

Canon

FREE SPACE OPTICS

CANOBEAM

DT-100 Series

COMPLETE LASER FSO SOLUTIONS FOR LOW-COST, HIGH-SECURITY, HIGH-SPEED
DATA TRANSMISSION NETWORKS



DT-150



DT-110



DT-120



DT-130

CANOBEAM

Free Space Optics Transceiver

DT-100 Series, Canon's Next Generation Free Space Optics

Since Canobeam I was launched in 1993, Canon has been proudly leading the way in optical wireless transmission. With the communication network showing mass improvement in its speed by the rapid spread of the Internet, Free Space Optics have become imperative devices to meet the industry requirements.

Now in its latest generation, the Canobeam DT-100 series establishes itself as a versatile and solid performer, optimizing transmission even from the tops of buildings that are prone to sway and to vibrate.

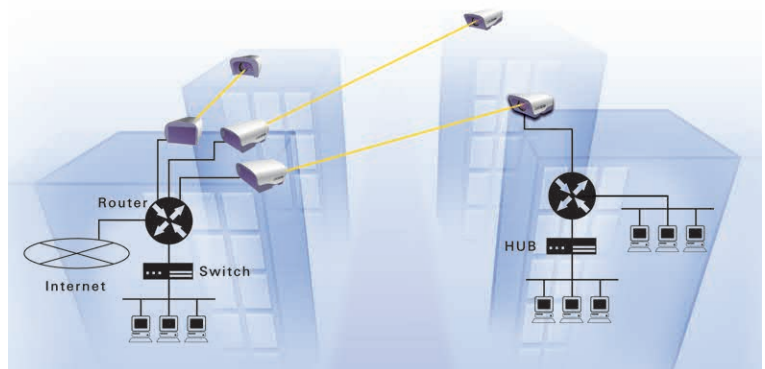
All of the models within the Canobeam DT-100 series employ Canon's evolving and we believe, essential Automatic Tracking Function that maintains beam alignment, compensating for changes in the building due to temperature variations and vibration due to wind and other factors. Because this feature always provides maximum power to the receiver, the unit is capable of highly reliable and stable communications.

Canon's latest and unique FSO technology, incorporating auto-tracking in all DT-100 series models, provides the most affordable, quick and flexible transmission solution possible while maintaining the highest communication quality.

For Network Transmission

Highlights of Canobeam DT-100 series Type SFP include:

- High speed economical transmission of up to 1.485Gbps
- Provides high-quality, reliable wireless communications of up to 2km with Auto Tracking
- Requires no radio frequency allocations, permits or licenses
- Highly secure data links
- Protocol independent, like fiber optic cable
- Installation and operating costs are much lower than installing fiber optic cable
- One SFP SLOT



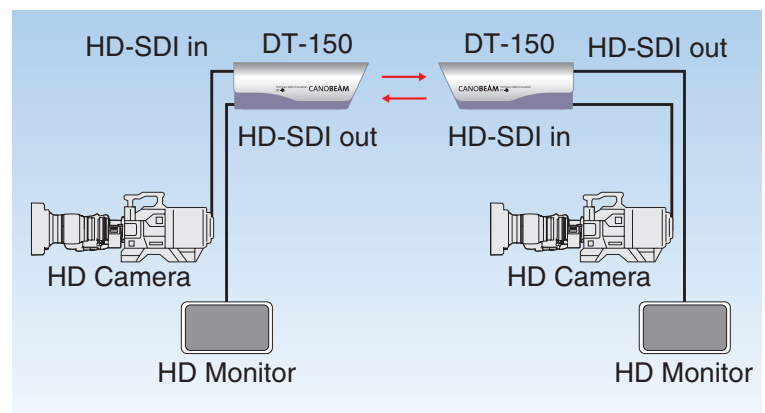
For HD-SDI/SD-SDI/DVB-ASI Transmission

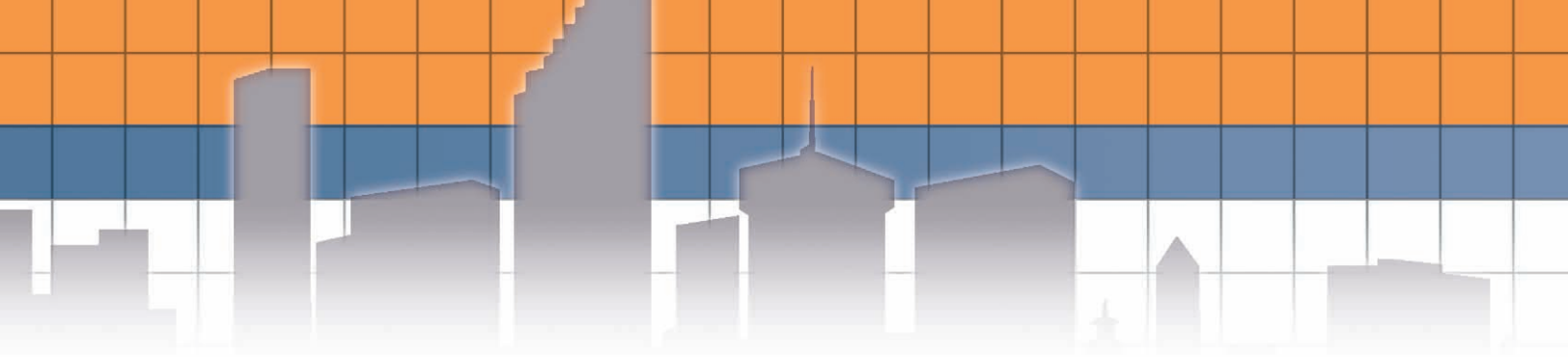
Canon is proud to announce the NEW DT-150, our latest Canobeam series for digital video signal transmission.

DT-150 transmits both HDTV and SDTV digital video formats (HD-SDI, SD-SDI, and DVB-ASI).

Taking advantage of its super fast data transmission speed of 1.485Gbps, DT-150 transmits the HDTV video format (HD-SDI) without compression and thus the transmitted picture quality has no loss and has no frame delay.

Links can be bi-directional at distances as far as 1km.





Auto Tracking provides stable communications

The DT-100 series is equipped with Canon's latest Auto Tracking function that adjusts the laser axis to compensate for slight building movement due to temperature variations, or vibration due to wind and other factors. A CPU calculates the point of maximum light input and controls the laser axis appropriately.

Accommodates a wide range of data transfer speeds

The DT-100 series can handle a wide range of data transfer speeds from 25Mbps to an ultra-fast 1.485Gbps. The user can select the transfer speed according to the type of network in which the unit will be installed.

Model Name	Data Transfer Speed
DT-110	25Mbps – 156Mbps
DT-120	25Mbps – 156Mbps
DT-130	1.25Gbps
DT-150	1.485Gbps, 1.485/1.001Gbps, 270Mbps

Provides high-quality, reliable wireless communications of up to a standard of 2km*

If the units have an unobstructed line of sight, this laser network can provide instant, high-quality, highly reliable communications at a standard distance of up to 2km*. (in case of DT-120)

* For DT-130 and DT-150, the standard distance is up to 1 km. For DT-110, the standard distance is up to 0.5 km. Longer transmission can be achieved but this is a function of weather conditions and acceptable link availability. Please see further information in the "Canobeam Q & A" section.

Installation and operating costs are much lower than installing fiber optic cable

Since construction is avoided, the cost of installing a laser network is considerably lower than installing fiber optic cable, including operating costs due to simple routine maintenance.

Optimized optical performance

As a world leader in optical design and laser transmission technology, Canon has been able to develop a group of optical lenses that are optimally designed for use in data transmission equipment.

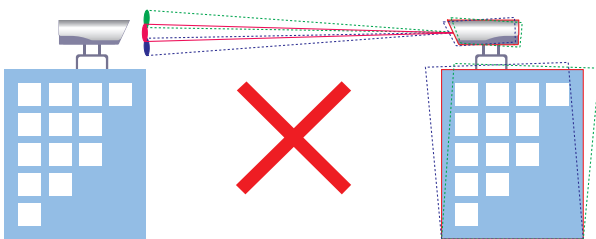
High security

The optical beam's narrow footprint makes it virtually impossible to tap into, allowing for a highly secured point to point wireless transmission.

3R Function (Re-shaping, Re-timing, Re-generating) with DT-130 and DT-150

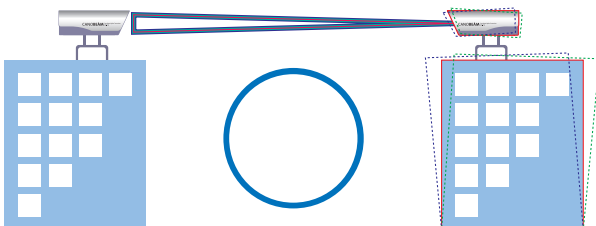
The DT-130's and DT-150's 3R function is used to normalize the signal waveform with Gigabit class transmissions. This is in order to permit relay transmissions without deterioration of signal quality between buildings that are more than 1km apart or that do not provide a good line of sight.

FSO without Auto Tracking



The optical beam axis will deviate with slight building movement.

DT-100 series with Auto Tracking



The system will correct errors in the optical beam axis caused with slight building movement.

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Free Space Optics Transceiver

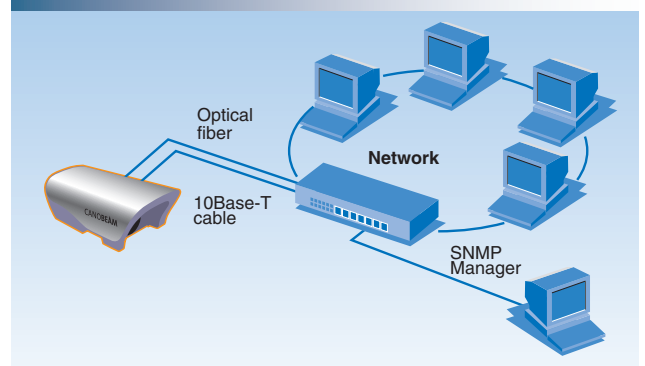
Requires no radio frequency allocations, permits or licenses

Because the DT-100 series uses lasers, it is not necessary to obtain radio frequency allocations, permits or licenses. In addition, this system is not affected by nor does it cause any radio frequency interference.

Management capabilities via SNMP, Telnet, and FTP

The transceivers can be managed via the SNMP protocol through the built-in DT-MNG100 management interface. This interface, a standard feature on all DT-100 Series models, provides out-of-band management. A simple TELNET menu in the DT-MNG100 allows for management and configuration, and internally-stored alarm and status logs can be downloaded via the FTP protocol for problem analysis.

SNMP Connection Sample



Data Log Sample

DATE	OPT RX	OPT TX	TEMP
Jan 28 2007 10:02:03	7	8	25
Jan 28 2007 10:03:03	8	8	25
Jan 28 2007 10:04:03	8	8	25
Jan 28 2007 10:05:03	8	8	25
Jan 28 2007 10:06:03			25

Specifications

DT-100 Series	DT-110 Type SFP	DT-120 Type SFP	DT-130 Type SFP	DT-150
Applications	SDH/ATM/FDDI/Fast Ethernet		Gigabit Ethernet	HD-SDI/SD-SDI/DVB-ASI
Standard Transmission Distance ^(*)	20~500m	100~2000m	20~1000m	20~1000m
Data Transmission Speed	25~156Mbps	25~156Mbps	1.25Gbps	1.485Gbps 1.485/1.001Gbps, 270Mbps ^(*)
Transmission Device	Laser Diode			
Laser Wavelength	785±15nm			
Laser Output Power	Approx. 7mW	Approx. 11mW		
Safety Class of Laser	Class 1M			
Receiving Device	Si PIN-PD	Si APD		
Auto Tracking Adjustment	Horizontal: ±1.2° Vertical: ±1.2°			
3R Function	-	-	○	○
Media Interface	SFP SLOT x1			
Console Port	RS-232C(DSUB-9Pin), 10Base-T(RJ-45)			
Operation Temperature Range	-20°C~+50°C			
Power	100-240VAC 50/60Hz (DC-48V optional)			
Power Consumption	Approx. 20W			
Installation Environment	Indoor or outdoor (Weatherproof : IP56)			
Dimensions	246(W)×168(H)×487(D)mm			
Weight	Approx. 8Kg			

^(*) Above values are calculated under conditions of more than 99.5% reliability based on actual visibility data in Tokyo, Japan. Longer transmission distances can be achieved but this is a function of weather conditions and acceptable link availability

^(*) This model is not compliant with SDI Check Field Signals (pathological signals)

Optional SFP Module

Model Name	DT-SFPMM	DT-SFPSM	DT-SFPSX	DT-SFPLX	DT-SFPHD
Data Transmission Speed	25~156Mbps	25~156Mbps	1.25Gbps	1.25Gbps	1.485Gbps, 1.485/1.001Gbps, 270Mbps
Applicable Model	DT-110, DT-120		DT-130		DT-150
Type of Connector	LC connector				
Type of Cable	Multi-Mode Fiber (MMF) 62.5/125μm or 50/125μm	Single-Mode Fiber (SMF) 9~10/125μm	Multi-Mode Fiber (MMF) 62.5/125μm or 50/125μm	Single-Mode Fiber (SMF) 9~10/125μm Multi-Mode Fiber (MMF) ^(*) 62.5/125μm or 50/125μm	Single-Mode Fiber (SMF) 9~10/125μm
Maximum Length of Cable	2km	15km	220m (MMF 62.5/125μm) 500m (MMF 50/125μm)	10km (SMF 9~10/125μm) 550m (62.5/125μm or 50/125μm)	10km
Applications	SDH/ATM/FDDI/Fast Ethernet ^(*) (100Base-FX)		Gigabit Ethernet (1000Base-SX)	Gigabit Ethernet (1000Base-LX)	HD-SDI SD-SDI, DVB-ASI

^(*) Fast Ethernet requires 100Mbps fixed Full Duplex interface.

^(*) Please use mode conditioning patch cord with multi-mode fiber.



DT-110 Type SFP

- Economical FSO for data transmission from 20m to 500m
- Wide range of data speeds from 25Mbps to 156Mbps
- Auto Tracking Function
- DT-MNG100, Management Board built-in



DT-120 Type SFP

- Provides high-quality, reliable wireless communications from 100m to 2km
- Wide range of data speeds from 25Mbps to 156Mbps
- Auto Tracking Function
- DT-MNG100, Management Board built-in



DT-130 Type SFP

- State-of-art data transmission at 1.25Gbps for Gigabit Ethernet network
- Transmission distance from 20m to 1000m
- 3R Function (Re-shaping, Re-timing, Re-generating)
- Auto Tracking Function
- DT-MNG100, Management Board built-in



DT-150

- Transmission distance from 20m to 1000m
- Transmission of HD-SDI signal without compression and delay
- Correspond with SD-SDI and DVB-ASI signals
- 3R Function (Re-shaping, Re-timing, Re-generating)
- Auto Tracking Function
- DT-MNG100, Management Board built-in

Canobeam Q & A

Is performance affected by the weather?

It is unavoidable that an optical beam can be affected by weather conditions. Rain, fog or snow reduces visibility, scattering and attenuating the amount of laser light that passes between the two units. This can result in transmission errors, that is why a back up line is recommended. However, if it is possible to see approximately half way to the opposite site under bad weather conditions, the DT-100 series can transmit correctly.

Are the lasers safe?

The DT-100 series is rated as a class 1M laser. The laser light that is transmitted by the DT-100 series is safe even if viewed with the naked eye at the point of transmission. Because the laser beam spreads out by the time it reaches the receiving side, it is even safer there than it is on the transmitting side. (It is not recommended to use magnifying optics such as binoculars at the point of output, as the effect on the eyes would be amplified). FDA Laser Notice No.50, IEC/EN60825-1/A2:2001 Class 1M

What happens if a bird flies across the path of the laser?

If a bird flies across the path of the laser, the amount of light that is received will be reduced, but will still be adequate enough for data transmission. However, if a bird flies near the source of the laser, obstructing it completely, the data will be momentarily interrupted. But if you are using TCP/IP, the problem will be resolved by a retransmission of the data.

What is the maximum transmission distance?

Standard transmission distances for each model are shown in the specifications. However, maximum transmission distance is a function of weather conditions and acceptable link availability.

Is a relay setup possible?

If you want to set up a network connection between two buildings that are separated by more than 2km or that does not have a clear line of sight, you can connect pairs of CANOBEAM units to relay the signal. With the DT-130 and DT-150, the relay process will not damage the data, because the waveform is normalized by the 3R function at each relay point.

Is laser communication through glass windows possible?

Yes. The DT-100 series can be installed indoors for window to window or window to roof transmission as long as the two units are located with a direct line of sight. However, some glass windows scatter and attenuate the amount of laser light. Therefore, conducting a field test is recommended.

Classifications

	USA	Europe
Electrical	UL60950(CSA60950)	EN60950
Laser Safety	21 CFR1040 (FDA Laser Notice No.50)	IEC60825-1 IEC60825-2
EMC	FCC-Part 15 (ICES-003)	EN55022 EN55024

Transmission Distances at Varying Degrees of Atmospheric Attenuation

Weather Condition ¹	Light Haze	Thin Fog	Light Fog
Precipitation ²	Light Rain @ 2.5mm/hr	Heavy Rain @ 25 mm/hr	Cloudburst @ 100 mm/hr
Attenuation/km	3dB	10dB	30dB
Visibility ³	4333	1300	433
DT-110 Transmission Distance ³	1750	1000	520
DT-120 Transmission Distance ³	5490	2360	1010
DT-130 and DT-150 Transmission Distance ³	3650	1720	780

Visibility distances are approximate.

Above values are calculated by transmission margin, beam divergence, Gaussian intensity distribution of light. Actual transmission distance should be considered with scintillation, backlight noise, and other factors.

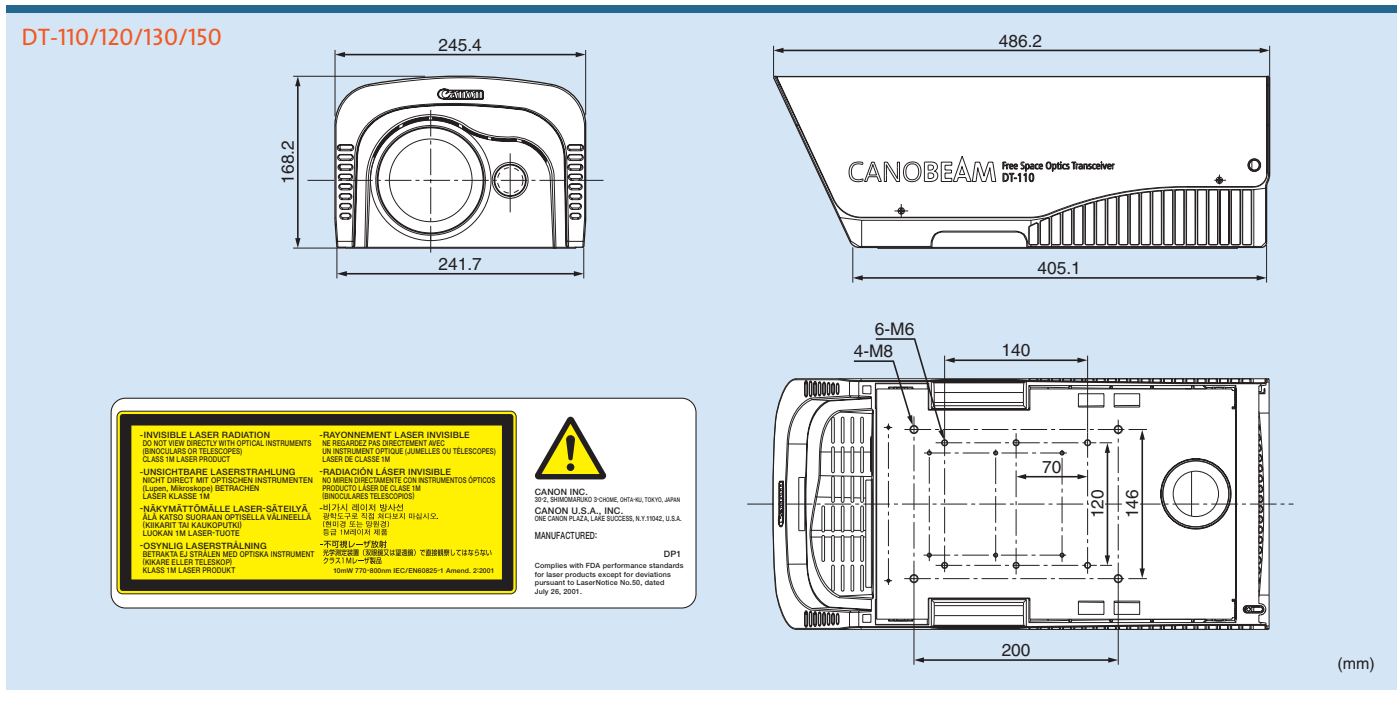
1. E.J. McCartney, *Optics of the Atmosphere*, J. Wiley & Sons, New York, 1976

2. T.S. Chu and D.C. Hogg, *Effects of precipitation on propagation at 0.63, 3.5, and 10.6 Microns*, Bell Syst. Tech. J., 47, pp. 723-759, 1968.

3. All distances expressed in meters.

Above values are different from Canon recommended transmission distances described in specifications.

Dimensions



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