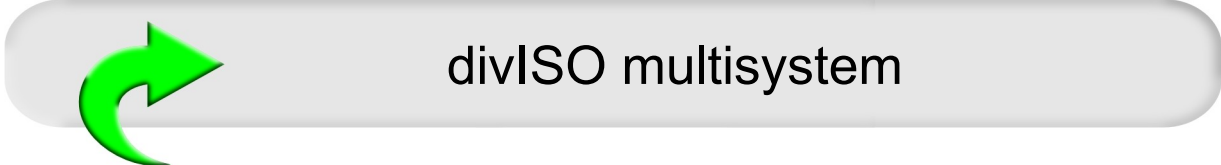
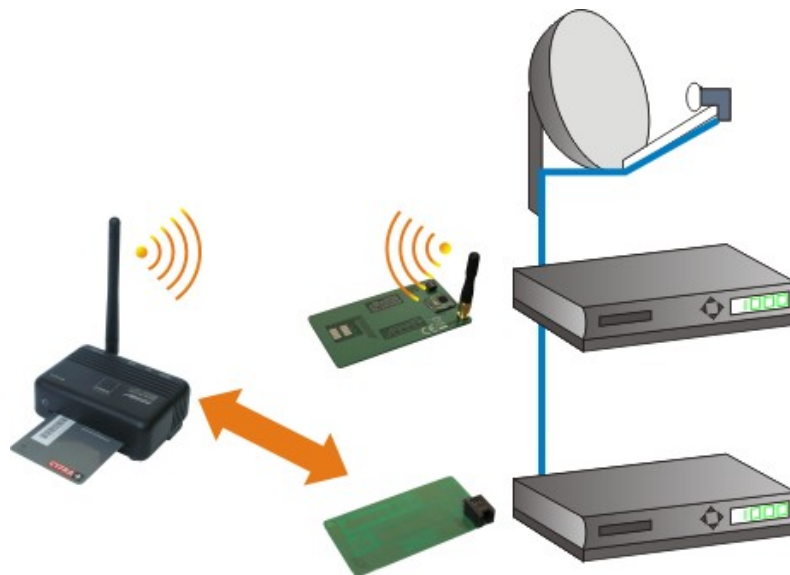


# divISO MULTISYSTEM



Version 1.5 EN

## System Structure



To receive a digital video transmission, the set top box have to exchange some information with the subscriber's card with almost no delays. When the decoder is up and running, it communicates with smart card every few seconds. The frequency of issuing the requests may in some circumstances significantly rise, for example when switching between channels. If the communication fails or the delay is too long, the decoder shows a message, saying that the channel is not available.

The splitter enables one subscriber's smart card to be used by a few different set top boxes at the same time. The card cannot be simultaneously present in may decoders, so the presence of valid smart card have to be emulated. The device doing so, is simply called the client card. The module is designed in the way, that it may be placed in the decoder's slot like a standard subscriber's card. The aim of the client card is to serve as a proxy between the decoder and the splitter server (in which the original card resides). The client module firmware imitates the crypt-card behavior in such way, that the decoder cannot distinguish it from the original subscriber's card.

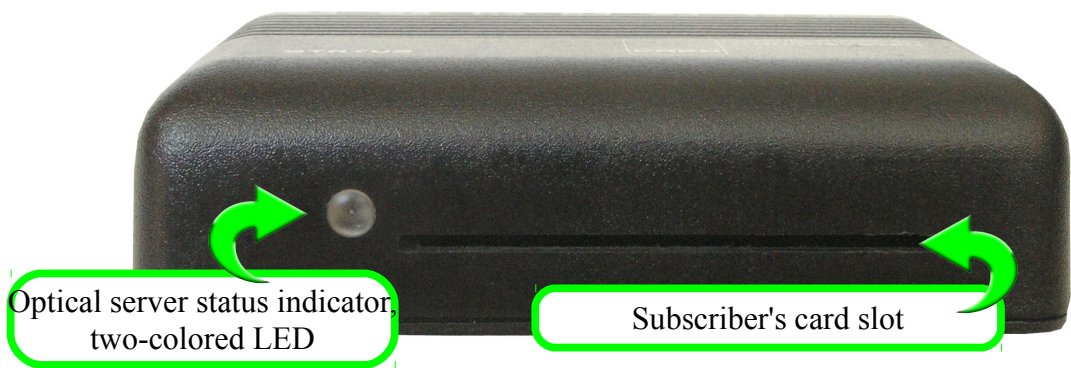


The server is the most important component of the system. Its task is to manage logical links between client cards and the subscriber's card. It gathers the requests from the decoders, arranges them in an optimal order and finally exchange the data with the smart card. The subscriber's card should be placed in server's slot, like it was the actual decoder.



The device can also serve as a “blocker” (enabled separately for each slot). That option can be accessed by USB port, using the DivisoManager computer program.

## The Server's Front Panel



To exchange data with the subscriber's card, it must be properly inserted to the server's smart card slot. The card should be placed with the connector facing down. The valid card orientation is shown in the picture on the right.

If the card is placed in an improper way, the system will be unable to use it. Such case is indicated by the status indicator blinking red.

The server status indicator provides visual information on device state. The interpretation of signals is summarized in the table:



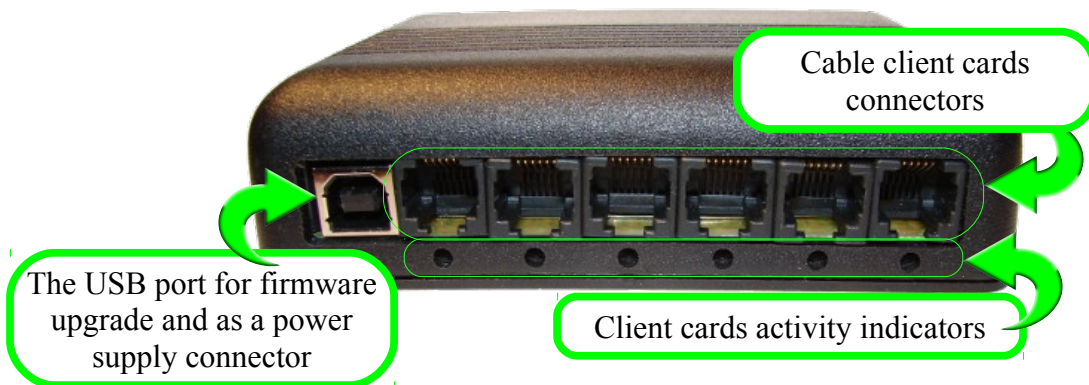
The indicator behavior	The device state
blinking green	working: idle state
lag, when blinking green	working: transmission in progress
fast blinking red or orange	no smart card detected
still green light	firmware upgrade mode
still red light	the card is invalid or inserted wrongly
no light at all	no power supplied

If, after inserting the card, the server does not start blinking green, please check the following:

- is the card placed with contacts facing down, and the contacts are inside the server
- is the card (relatively) clean and not damaged nor broken
- is the server powered with the enclosed USB power supply

The brightness of the server front panel indicators and client card indicator can be reduced using the computer with the DivisoManager application (ref. [http://diviso.pl/download/diviso\\_upgrade.pdf](http://diviso.pl/download/diviso_upgrade.pdf)).

## Back Panel Connectors



The back panel provides a set of connectors and indicators. The server is the only system component that requires an external power supply. We suggest using the enclosed adapter and USB A-B cable. It is possible, but not recommended, to power the server from other device, which has an USB port of suitable type (A). Such device should be always connected to mains and provide the power constantly.



The second function of the USB connector is to provide interface for upgrading the system firmware. To replace current firmware or change advanced settings please download and install suitable driver and execute the DivisoManager program. Detailed instruction concerning those topics may be downloaded from [http://diviso.pl/download/diviso\\_upgrade.pdf](http://diviso.pl/download/diviso_upgrade.pdf).

In radio enabled servers (namely AIR and AIR DUO), the back panel offers also an SMA aerial connector. The other connectors are used for connecting wired client cards. The order of using sockets is not important.

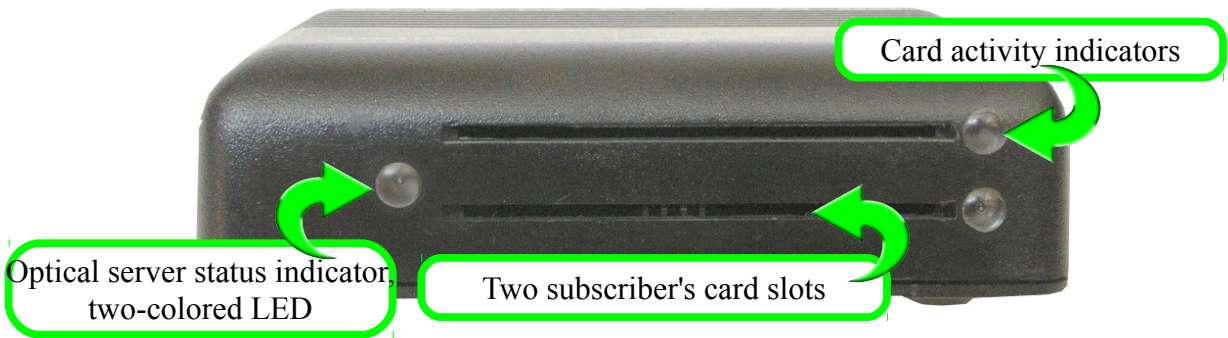
Server type	Wired client card conns.
Standard	6
DUO	6
AIR	2
AIR DUO	4

The divISO splitter wired installation should be made of four-wire or six-wire telephone cable. The connections should be made in the “straight” fashion (1 to 1), which means that the wires should be placed in both jacks of the same cable, exactly in the same order. For more information concerning methods of making the cabling please refer to [http://diviso.pl/download/diviso\\_cables.pdf](http://diviso.pl/download/diviso_cables.pdf). The installation can be also made of the two-wire telephone cable or the cables of other systems, but this will not guarantee as high transmission quality or reliability like the recommended solution. When planning a custom installation, you should necessarily read the document referenced above.

There is an optical client card activity indicator under every socket. Every time when the client card is exchanging data with server, its corresponding indicator blinks red. There is no need to analyze those signals, until the installation does not work correctly. They may be very useful for diagnosing some common electrical problems, like lack of connection (when the indicator on client card lights up, but the indicator on server does not) or possible short circuit (when the indicator on server's back panel glows constantly).

## The DUO Versions

The DUO version of divISO server has two smart card slots for subscriber's cards.



Every smart card connector has an additional optical activity indicator assigned to it, enabling user to roughly estimate the card's occupancy. In the divISO DUO line of servers, you should not place two cards using the same cryptographic systems. For example, it is not possible to simultaneously use the following pairs of platforms: TNK & TechniSat, Cyfra+ & TV VLAANDEREN. If this condition is not fulfilled, only one of those two cards will be used by the system. It is not possible to speed up the system by placing two cards of the same platform in it. The most popular configurations, that are known to work well, are: Cyfra+ & TnK; Cyfra+ & TechniSat MTV; Cyfra+ & Dorcel, Free-X TV, Dream-X TV; TnK & Free-X TV; TnK & TV VLAANDEREN; TV VLAANDEREN & TechniSat MTV; TV VLAANDEREN & Dorcel, Free-X TV, Dream-X TV.

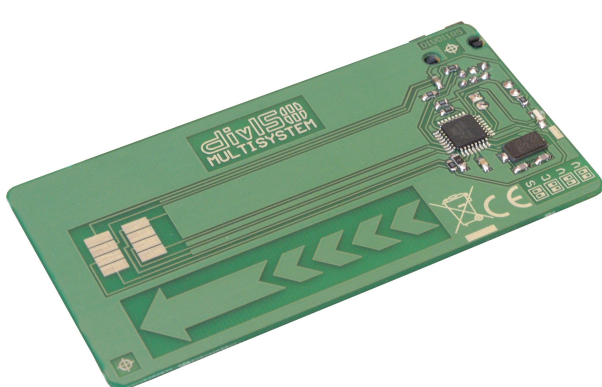
## The AIR Version

The AIR version of splitters is equipped with radio transceivers. Every divISO AIR server can cooperate with up to 8 AIR clients using the wireless link in the 868 MHz band. The AIR servers are offered with simple omnidirectional aerials, which are suitable for most applications. The aerial is connected using standard SMA connector, enabling the use of more advanced or directional aerials (which are more expensive and harder to mount). Replacing the aerial may help when making long-distance links or the system is supposed to work in the conditions of high electromagnetic interferences. Both the server and the client cards support changing the aerial.

The AIR server provide also 2 or 4 (in DUO version) cable client card sockets, that enable user to connect few cheaper wired cards, if the server is located near some of the cooperating tuners. Due to little amount of required connectors, the basic divISO AIR server is enclosed in an aesthetic casing, which is by ¼ smaller than other servers.



## The divISO Multisystem Client Cards



Standard divISO client card



divISO FLEX client card

The divISO multisystem client cards are designed in such way, that they can be inserted into the decoder slot like standard smart card. Both solutions, shown above, have identical functionality. The choice between standard and FLEX client is only matter of your preferences.

The standard divISO client card, when inserted into the decoder, does not completely hide inside it. The electronic components, coding scheme switch and the cable or aerial connector are still outside the set top box. Despite this inconvenience, this solution is satisfactory in most cases.



If you prefer to completely hide the client card, so that the splitter presence is not directly visible, we suggest using the FLEX version. The size of card with contacts is almost identical to the original subscriber's card, due to the fact that the whole electronics was placed in separated casing and connected using ribbon cable. If using the decoder with a flap covering the card slot, the client card presence can be well masked. We suggest to first remove the flap. Then put the card inside and lead the cable under the decoder, and finally put the flap back in place.



The client card activity is signaled by built-in optical indicator. It lights up, when the client card receives data that should be exchanged with server, and dim when the operation finishes. After placing card in the decoder, in the valid and working installation, the diode should first blink several times (the decoder gathers information about the card), and then just flash periodically (every few seconds, the decoder acquires new deciphering keys from card).

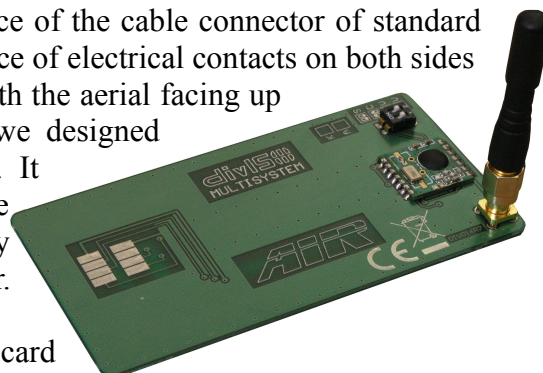
Do not be afraid of accidentally damaging the electronic components of card. They are firmly fastened to the board and they are also protected against electrostatic discharges of voltages up to 2 kV. The card should be cleaned with dry cloth. If its surface is seriously contaminated, we suggest using cloth dampened with small amount of clean alcohol. We do not provide any additional casings, because they would not provide any excessive mechanical protection to the card, but only reduce the techie look of the module.

## The Wireless divISO Client Card

The wireless divISO client card has the aerial in the place of the cable connector of standard client card. The second important difference is the presence of electrical contacts on both sides of the card module, so it can be placed in the decoder with the aerial facing up or down. To compensate lack of the FLEX version, we designed additional pass-through connector, called the Repeater. It provides the possibility to place the client card in the location in which it will not be easily visible, for example behind the decoder.







Apart from that, the wireless client card operation is identical to the wired one.



## Choice of the Coding Scheme

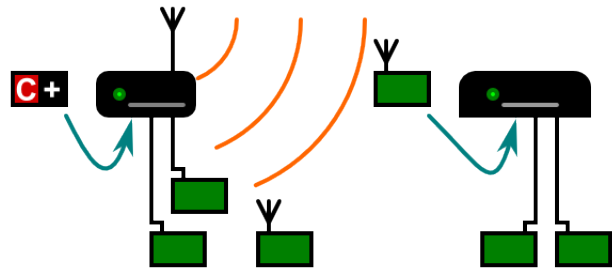
When the client card is powered on (for example by placing in the decoder or by turning the decoder on, from standby) it has to immediately identify itself, providing information of used coding scheme. This information has to be available instantly, so it cannot be transmitted from server. To configure card for using particular coding scheme (and the digital platform, indirectly), the card provides a pair of small switches on its surface.

Before the client card is inserted into the decoder, it should be configured to work with the platform of your choice. To choose the coding scheme configuration please use the following table:

Position	Coding scheme	Platforms
	SECA	Cyfra+, TV VLAANDEREN, Canal Digitaal Satelliet
	VIACCESS	Dorcel, Free-X TV, X-Dream TV
		
	CONAX	Telewizja na Kartę, TechniSat MTV

## divISO Splitters Cascading

Since the 2.5 firmware release it is possible to chain multiple divISO installations together, by inserting one client card into the other server. This enables for providing signal to several tuners in the remote location using only one radio link – which is depicted in the sketch. This type of cooperation was impossible in the earlier firmware revisions because the divISO card when inserted into the divISO server immediately entered the firmware upgrade mode. Since the 2.5 release it is possible to configure the server to use the card for data transmission only instead of forcing it to start an upgrade process.

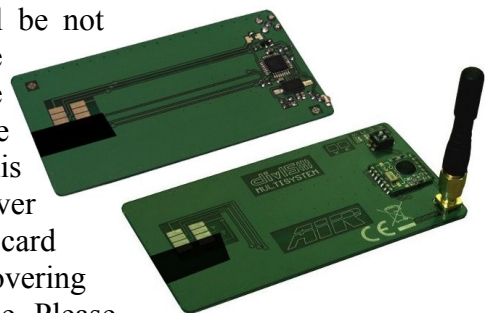


This mode is disabled by default, because it renders the further client card's firmware upgrade impossible. To be able to use the divISO server for upgrading clients again, the cascading mode has to be disabled first.

Whether or not is the server in cascading mode can be determined by observing the optical indicator after removing the card from the slot (both slots, in case of DUO servers). If the indicator then blinks red, the cascading is turned off. It blinks orange when the cascading is active.

## The Tuners Violating the ISO 7816

Among eight contacts of a standard smart card, two shall be not connected in the ISO 7816 standard compliant tuners. The divISO cards use these contacts for firmware upgrade purposes. Unfortunately there are few decoders that violate the standard and provide some signal to these terminals. This may cause the AIR cards to stop contacting the divISO server which results in no video decoding. If this is the case, the card has to be stopped from entering the upgrade procedures by covering the two contacts with a piece of insulating or stationery tape. Please use the picture on the right for reference on this operation. This fix is only required for the AIR card operating in one of the following tuners: SRT-6880, TS4, ARIVA TT PVR and several revisions of Aston CI modules.







## The Ferguson Ariva Tuners

also Opticum X110 & 9600 mini and Linbox 7818 & 7819

A few tuners impose very strict timing constraints on the data transmission with the card and require special servicing routines in the splitter. To achieve a full system reliability in case of Ferguson Ariva line, Opticum X110 & 9600 mini and Linbox 7818 & 7819 tuners it is recommended to turn on the “More demanding tuner” option in the client card settings. To activate or deactivate this mode the DivisoManager application has to be used. This computer program is available for download in the appropriate section of our website: [http://diviso.pl/en\\_download.php](http://diviso.pl/en_download.php). The method for switching this mode is described in more detail in the firmware upgrade manual available at [http://diviso.pl/download/diviso\\_upgrade.pdf](http://diviso.pl/download/diviso_upgrade.pdf). Using the “More demanding tuner” mode for other tuners cannot cause any harm to them, but may introduce occasional freezes of the video stream.



## The Wireless System Tips

The tips for arranging the wireless installations:

1. The wireless installation server should be located close to the geometrical center of the area in which the AIR clients are supposed to operate.
2. The system should not be installed in cable shafts, steel crates or near any large metal surfaces because the effective splitter range may be therefore considerably limited – due to radio signal interferences.
3. The aerials should all keep the vertical direction, however it is not important if the aerial actually points up or down.
4. Neither the wireless card nor the server should operate closer than half a meter from large TVs (over 30”) as their power supplies can emit considerable electromagnetic fields that may degrade the radio link range.
5. If the AIR client have to be located near a large TV (or directly in the TV) it is recommended to use the aerial with cable (e.g. <http://alfatronic.pl/index.php?p27>).
6. To implement long links (up to about 300 m) an ATK 20 or similar aerial is advised.
7. The aerial for the divISO AIR devices should support the 868 MHz band and have a SMA connector (but not SMA R/P).

In most countries the splitter may be used without a license as it operates at the frequencies that are part of the free ISM bands. If in doubt, please consult your national band plan. All the radio transmissions are scrambled to prevent unauthorized use of the splitter signal. To pair the AIR card with server the card has to be inserted into the server's slot for a short time (about 2 s).



## Installation and Exploitation

To install the system, we suggest to proceed with the following steps:

1. Connect every wired client card to the server's sockets (some useful hints concerning cable installations may be found at [http://diviso.pl/download/diviso\\_cables.pdf](http://diviso.pl/download/diviso_cables.pdf)).
2. Supply power to the server, it is preferred to use the enclosed adapter and USB cable. The indicator, located at the front panel of the device, should start blinking red (informing that the smart card is not present)
3. If the server is of the AIR type, insert each wireless client card to the server's slot for at least two seconds. This procedure will pair cards with the server. One server can work with no more than eight radio client cards.
4. Insert the subscriber's card in the server slot with contacts facing down (see in the picture on the right). The indicator should turn green and start blinking, which means that the device is operating properly. In case of DUO servers, you can now insert the second smart card.
5. Place the client cards in the decoder slots, keeping in mind on which side the electrical contacts should be (if in doubt, consult the decoder's manual)
6. If the decoders were off, it is time to turn them on and test the system. Decoders should work as with the original subscriber's card.



Contacts are on the opposite site

After completing those steps the system is ready to work for your convenience, and should not require any additional attention.



## See Also

- The firmware upgrade manual  
([http://diviso.pl/download/diviso\\_upgrade.pdf](http://diviso.pl/download/diviso_upgrade.pdf))
- The cable installations planning and preparing manual  
([http://diviso.pl/download/diviso\\_cables.pdf](http://diviso.pl/download/diviso_cables.pdf))