4.3 Communications

1 Practice your speed reading. Find the answers to the quiz about communications satellites. Try to be the first to complete this task.



Television satellites are all in orbit about 35,700 km above the Earth and travel at approximately 11,000 kph. At this speed and altitude, the satellite revolves around the planet once every 24 hours, the same period of time it takes the Earth to make one full rotation. In other words, the satellite appears to be permanently at the same location. You therefore only need to direct your dish at the satellite once, and then it picks up the signal without further adjustment. Satellites transmit signals in the frequency range of 10.7 – 12.75 GHz (in Europe). The feed horn (or LNB, low noise block) on the satellite dish on your roof converts this high-frequency signal into a lower signal in the range of 950 – 2150 MHz.

1 How high are communications satellites above the Earth?

a) 15,700 km b) 25,700 km c) 35,700 km d) 45,700 km

2 How fast do these satellites travel around the Earth?

a) 7,000 km/h b) 11,000 km/h c) 15,000 km/h d) 21,000 km/h

3 What frequency are signals from a communications satellite to your satellite dish?

a) 12 GHz b) 1 GHz c) 500,000 MHz d) 5000 MHz

4 What frequency are the signals from your satellite dish to your TV.

a) 150 MHz b) 1500 MHz c) 15,000 MHz d) 150,000 MHz

LIVEWORKSHEETS

2 Read the instuction leaflet and label the diagram with the words in the box.

computer	dish	DTV card	feed horn	satellite	TV	TV station

How to receive satellite digital video broadcasts

Equipment needed

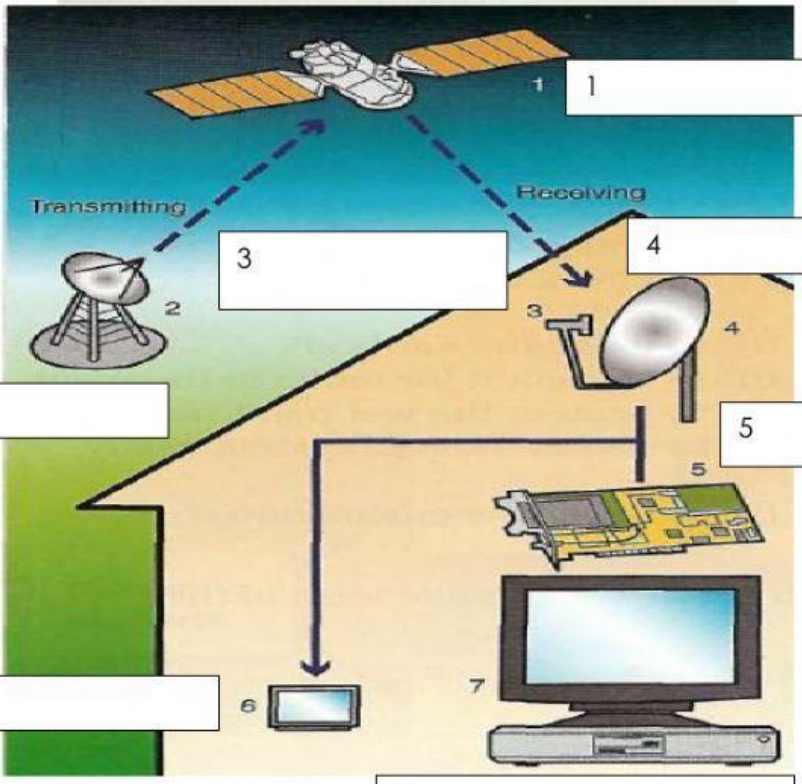
You will need a computer with a DTV (digital TV) card. This is connected by cable to a satellite dish, which should be between 60 cm and 1.8 m in diameter. The dish must have a feed horn. This converts high-frequency signals to low-frequency ones.

How it works

There is a communications satellite in orbit high above the Earth. TV programmes are transmitted from TV stations up to the satellite, which then sends the signals down to Earth. These signals have a high frequency of several GHz.

Your dish receives the high-frequency signals and reflects them to the feed horn, which then converts the signal into a lower frequency.

The feed horn is connected via a cable to the DTV card, which processes the signal. It extracts the video and audio, and plays them via the PC monitor and speakers.



1 [ ]

2 [ ]

3 [ ]

4 [ ]

5 [ ]

6 [ ]

7 [ ]

LIVEWORKSHEETS

3 What does 'which' refer to in the text?

1	Line 5	a)	the cable	b)	the satellite dish
2	Line 13	a)	the satellite	b)	the TV stations
3	Line 17	a)	the frequency	b)	the feed horn
4	Line 20	a)	the DTV card	b)	the feed horn

4 Study the diagrams below. When to use *which* and when to use *who*.

Signals are transmitted to	the satellite. the satellite the satellite, ***which***	then sends the signal to earth.
John reports to	Adel. Adel Adel, ***who***	is the training manager.

5 Join these pairs of sentences. Use *who* or *which*.

1 My computer has a DTV card. This is connected by cable to my satellite dish.

My computer has a DTV card, which is connected by cable to my satellite dish.

2 If your DTV card doesn't work, contact our technician. He will repair it.

3 The dish reflects the signal to the feed horn. This converts the signal to a lower frequency.

4 Please send any complaints to our customer service manager. She will then contact you.

5 The radio station sends signals to the satellite. This then transmits the signals to my dish.

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6 My DTV card extracts the audio and video. These are then displayed on my PC monitor.

_____

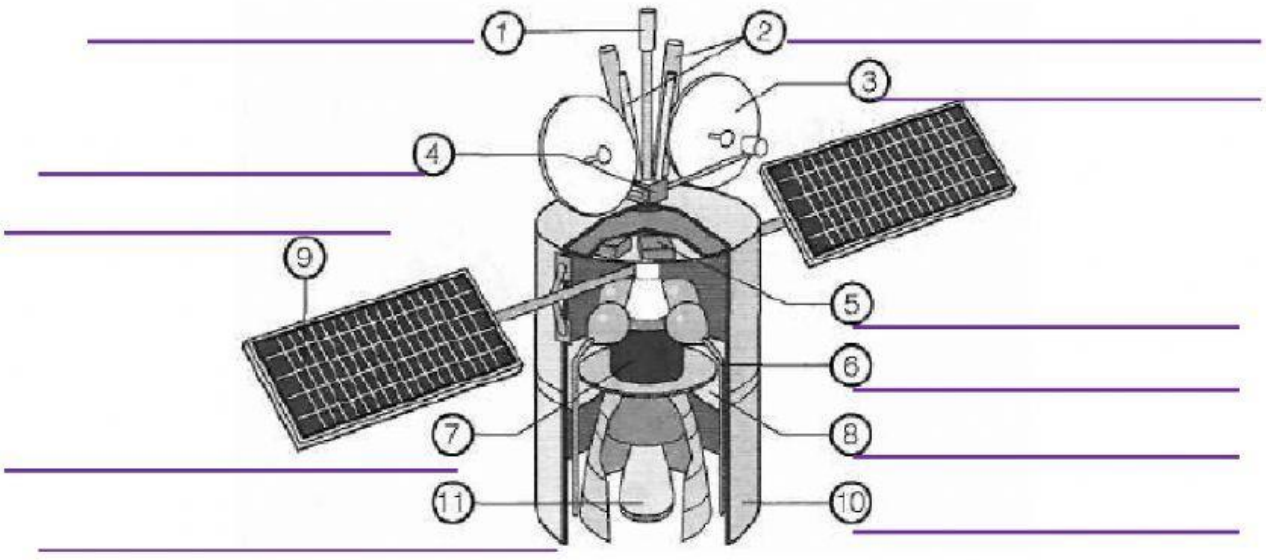
_____

6 Match the words with the same or similar meaning.

1	transmit		A	get
2	receive		B	work
3	convert		C	send
4	extract		D	show
5	display		E	change
6	operate		F	take out

7 BONUS ACTIVITY: Label the satellite parts and write the number of the parts next to the descriptions in the text on the next page.

antenna	bus	computer	downlink	main rocket nozzle
pressurised tank	puffer jets	radio	rechargeable batteries	solar panels



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Each satellite has a frame or **bus** *10,* which is strong enough to hold everything together.

All satellites need a source of **electrical power**. This comes from solar panels _____. However, these do not work when the satellite is in shadow, on the side of the Earth away from the Sun. Therefore, a ring of rechargeable batteries _____ is installed.

All the satellite's systems are monitored and controlled by a **computer**_____.

All satellites have antennas, which receive radio wave information from the ground (**uplink**) _____ and transmit radio wave information back to Earth (**downlink**) _____. The antennas _____ are connected to the **radio** _____ on the satellite. Satellites are controlled by the ground-control crew in many ways. They can change the satellite's orbit by firing the main rocket _____ or request information.

All satellites have an **attitude control system**, which controls the positioning of the satellite. For example, the side with the solar panels may need to face the sun. Or the side with the camera or antennas may need to face the Earth. Puffer jets _____ use gas from a pressurised tank _____ to change the attitude of the satellite.

Satellites carry items of **equipment** that 'listen, speak, see and touch'. In addition to radio antennas, they may carry a telescope or camera, a thermometer or sensors.

8 What do these words in the text refer to?

1	which (line 1)	a)	satellite	b)	bus
2	This (line 3)	a)	electrical power	b)	frame
3	these (line 4)	a)	solar panels	b)	satellite
4	which (line 7)	a)	satellites	b)	antennas
5	They (line 10)	a)	ground-control crew	b)	ways
6	which (line 12)	a)	attitude	b)	attitude control system
7	that (line 17)	a)	items	b)	equipment

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