

## Datasheet



### V5-EVO Multiswitches - Line Powered

- EV5-508 5-input, 8-output line powered multiswitch**
- EV5-512 5-input, 12-output line powered multiswitch**
- EV5-516 5-input, 16-output line powered multiswitch**
- EV5-524 5-input, 24-output line powered multiswitch**
- EV5-532 5-input, 32-output line powered multiswitch**

V5-EVO is tuned to minimise 4G-800 LTE interference and has been developed for very low current consumption from the trunk cables, headend and from receivers. V5-EVO multiswitches are powered either via the horizontal trunk cables or locally via the auxiliary input socket. These multiswitches are ideal in small, medium and large cascaded systems where up to 40 multiswitches can be powered from single V5-034 power source. All multiswitches have stepped gain at each bank of four (eight on 24 & 32) outputs to balance subscriber signal levels and allow long (up to 120m) and short subscriber cables to be connected to the same multiswitch.

- Designed for large, medium and small line powered IRS installations
- Power from headend, anywhere on horizontal trunk cables via remote power supply, or local power
- Current consumption as low as 60mA from trunk and 65mA receiver
- Active satellite and terrestrial with "stepped" gain for signal equalisation
- Gold contact switchable input attenuators for all satellite and terrestrial input bands
- High input / output capability for long subscriber lines
- Pre-mounted earth bars and 6mm<sup>2</sup> earth post
- LED power indicator
- Fully screened diecast housings for extreme interference immunity

Model	EV5-508	EV5-512	EV5-516	EV5-524	EV5-532	
Number of Inputs	4 x SAT + 1 x Terrestrial					
Number of Outputs	8	12	16	24	32	
Frequency Range	SAT 950 – 2400MHz					
	Terr 47 – 790MHz					
Gain SAT Fixed Slope Pre-emphasis	Output 1 - 4		+5 to +14dB		Output 1 - 8	+5 to +14dB
	Output 5 - 8		+4 to +12dB		Output 9 - 16	+4 to +12dB
	Output 9 - 12		+3 to +10dB		Output 17 - 24	+3 to 10dB
	Output 13 - 16		+2 to 8dB		Output 25 - 32	+2 to +8dB
Gain Terrestrial	Output 1 - 4		-1 to +5dB		Output 1 - 8	-1 to +5dB
	Output 5 - 8		-2 to +3dB		Output 9 - 16	-2 to +3dB
	Output 9 - 12		-3 to +1dB		Output 17 - 24	-3 to +1dB
	Output 13 - 16		-4 to -1dB		Output 25 - 32	-4 to -1dB
Gain Control	SAT 0 – 12dB in 4dB steps					
	Terrestrial 0 – 15dB in 1dB steps					
Output Level SAT (max)	105dBµV (IMD <sup>3</sup> – 35dB) (EN50083-3)					
Output Level Terr (max)	IMD <sup>3</sup> -35dB (EN50083-3)					
Output 1 - 4	91dBµV	91dBµV	91dBµV	Output 1 - 8	89dBµV	
Output 5 - 8	89dBµV	89dBµV	89dBµV	Output 9 - 16	87dBµV	
Output 9 - 12		87dBµV	87dBµV	Output 17 - 24	85dBµV	
Output 13 - 16			85dBµV	Output 25 - 32	83dBµV	
SAT / SAT Input Isolation	>30dB					
Output Isolation SAT / SAT / Terr	>30dB / 35dB					
Rejection TV -SAT / SAT-TV	>30dB / 40dB					
DC Pass from external PSU	18V / 600mA max					
Current consumption from receiver	<65mA					
Current consumption from H Lines or external power supply	12V to 18V / 60mA			12V to 18V / 100mA		
Control Signals	V/Lo, H/Lo 11.5V – 14.5V/0kHz, 16.5 – 19V/0kHz					
	V/Hi, H/Hi 11.5V – 14.5V/22kHz, 16.5 – 19V/22kHz					
Operating Temperature	-20°C to +50°C					
Dimensions mm	187x135x30	227x135x30	267 x 135 x 30	227x135x50	267x135x50	
Weight	0.6kg	0.7kg	0.9kg	1.5kg	1.9kg	

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## Datasheet

### V5-EVO Multiswitches - Mains Powered

- EV5-508M 5-input, 8-output mains-powered multiswitch**
- EV5-512M 5-input, 12-output mains-powered multiswitch**
- EV5-516M 5-input, 16-output mains-powered multiswitch**
- EV5-524M 5-input, 24-output mains-powered multiswitch**
- EV5-532M 5-input, 32-output mains-powered multiswitch**

V5-EVO is tuned to minimise 4G-800 LTE interference and has also been developed for very low current consumption from trunk cables and receivers alike. EV5-xxxM series mains-powered multiswitches are designed to be used either as stand-alone radial multiswitches for "star" wired networks or to be used in conjunction as a power source with the line powered multiswitches for smaller to medium cascaded networks. These mains-powered multiswitches can be used to power up to six line powered multiswitches and an LNB. EV5-xxxM will power a Quattro LNB via the horizontal inputs at up to 650mA max. Power is provided from the built-in switch-mode power supply.



EV5 has been developed to minimise 4G-800 LTE interference with built-in filtering of the terrestrial input to 790MHz and sharp filtering and excellent isolation of the satellite inputs. The diecast housing provides maximum screening and is fitted with "slot-on" mounting brackets for easy installation.

Model		EV5-508M	EV5-512M	EV5-516M	EV5-524M	EV5-532M
Number of Inputs		4 x SAT + 1 x Terrestrial				
Number of Outputs		8	12	16	24	32
Frequency Range	SAT	950-2150MHz				
	Terr	47 – 790MHz				
Gain SAT Fixed Slope Pre-emphasis	Output 1 - 4	0 to +8dB			Output 1 - 8	-3 to +5dB
	Output 5 - 8	-1 to +6dB			Output 9 - 16	-4 to +3dB
	Output 9 - 12	-2 to +3dB			Output 17 - 24	-5 to +1dB
	Output 13 - 16				Output 25 - 32	-6 to -1dB
Gain Terrestrial	Output 1 - 4	-1 to +3dB			Output 1 - 8	-2 to +1dB
	Output 5 - 8	-2 to +1dB			Output 9 - 16	-4 to -1dB
	Output 9 - 12	-3 to -1dB			Output 17 - 24	-5 to -2dB
	Output 13 - 16	-4 to -3dB			Output 25 - 32	-6 to -4dB
Gain Control	Terrestrial	0 – 15dB in 1dB steps				
Output Level SAT		96dBµV (IMD <sup>3</sup> – 35dB) (EN50083-3)				
Output Level Terr		(EN50083-3) IMD <sup>3</sup> -35dB				
Output 1-4		94dBµV			Output 1 - 8	92dBµV
Output 5-8		92dBµV			Output 9 - 16	90dBµV
Output 9-12		90dBµV			Output 17 - 24	88dBµV
Output 13-16		88dBµV			Output 25 - 32	86dBµV
SAT / SAT Input Isolation		>30dB				
Output Isolation SAT / SAT / Terr		>30dB / 35dB				
Rejection TV –SAT / SAT-TV		>30dB / 40dB				
DC Pass from built-in PSU		14V / 18V / (Terrestrial) 12V <0.65A total (12V – 100mA)				
Current consumption from receiver		<65mA				
Control Signals	V/Lo, H/Lo	11.5V – 14.5V/0kHz, 16.5 – 19V/0kHz				
	V/Hi, H/Hi	11.5V – 14.5V/22kHz, 16.5 – 19V/22kHz				
Power Consumption 230V AC 50/60Hz without external load/ with maximum external load		2W/17W			3W/17W	
Operating Temperature		-20°C to +50°C				
Dimensions mm		253x135x52	293x135x52	333 x 135 x 52	293x135x52	293x135x52
Weight		0.8kg	0.9Kg	1.1kg	1.7kg	2.1kg

## Datasheet

### V5-EVO Launch & Line Amplifiers

#### EV5-100T Mains Powered Launch Amplifier

#### EV5-101T Line / Remote Powered Launch / Repeater Amplifier

EV5 Launch and Line amplifiers are designed for EV5 cascaded and radial multiswitch systems for amplifying satellite and terrestrial trunk cable signals. Each amplifier has four separate SAT IF amplifiers and one broadband terrestrial amplifier in a fully-screened diecast housing for added interference immunity. V5-100T and 101T are designed to reject 4G-800 LTE interference. Each model incorporates reliable gold contact switched attenuation and slope control on all five inputs. The terrestrial amplifiers use high quality push-pull technology for low distortion and high output capability.

EV5-100T with built-in power supply can be used to power line powered systems including the LNB at up to 2A. EV5-101T can be line powered via its input or output connectors or with a remote power supply (V5-034 recommended). Both models have LED indicators for power on both 14V (V) and 18V (H) line. EV5-100T has additional red/green LEDs for overload or short-circuit identification.



Model		EV5-100T	EV5-101T
Frequency Range	SAT IF	950-2400MHz	
	Terrestrial	47 -790MHz	
Gain	SAT IF	22dB	
	Terrestrial	22dB	
Gain Control/ Attenuation	SAT & Terr Inputs	0 – 15dB 1dB steps	
Slope Control	SAT IF	0 / 3 / 5/ 7dB	
	Terrestrial	0 / 6 / 12 / 18dB	
Isolation	SAT / SAT	30dB	
	SAT / Terr	30dB	
Noise Figure (typical)		≤9dB	
Terr Output IMD <sup>3</sup> -35dB ( EN50083-3) SAT IF Output IMD <sup>3</sup> -35dB (EN50083-3)		115dB <sub>μ</sub> V 114dB <sub>μ</sub> V	
External powering	V Lines	14V 0.5A switchable with LED indicator	
	H Lines	18V 2.0A switchable with LED indicator	
	Terr Lines	12V 0.1A switchable with LED indicator	
DC Pass switchable via H Lines		2A max when load is shared on H:Lo & H:Hi	
Power consumption		230V AC 50Hz 7w without external load	DC 9-18V 4W line powered or external PSU**
Operating temperature range		-20 <sup>0</sup> to +50 <sup>0</sup> C	
LED indicators x 3		Green: 12V on   18V on   14V on / Red: overload/SC	Green 12V on   18V on   14V on
Connectors / Earth Connection		RF F female   4mm2 Earth Post   UK mains plug 3A	RF F female   4mm2 Earth Post   DC 18V F female
Dimension & Weight		284x 135x52mm 1.0kg	178x135x30mm 0.6kg

\*\* recommended PSU for external remote power is EV5-034 18V 2.5A. Use direct connection to EV5-101T or V5-033 DC injector/ line power tap.

## Datasheet

### V5-EVO Splitters & Taps 4 x SAT + 1 x Terr

<b>EV5-204</b>	<b>2-way equal splitter</b>
<b>EV5-408</b>	<b>4-way equal splitter</b>
<b>EV5-210</b>	<b>Tap -10dB</b>
<b>EV5-220</b>	<b>Tap -20dB</b>

V5-EVO splitters are built to compliment all V5-EVO models is small, medium and large IRS installations. With class leading performance in terms of low insertion loss, cable slope pre-emphasis and linearity, these splitters and taps allow managed trunk signal distribution for 5-wire IRS. V5-EVO taps attenuate the signal to the side output while minimising trunk through losses. EV5 splitters provide equal division of the incoming signal to all ports.

V5-EVO splitters and taps pass DC on the through lines at up to 2A when the current is shared across 2 of the IF lines. Switchable DC is provided on the tap/splitter ports of the H:lo and H:hi lines.



Model		EV5-210	EV5-220	EV5-204	EV5-408
Frequency range	SAT	4 x 950 – 2400MHz			
Terr		1 x 5 – 862MHz			
Number of tap outputs		1 x 5 Tap	1 x 5 Tap	1 x 5 splitter	4 x 5 splitter
Through loss	SAT	<2dB	<1dB	4dB	8dB
	Terr	<2dB	<1dB	4dB	8dB
Tap loss	SAT	10dB	20dB	4dB	8dB
	Terr	10dB	20dB	4dB	8dB
Input Isolation	SAT	30dB			
	Terr	30dB			
Return loss		>13dB			
DC through pass	H lines	2.0A max when shared across H:lo & H:hi (1A max through one line)			
DC through pass	Terr line	0.1A max			
Connectors		F female (F male quick to f female on earth bar) 1.0mm max centre conductor for direct connection 5 x F male quick to F male quick for close coupling of multiswitch			
Operating temperature		-20°C to +50°C			
Dimensions	mm	126x135x30mm			267x135x30mm
Weight		0.44kg			0.7kg
All specification ±1dB					

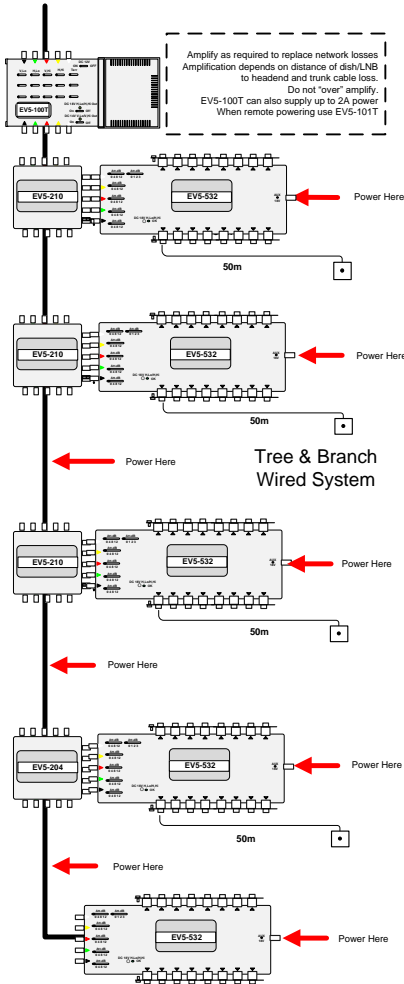
V5-EVO is designed to be installed using type 100 cable and larger sizes are usually unnecessary if the system is correctly planned.

V5-EVO taps and splitters are designed with high quality 1.0mm f-female sockets for high surface area contact and maximum return loss performance. Use **only** type-100 cable directly on inputs or outputs. For larger cables it is important to use the correct reducing pin connectors. Consult your cable/connector supplier. Do not force type-125 cable directly into the connectors as damage will occur.



### Planning and design of EV5 systems

V5-EVO is simple to plan and build into a fully operational and reliable IRS installation. Trunk signal levels remain low because each multiswitch has gain at satellite IF and terrestrial frequencies. In standard "tree-and-branch" or "cascaded" distribution, the cable losses are calculated and the appropriate tap value is inserted into the trunk to supply the multiswitch input with the optimum signal level. This enables a balanced system as the multiswitches furthest from the amplifier require the least tap value and those nearest the amplifier require the greatest tap side-loss value.

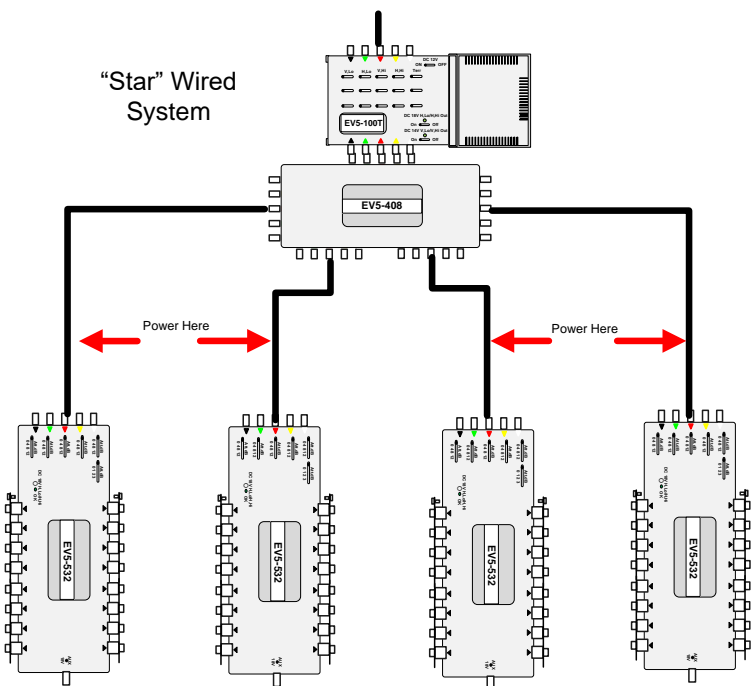


Where a "star" network is required the multiswitches can be connected to splitter/splitters to form an equi-distant cable network. Each multiswitch will be provided with the same signal levels for equal performance. Calculation of the cable attenuation based on the cable lengths can determine the correct amount of amplification.

Further adjustment of the of the input signal can be made using the input attenuator switches on line powered models.

Combinations of "tree-and-branch" and "star" wired systems can be assembled to suit the building layout. Multiswitches can be close coupled, remote wired directly, or to a tap or splitter giving the flexibility to position the multiswitch nearer to the central position of apartments for best performance. Always try to position multiswitches as near to apartments as possible. Best practice and performance dictates that subscriber cables are best kept as short as possible. However EV5 multiswitches can provide adequate signal for up to 100m subscriber cables.

It is always recommended to minimise the use of amplifiers. In analysis of technical support it was found that a high proportion of technical problems were due to too much amplification of both satellite and terrestrial signals. Avoid amplifying trunk signals and then immediately attenuating with a high tap value.



V5-EVO multiswitches have "stepped" gain outputs (shown in data above) to accommodate short and long subscriber lines with a 2dB step in each group of four (or eight on EV5-524 and 532) outputs. Gain is pre-emphasised to high frequencies to counteract the effects of cable slope attenuation.

The terrestrial input of V5-EVO amplifiers and multiswitches are filtered 47 to 790MHz. A terrestrial filter is fitted at the input to minimise 4G-800 LTE interference. The 4G-800 filter will cut LTE interference in each of the amplifier and the multiswitches by up to 14dB giving a total 28dB of protection in the network. Further filtering may be necessary due to local conditions.

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### EV5 Power Supplies



EV5-034 switch-mode-power-supply is designed to provide up to 2.5A at 18V which is enough to power even the largest of installations with as many as 40 x EV5-532 multiswitches connected together. That's a total of 1,280 subscriber cables!

EV5-034 has been fitted with 600mm DC lead terminated in a F male connector and a 500mm AC input lead with UK standard plug fused at 3A.

EV5-034 power supply is housed in an ABS moulded housing incorporating a red "power on" LED. If the LED is not illuminated the power is disconnected or the output is short-circuited.

The power supply housing incorporates large easy to see fixing lugs for convenient bulkhead mounting



The EV5-185 is a small UK standard plug-top power supply capable of delivering 18V at up to 500mA (0.5A) with short-circuit protection. It is ideal for smaller systems of three or four multiswitches and an LNB. Fitted with a male F connector makes it reliably connect to the auxiliary connector on an EV5 multiswitch or the EV5-033 DC injector.

Model	EV5-185	EV5-034
Voltage	18V DC	
Maximum Current	0.5A (500mA)	2.5A (2500mA)
Power Supply Type	Switch-Mode Power Supply (SMPS)	
Input Voltage	240V AC 50Hz	
Maximum Consumption	11.50W	57W
DC Connector	F Male Connector to IEC 60169-24	
DC Lead length (nominal)	600mm	
AC mains lead length (nominal)	N/A (Plug Top)	500mm
Operating Temperature	-5°C to +50°C Indoor Use Only	
Weight	0.1kg	0.3kg
Housing Dimension inc fixing lugs	75mm x 50mm x 35mm	142mm x 75mm x 47mm

### EV5-033 DC Inserter or DC Tap



V5-033 is a switchable dual direction DC inserter ideal for remote powering of EV5 systems anywhere in the trunk cable. The DC can be diverted up, down or in both directions in a network. LED indicators confirm the direction of DC powering. V5-033 is fully screened for high RF performance and interference immunity. This model is ideal for remote powering where mains voltage is not available for a headend power supply / amplifier and can also be used to tap off DC voltages to other DC devices.



### EV5-255 5-Core Galvanic Isolator

The Vision EV5-255 Galvanic Isolator is ideal as a critical safety device when the trunk cable of an IRS installation joins two buildings together. Where two buildings are joined across different phases of the mains it is likely that an earth potential difference is created and a high balancing current flows across the coaxial cables. EV5-255 isolates one building from the other at up to 2kV but allows the RF signal to pass with minimal insertion loss.

EV5-255 can also be used as a 5-core DC block.

Refer to separate EV5-255 data sheet for full information.

### V17-018 Coaxial DC Block

V17-018 coaxial DC block is a fully screened DC block for use where components in an IRS installation require DC isolation from each other. For example, in large systems it may be prudent to power separate zones in a system so as not to overload a particular power source, yet provide signals from the same headend.

V17-018 is also ideal where the addition of high power consumption devices are added to a system at a later date and require separate a power source to avoid overload of the original system. V17-018 can be used to DC isolate that addition device.

It is never good practice to connect two DC power supplies to the same coaxial cable. They may be at slightly differing voltages and try to power each other causing premature failure. V17-018 will isolate up to 30V DC, is fully screened for interference immunity and fitted with a male and a female F connector.



**Equipotential Earth Bonding**

Current UK legislation and codes of practice require that aerial systems that join individual dwellings together, via a common cable system, are earthed to the main earth terminal (MET) of the building. This is for safety of the engineer working on the system as much as any resident using the network. All subscriber cables should be connected to the MET of the building with a 4mm<sup>2</sup> earth cable sheathed in the standard green and yellow striped earth wire. (if in doubt consult a qualified electrician).

When coaxial cable systems join separate buildings together, it may be necessary to provide galvanic isolation on trunk or subscriber cables between buildings. Galvanic isolation stops balancing currents flowing between each building with a different earth potential. These balancing currents can be dangerous.

Consult your trade association codes of practice and documentation for the correct procedure.

EV5-xxx multiswitches and taps/splitters are delivered with factory fitted earth-bars. These are fitted to the output sockets enabling removal of the all input and subscriber cables while the earth integrity remains intact for all subscribers. A 6mm<sup>2</sup> saddle and clamp earth post is also provided for connection and linking of each earth bar to the earth wire, making installation and servicing fast and safe. All specification and performance data is made with these earth-bars fitted.

**Locating equipment**

All V5-EVO products are designed for indoor use only. A suitable indoor location or IP65 rated outdoor cabinet or housing should be found for installation of each component. Do not fit this equipment in areas of high humidity or allow equipment to come into contact with moisture or sources of heat. Ensure adequate drip loops are formed in input or outputs cables to divert any moisture away from electronic equipment.

When commissioning the installed system connect all coaxial and DC cables before connection and powering from the mains. We do not recommend "hot-swapping" active DC components when powered. Accidental short-circuit may damage the equipment. Always disconnect a power supply whenever a short circuit is discovered. Although protected, a power supply may overheat with a prolonged short-circuit.

**System Design & Planning**

Vision Products is pleased to offer a free system design, planning and technical support service. Ask your wholesaler for further details or contact us for further information.