ750 RS485 distributor.

In the following example and diagram, domes 1,4,5 and 7 are at the end of each spur and therefore require the 120Ω resistor enabling by moving the jumper setting within the domes. Domes 2,3 and 6 are all "midway" in each spur and do not need the 120ohm resistor and can be left as default. The PTZ750 itself has four 120Ω resistors built in as shown and you do not have to do anything with the PTZ750 as the resistors are permanently connected within it.



(*Diagram showing how to use an RS485 distributor to improve PTZ control reliability*)

Please note if you have the PTZ750 located within 5mtrs of the keypad or DVR you can connect up to 3 of them in parallel.

Connections

Power Supply

The PTZ750 RS485 distributor requires a 12v DC regulated supply at 50mA. The unit has a 2.1 Mini Jack Plug socket and can use the POW100 power supply (not supplied with this product.)

RS485 Input

Push the green three pin terminal connector into the RS485 connection on the distributor. Using the correct markings on the distributor, connect the A line to the + and the B line to the –
NOTE: a (GND) ground connection is also available.

RS485 Output

Push the green nine pin terminal connector into the RS485 connection on the distributor. Using the pairs grouped as shown in the diagram above connect the RS485 A and B lines.
NOTE: The CN2 connection is a ground connection.