1/4 Watt, Body Worn Video Transmitter Manual

VBS2-250 Frequency 2200-2300 MHz

VBS-250 Frequency 2400-2500 MHz

VBL-250 Frequency 1700-1850 MHz

DTC COMMUNICATIONS INCORPORATED

PN OP1920256 REV6

How to contact DTC

For operator and troubleshooting information, customers are encouraged to refer to the details in this manual. For additional clarification or instruction, or to order parts, contact DTC. Customer Service is available Monday through Friday between the hours of 9:00 AM and 5:00 PM EST at:

Tel: 603-880-4411
Fax: 603-880-6965
Website: www.dtccom.com
Email: info@dtccom.com

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Nashua, New Hampshire 03063
USA

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- DTC
- MiniPIX®
- DynaPIX®

Other product names used in this manual are the properties of their respective owners.

Warranty

DTC warrants its manufactured components against defects in material and workmanship for a period of two (2) years, commencing on the date of original purchase.

Products manufactured by others that are approved for use with DTC equipment are warranted for the manufacturer's warranty period, commencing from the date of shipment from DTC.

FCC information

The following information is provided as a service to our law enforcement customers who require a Part 90 station license for video surveillance operations using the 2450 to 2483.5 MHz band.

You will need to provide:

- Form 600 (the application form)

Forms can be obtained from the FCC on their website at:

www.fcc.gov

You can also contact the FCC using their FAX back service at: (888) 418-3676

Additional instructions are available by telephone at: (888) 225-5322

The filing fee form is returned to:

Federal Communications Commission
1270 Fairfield Road
Gettysburg, PA 17325-7245

Manual Conventions

NOTE Describes special issues you should be aware of while using a particular function.

WARNING Calls out situations in which equipment could be damaged or a process could be incorrectly implemented, but in which operator safety is not a factor.

TIP Describes application hints.

RF EXPOSURE STATEMENT

When used as directed, the maximum SAR of this device is 2.7 W/kg, which meets the limits set forth by the FCC. Refer to Appendix A in this manual for instruction in the proper use of antennas with this device.

FCC ID# H25VXS250

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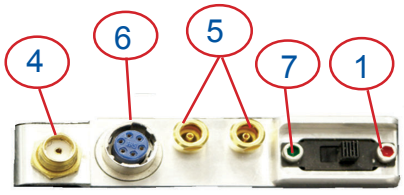
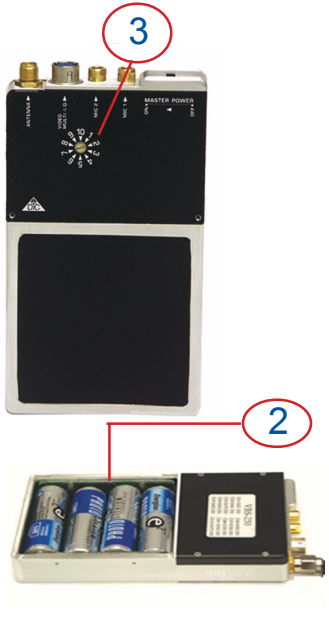
QUICK START GUIDE





1. Make sure that the ON/OFF switch is set to OFF. (**Red** dot is OFF).
2. Install 4 “AA” batteries in the internal battery compartment of the module. (Lithium batteries are recommended)
3. Using a screwdriver, turn the channel selector to the correct transmission channel number.
4. Connect an antenna to the ANTENNA connector on the module.
5. Connect the microphone or microphones to the MIC-1 and MIC-2 connectors on the module.
6. Connect a video source to the Video/Multi I/O connector.
7. Slide the power switch to the ON position (**Green** dot is ON) to apply power to the transmitter.

Note: While installing the batteries, observe proper polarity as printed in the battery compartment. Reverse polarity protection is a built-in design feature of the transmitter. If a battery is installed backwards, this feature prevents the transmitter from powering up, without damaging the transmitter or battery.

Warning: Do not apply power to the transmitter until an antenna has been connected in step 4.

Warning: Refer to **Appendix A** of this manual for information on the proper use of antennas.

What should you expect to receive with your 250mW Transmitter?

1 VBS/VBL Video Transmitter
1 Dipole antenna with right angle SMA connector
1 One Video and Power In “Y” cable
1 DTC programming software package
1 DTC programming cable
8 Batteries

NOTE: The dipole antenna included is not recommended for normal use! This antenna enables you to quickly set up your transmitter and ensure proper operation. DTC highly recommends the use of circularly polarized antennas for the best rejection of multi-path.

NOTE: DTC has provided you with a “Y” cable (power and video) terminated with an RCA connector and a BNC adapter for your convenience.)

The VBL/VBS series video transmitters from DTC represent the first true “video body wires” available. DTC has developed a fully user programmable video transmitter and mated it with an integral AA battery pack. This dramatically simplifies wiring, lowers the risk of detection, and increases the chances of operational success.

For best results, DTC recommends the use of its VidiWIRE on body dual patch antenna system with phase matching module, and a DTC diversity receiver.

Users should also consider using the VBL/VBS series transmitters for rapid deployment drop cameras. Packaging the transmitters with miniature board cameras is exceptionally easy, and in the case of 5 volt cameras, power may be provided to the camera directly from the VBL/VBS transmitter’s internal battery pack.

This product in only available for sale to legitimate state, local, federal and friendly foreign government agencies.

FEATURES

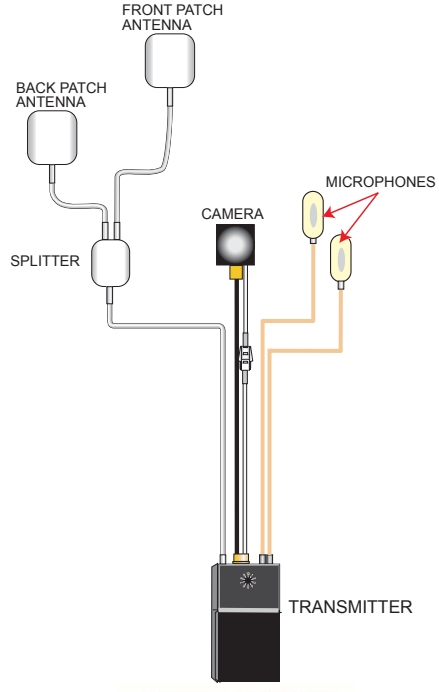
Feature	Description
Remote Switching Capability	• You may turn the device ON remotely, by attaching a switch to one of the pins on the Multi I/O connector. DTC provides hard-wired and wireless switches for this application.
External Power Loop Through	• The power applied to the Multi I/O pin is automatically looped through the unit, and available on a second pin to power a remote device, such as a camera. If you apply 9 Volts in, you will get 9 Volts out. Applying power through the multi I/O connector automatically disables the internal AA battery pack.
	 WARNING: Make sure your camera will operate on the voltage being supplied to the transmitter.
Programmable	User programmable video channels, selectable in 250 kHz steps. Two user programmable audio sub carriers, selectable in 10 kHz steps from 6 MHz to 7.5 MHz.
Audio	• Audio sub carriers are OFF unless microphones are attached. The transmitter automatically senses when a microphone has been attached. • The audio sub carriers are phase locked, and will not drift into the video signal. • Automatic Gain Control is provided on each audio input, amplifying soft sounds.
Efficient Switching Power Supply	• They generate far less heat than a traditional video transmitters. • They operate significantly longer than traditional video transmitters on the same power source.
Camera Power Available through Multi I/O Connector	• When powering the device using the internal battery pack, regulated 5 VDC is available on the multi I/O connector, limited to 200 mA current drain.

Specifications for the body worn VBS/VBL-250

SPECIFICATIONS

Power Supply	Internal batteries 4 “AA” batteries or external 9-16 VDC.
Power Consumption	2.5 Watts (not including camera)
Battery life	3 hours - Alkaline AA
Reverse polarity protection	Yes
Dimensions	2.5 x 4.5 x 0.675”
Camera Power	**Using external power input:** Same as supply voltage, switched (200 mA max) **Using internal batteries:** 5 VDC @ 175 mA, switched (internal regulator)
Controls	10 channel select rotary switch Panel mounted, slide ON/OFF switch
Connectors	**2 pin Lemo:** Mic 1 **2 pin Lemo:** Mic 2 **SMA:** Antenna **6 pin Multi I/O:** Video in, Data in, DC input 9 -16 VDC, camera power, Remote ON/OFF, Multiplexed Data out, Ground
Programmability	**Video:** 2400 - 2500 MHz (VBS-250) 1700 - 1850 MHz (VBL-250) 250 KHz resolution steps **Audio:** User programmable from 6.0 - 7.5 MHz, in 10 kHz steps
Chassis notes	Machined solid aluminum with rounded edges.

Audio	
General	Mic level input (line level factory opt.) 50 - 3000 Hz Phased locked with AGC on both inputs. Sub-carrier auto sensing, only active when microphone is attached.
Number of sub-carriers	2
Sub-carriers frequencies	6.0 - 7.5 MHz , user programmable



Four lithium “AA” batteries

SPECIFICATIONS

Sub-carrier ON/OFF control	Subcarriers are activated when mic is connected.
Subcarrier frequency stability	+/- 0.003%, -30°C to +70°C
Sub-Carrier Deviation	50 kHz peak
Audio S/N	45 dB min.
Frequency Response	$BW_{1.5dB}$ = 50 - 3000 Hz
Total Harmonic Distortion	<2%
Input Level	8 mVpp @ 400 Hz for 50 kHz peak dev.
Pre-Emphasis	75 uS
Input Impedance	10 k Ohm

Video

Video Frequency Response	$BW_{1.5dB}$ = 6 Hz - 5.0 MHz
Input Impedance	75 Ohms
Input Level	$1V_{p-p}$ Max.
S/N	60 dB min.
Pre-Emphasis	Per CCIR 405 525 line curve
Differential Gain	5%

RF

Operating Frequency	1700 - 1850 MHz, 250 KHz resolution steps 2400 - 2500 MHz, 250 KHz resolution steps
Power output	250 mW min. @ nominal supply voltage, 25 Deg. C. -3 dB @ 3.6 VDC int -2 dB over temp.
Output Impedance	50 Ohms
Spurs and Harmonics output	-50 dBc
Load Pull Stability	8:1 VSWR

SPECIFICATIONS

Frequency Stability	+/- 0.003%, -30°C to +50°C
Modulation Sensitivity	8 MHz/V nom.
Modulation Sensitivity Variation	+/- 5% across the band
Peak Carrier Deviation	4 MHz nom.
Number of channels	10 max. (user programmable)
Sub-carrier sideband level	-28 dBc, +/- 2 dB
Environmental Temperature Range	-30°C - +70°C
Humidity	90% (non-condensing)

Four lithium batteries

			Transmitter & Camera	
Battery Type	**Part Number**	**Transmitter Only**	**Camera 9V@153mA**	**Camera 12V@120mA**
9 AA Alkaline Pack (External)	4045131	6 hours	3.3 hours	3.6 hours
9 AA Lithium (External)	4045132	9 hours	5 hours	5.5 hours
9 AA NiMH Rechargeable (External)	4045130	7 hours	4 hours	4.3 hours
4 AA (Internal)				
4 AA Lithium (Internal				

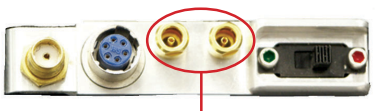
CONNECTORS

MATING CONNECTORS

Lemo Male Part # (FFS.01.250.DLAE31)
DTC Male Part # (8570003)

Hirose Part # HR10A-7P-6P (02)
DTC Part # 954020

Standard Male SMA connector



Microphone Connectors

MICROPHONE CONNECTORS

Two connectors accommodate two microphone inputs. Each connector has two contacts and provides power to the microphone as well as connecting the audio signal into the transmitter. The audio sub-carriers are activated by the presence of the microphone. If a microphone is removed, that sub-carrier is removed from the transmit signal. Turning off the unused sub-carrier saves power and improves picture quality.

ANTENNAS

A standard SMA connector is used as the antenna connector on both the VBS/VBL-250. Refer to a list of DTC antennas available beginning on page 18.

TIP: You may use the VBS/VBL series transmitters with other manufacturers antennas. Verify that they are suited for the band you are operating in.

WARNING: Refer to Appendix A of this manual for information on the proper use of antennas.

CHASSIS MOUNTED POWER ON/OFF SWITCH

A slide switch is provided for local control of power ON and OFF. **Green** dot is ON, **Red** dot is OFF.

NOTE: REMOTE ON overrides the chassis mounted OFF switch. (i.e. When the chassis mounted power switch is set to OFF, REMOTE ON can be used to turn the transmitter ON.)

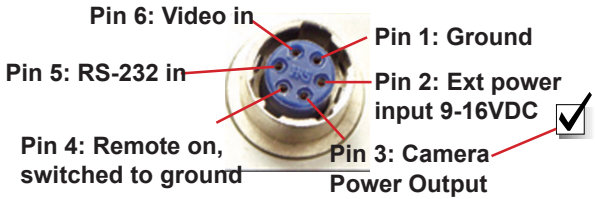
CHANNEL SELECT SWITCH

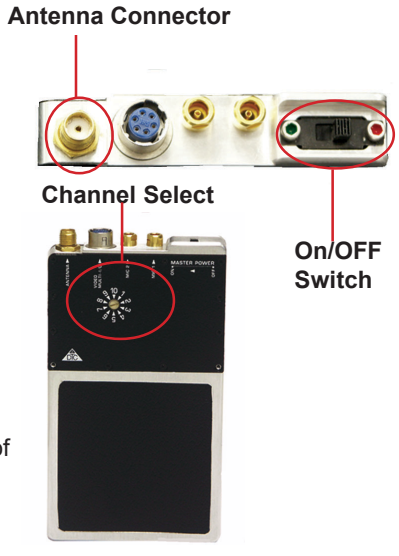
Select a transmission channel by using the rotary switch located on the front surface of the transmitter. Use a screwdriver to rotate the switch to the desired channel number.

MULTI I/O CONNECTOR

The multi I/O (6-pin Multi I/O) connector is mainly used as the video and external power input connector. It also provides access to many transmitter functions, such as:

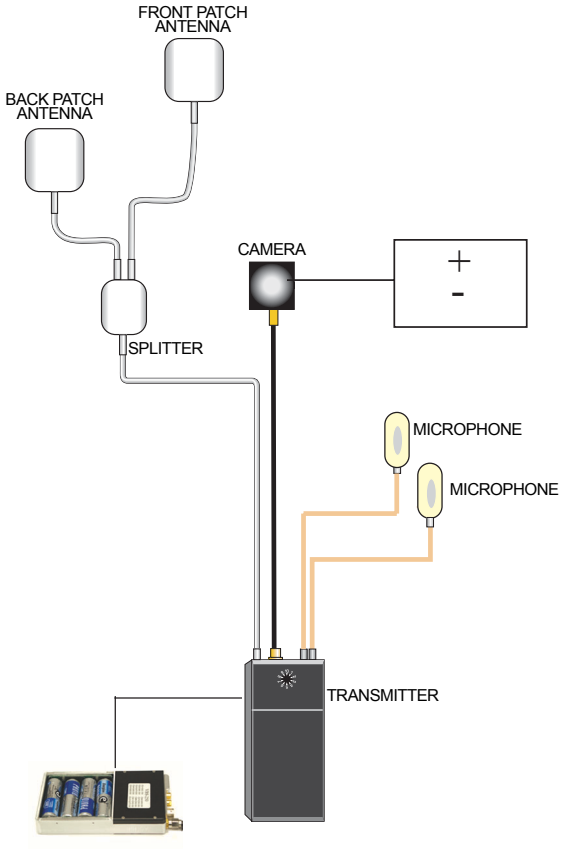
- Programming the device
- Video in
- Power in
- Remote on
- Camera power





NOTE: Same as supply voltage. Do not exceed 200mA.

EXTERNAL CAMERA POWER



The basic VBS/VBL-250 configuration consists of the video transmitter, Vidi-Wire Antenna, and DTC cable part number **4045170-024.** This cable is connected to the multi I/O port of the transmitter, and is configured to supply:

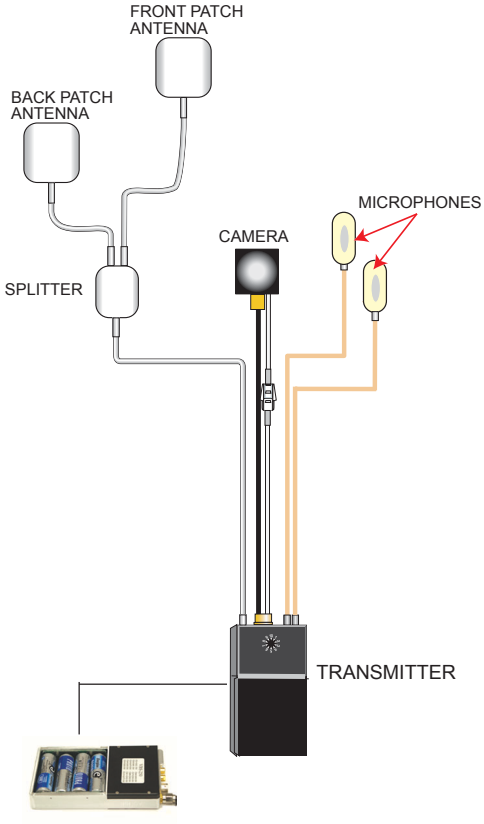
- The video signal from the camera to the transmitter.
- Power to the transmitter through the internal battery pack.

NOTE: You will need external camera power if voltage to the transmitter is not compatible with your camera's operating voltage, and/or you need greater battery life, and/or your camera draws more than 200mA.

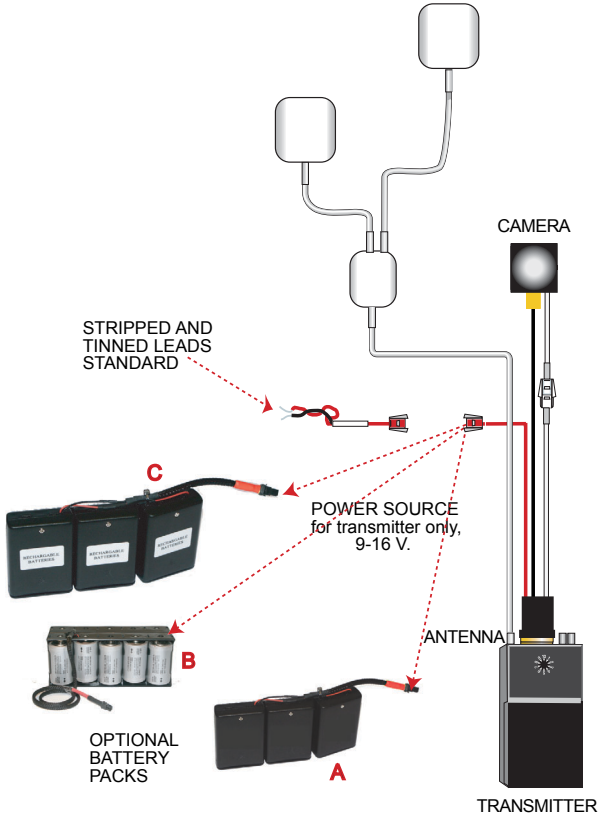
TRANSMITTER AND CAMERA (INT)

The basic VBS/VBL-250 configuration consists of the video transmitter, Vidi-Wire Antenna, and DTC cable part number **4045194-024.** This cable is connected to the multi I/O port of the transmitter, and is configured to supply:

- The video signal from the camera to the transmitter.
- Power to the transmitter and camera through the internal battery pack.



EXTERNAL TRANSMITTER POWER



The VMS/VML-250 configuration, which uses the loop through power source for the camera, consists of the video transmitter and DTC cable part number **4045189-024 .** This cable is connected to the multi I/O port of the transmitter.

It is configured to supply:

- The video signal to the transmitter from the camera.
- Power to the transmitter through a molex connector that can be easily connected to DTC's battery packs.
- Power to the camera through a molex connector that can easily be connected to DTC's optional cameras.

A **4045131 (AA non-rechargeable)**

B **4045177(D-Cell battery pack) Alkaline**

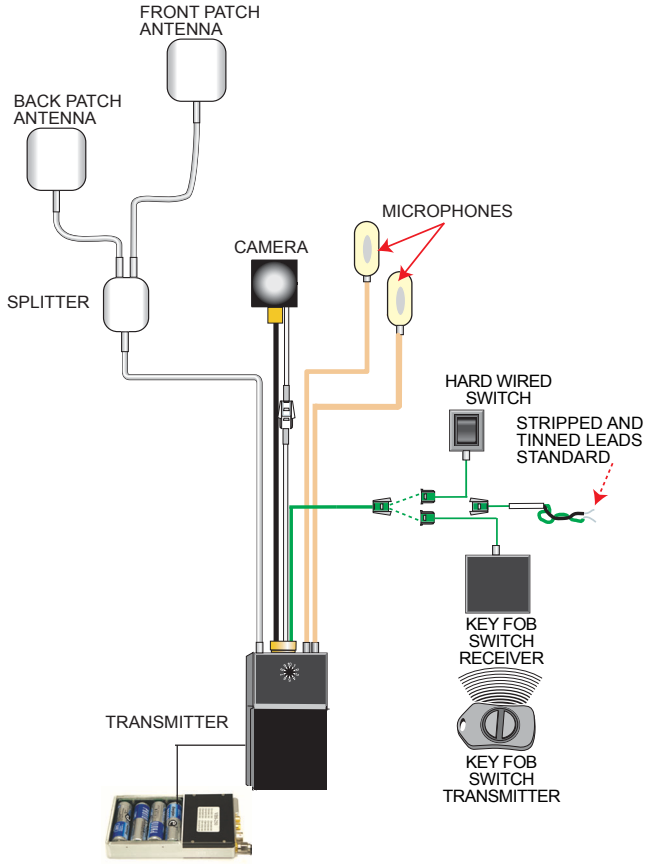
C **4045130 (AA rechargeable) MiMH**

ADDING REMOTE ON FUNCTION TO BASIC

This configuration consists of the video transmitter, Vidi-Wire antenna, and DTC cable part number **4045192-024.** This cable is connected to the multi/IO port of the transmitter, and is configured to supply:

- The video signal from the camera to the transmitter.
- Power to the transmitter and camera through the internal battery pack.
- Remote on function through a hard wired switch or remote Key FOB transmitter. This remote on function overrides the OFF switch located on the transmitter chassis.

NOTE: You will need external camera power if voltage to the transmitter is not compatible with camera's operating voltage, and/or you need greater battery life, and/or your camera draws more than 200mA.



ACCESSORIES

Part Number	Description
1088185	Vidi Vest™

The VidiVest™ is designed to be used in conjunction with DTC's body worn video transmitter. The vest supplies compartments for the video transmitter, associated wiring, antenna system (i.e. VidiWire™), microphones, and a button camera. The garment is ventilated for comfort and can be adjusted with velcro straps at the waist and shoulders. The vest is intended to be worn as an undergarment with a loose fitting shirt or other garment over the vest.

4045181	Camera with 3-pin connector Assembly

This camera is a high-resolution color CCD type, which has been modified to look like a shirt button. This allows for easy concealment through a regular button hole.

4045192-024	VidiVest cable harness

This cable harness connects all of the components, such as, the transmitter, battery packs, microphones, and VidiWire antenna system.

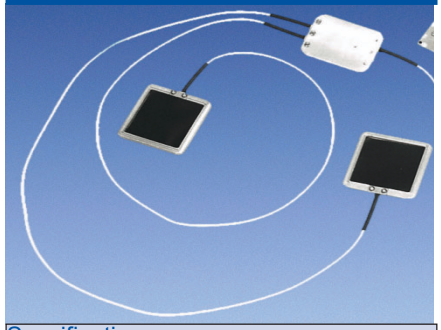
Part Number	Description
VW-ANT-2-SMA	**VidiWire antenna system 2.4-2.5 GHz**
VW-ANT-1-SMA	**VidiWire antenna system 1.7-1.9 GHz**

The VidiWire™ antenna system was specifically designed for video transmission from on-body transmitters. This DTC Proprietary system provides the best possible omnidirectional video transmission from a body-worn system. The system is composed of three parts: two special patch-type antennas, and a phasing module.

WARNING: VidiWire Antennas are housed in a milled aluminum cover which shields the wearer from RF energy. Make sure the antennas radiating side is directed away from the body.

WARNING: Do not use the VidiWire antenna system on the body with any transmitter outputting more than 250mW of RF energy.

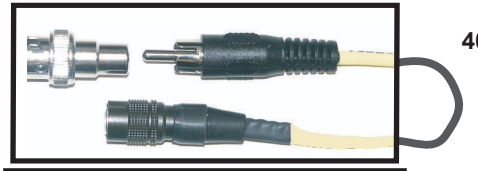
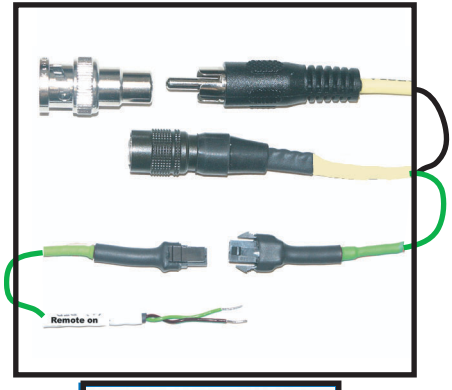
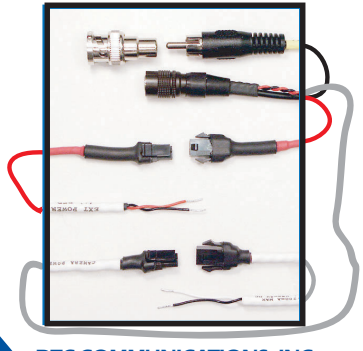
WARNING: Refer to Appendix A of this manual for information on the proper use of antennas.



Specifications

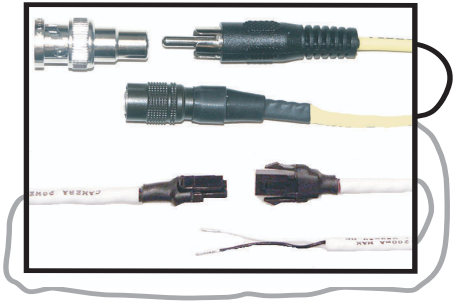
Type		DTC proprietary VidiWire™ design
Polarization		Dual Polarized
Peak Gain		Pseudo-Isotropic
Horizontal Beamwidth		Omnidirectional
Vertical Beamwidth		Omnidirectional
Nominal Impedance		50 Ohms
Groundplane Requirements		Not applicable
Size	Antennas:	2.0" W x 2.0" H x 0.25" D (51 mm x 51 mm x 6.35 mm)
	Phasing Unit	2.0" W x 1.5" H x 0.25" D (51mm x 38mm x 6.35mm)
Net Weight		6oz
VW-ANT-2-SMA		2.4 to 2.5 GHz SMA male connector
VW-ANT-2-TNC		2.4 to 2.5 GHz TNC male connector
VW-ANT-1-SMA		1.7 to 1.9 GHz SMA male connector

ACCESSORIES

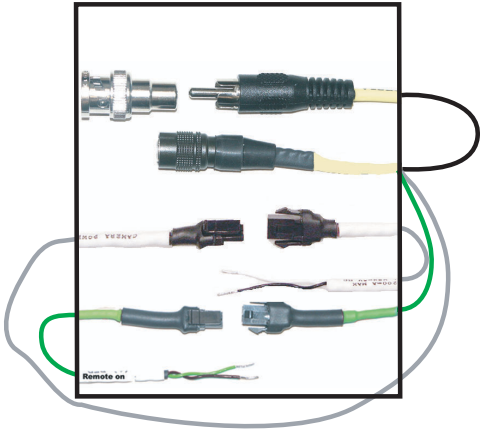
	Part Number	Description
	**4045170-024**	Video In, 24”standard. **Video In:** Multi I/O to RCA(M) with BNC adaptor. (YELLOW)
	**4045193-024**	Video In/Remote On, 24”standard. **Video In:** Multi I/O to RCA(M) with BNC adaptor. (YELLOW) **Remote On:** 24 AWG wire with a molex connector and stripped and tinned leads. (GREEN)
	**4045189-024**	Video In/EXT Power/Camera Power cable, 24”standard. **Video In:** Multi I/O to RCA(M) with BNC adaptor. (YELLOW) **Ext. Power:** 24 AWG wire with a molex connector and stripped and tinned leads. (RED) **Camera Power:**24 AWG wire with a molex connector and stripped and tinned leads.(GRAY)

ACCESSORIES

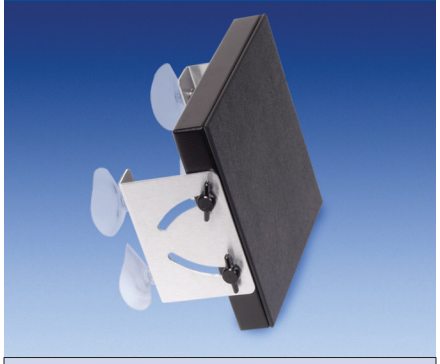
Part Number	Description
4045194-024	Video In/Camera Power, 24”standard. **Video In:** Multi I/O to RCA(M) with BNC adaptor. (YELLOW) **Camera Power:** 24 AWG wire with a molex connector and stripped and tinned leads. (GRAY)



Part Number	Description
4045192-024	Video In/Camera Power/Remote On, 24”standard. **Video In:** Multi I/O to RCA(M) with BNC adaptor. (YELLOW) **Camera Power:** 24 AWG wire with a molex connector and stripped and tinned leads.(GRAY) **Remote On:** 24 AWG wire with a molex connector and stripped and tinned leads. (GREEN)



ANTENNAS

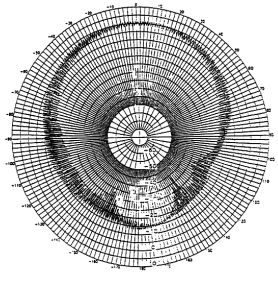


Specifications	
Type	Three Hybrid Patch™ elements
Polarization	RHCP
Peak Gain	5dBic
Horizontal Beamwidth	90°
Vertical Beamwidth	90°
Nominal Impedance	50 Ohms
Groundplane Req.	Built-in
Size	6.6" H x 6.6" W (167mm x 167 mm)
Weight	12 Oz. (34g)
DTC Part Number	Frequency Range
7011156-1	1700 to 1850 MHz
7011156-3	1990 to 2110 MHz
7011156-2	2400 to 2500 MHz

Part Number	Description
VDAR-1	Single 5 dBic "Hybrid-Patch"™ Antenna with mounting options. Connector: TNC Female on chassis

The VDAR video antennas are designed to operate with traditional single video receivers and multiple antenna configurations for diversity receivers. The antenna uses the DTC Hybrid-Patch system to ensure high purity circular polarization. This ensures the highest possible performance in video reception, especially in diversity systems. It is available in three different bands. Reversible and adjustable suction cup mounts come standard for quick and easy installation on the inside or outside of window or other hard, smooth surfaces.

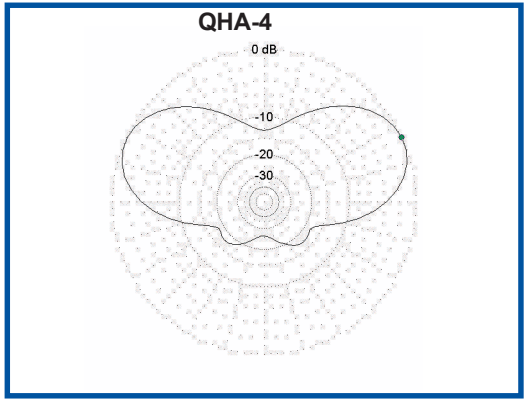
VDAR-1



WARNING: Refer to Appendix A of this manual for information on the proper use of antennas.

Part Number	Description
QHA-4	Quadrifilar Helix Antenna with Ring-Hybrid feed Connector: TNC Female Must be used with SMA to TNC antenna cable (4045174-006).

The QHA family of antennas was developed to provide a compact solution for pattern-tailored circularly polarized antennas. This rugged antenna is omnidirectional when the antenna is vertical. The pattern is slightly elevated to allow overhead coverage. The base of the antenna includes a special flat with #10-32 threaded hole, 0.25-in. deep for mounting. It is available in both RHCP and LHCP versions.



Specifications

Type	Quadrifilar Helix with Ring-hybrid feed
Polarization	Circular
Peak Gain	4dBiC at 24° above horizon
Horizontal Beamwidth	Omnidirectional
Vertical Beamwidth	46°
Nominal Impedance	50 Ohms
Groundplane req.	Not Required
Size	8.0" L x 1.25" dia (203 mm x 32 mm dia)
Weight	3.7 oz. (105 g)

DTC Part Number	Frequency Range
QHA-4-2-R	2.4 to 2.5 GHz, RHCP
QHA-4-2-L	2.4 to 2.5 GHz, Lhcp

WARNING: Refer to Appendix A of this manual for information on the proper use of antennas.

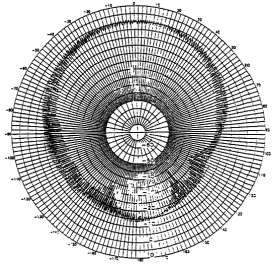
ANTENNAS

Specifications	
Type	Patch antenna with integral ring hybrid
Polarization	RHCP
Peak Gain	5dBic
Horizontal Beamwidth	90°
Vertical Beamwidth	90°
Nominal Impedance	50 Ohms
Groundplane Req.	Built-in
Size	4.0” W x 4.0” H X 0.625” D (102mm x 102mm x 16mm)
Weight	6.4 Oz. (180 g)
DTC Part Number	Frequency Range
ANT-5-P-SMA	2.0 to 2.5 Ghz with SMA male connector
ANT-5-P-TNC	2.0 to 2.5 Ghz with TNC with male connector

Part Number	Description
ANT-5-PIG	5 dBi Patch Antenna Connector: SMA or TNC Male on 18" coax. “pigtail”.

DTC has developed a series of circularly polarized patch antennas for use in the 2.0 to 2.5 GHz indoor and short term outdoor installations. The ANT-5-P is a 5dbi gain, 90 degree wide beamwidth, antenna, mounted on a 0.125 in. thick aluminum plate. Typical uses include disguised transmitters and vehicular-mounted transmitter antennas and in a variety of receive applications.

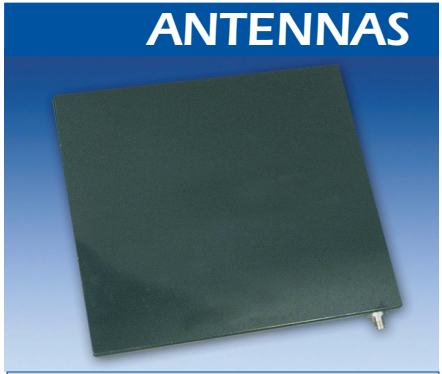
Ant-5P



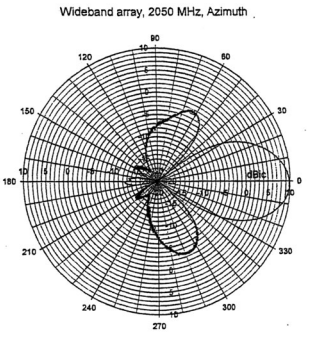
WARNING: Refer to Appendix A of this manual for information on the proper use of antennas.

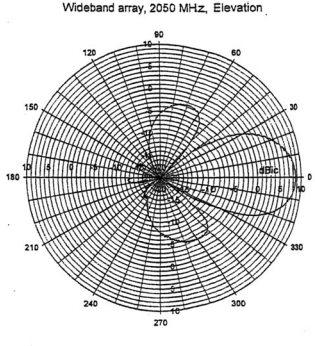
Part Number	Description
ANT-10	9dBic Wideband Panel Connector: TNC Female

DTC has developed a series of circularly polarized panel antennas for use in wideband transmit and receive applications from 1.7 to 2.7 GHz. The ANT-10-R is a very wide bandwidth, unidirectional log-spiral array. This antenna has useful gain, with some sidelobe variation, to 4 GHz. It can be mounted to a wall or swivel mounted with the MAF-1 grip on two surfaces, via two pairs of “1/4-20” tapped holes located in the rear center and the bottom center of the aluminum housing. The front of the antenna is a radome made of a polycarbonate material. The antenna is suitable for indoor and short-term outdoor use. It must be protected for extended outdoor use and installations since it is not water-



Ant-10





Specifications

Type	Log-spiral slot array, absorber loaded
Polarization	RHCP
Peak Gain	9dBic
Horizontal Beamwidth	30°at 2.0 GHz
Vertical Beamwidth	30°at 2.0 GHz
Nominal Impedance	50 Ohms
Groundplane Req.	Not required
Size	9” W x 9” H x 1.2” D (227mm x 227 mm x 30 mm)
Weight	1.7 lb. (750g)
DTC Part Number	Frequency Range
4044411	1.7 to 2.7 GHz; RHCP
7011142	1.7 to 2.7 GHz; RHCP with MAF - 1 grip included

WARNING: Refer to Appendix A of this manual for information on the proper use of antennas.

PROGRAMMING

Introduction

DTC has built in a lot of flexibility in the programming options you have on the VBL and VBS series transmitters. You can choose to use some, all or none of this flexibility.

When you order a VBL or VBS transmitter, DTC will factory program your frequencies at no additional charge to you. You may want to place a sticker over the rotary switch on the chassis, so users in the field don't attempt to change frequencies. This is often the best path for state and local agencies with limited frequencies available to them.

DTC will also provide you with free software and a free programming cable, enabling you to change your video frequencies and their associated audio sub-carriers. This is ideal if you often work with other agencies, or anticipate the equipment being used by a multi-jurisdictional task force. You can program up to ten channel settings per unit. In general, this allows you to program most variations you might encounter in the field at the depot level.

As a practical matter, your VBL or VBS transmitter's video frequencies and audio sub-carriers will be dictated by the frequency and sub-carriers(s) of your receiver and/or repeater. In many cases, these devices are crystal controlled or have few channel options.

TIP: Make sure that you program your transmitter to match the frequencies and audio sub-carriers or your receiver, and test the components as a system prior to going into the field!

Installing DTC Universal Programming Software on your PC

PROGRAMMING

☑ NOTE: Uninstall any previous versions by going to Add/Remove Programs, clicking on DTC Universal Programming, and clicking on uninstall.

1 Click on Start, click on run.

2 Click on the Browse button.

3 Click on or find your CD drive.

4 Install the JAVA Runtime Environment Application first (CD provided).

5 Follow the install wizard screens.

6 Install the Universal Programming software next (floppy provided).

7 Click on Start, click on run.

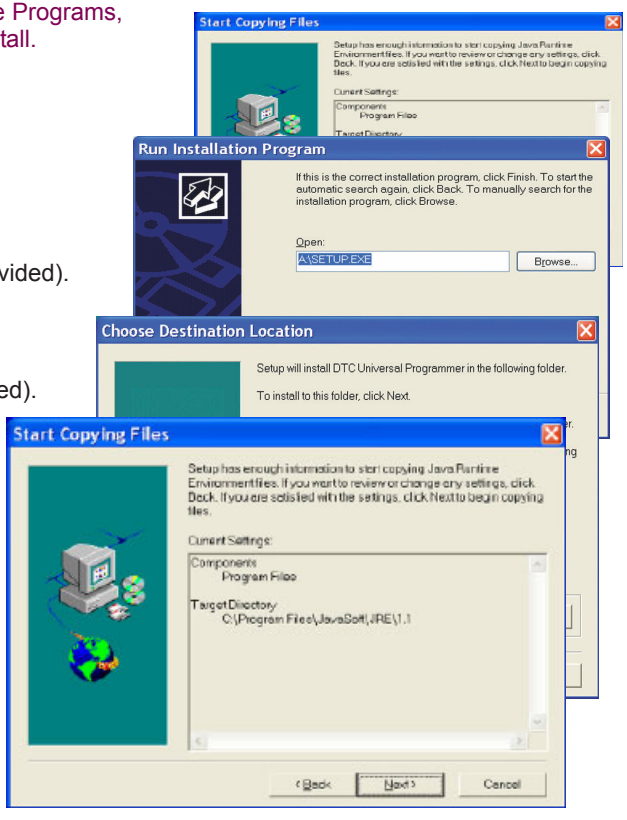
8 Click on the Browse Button.

9 Click on your floppy drive.

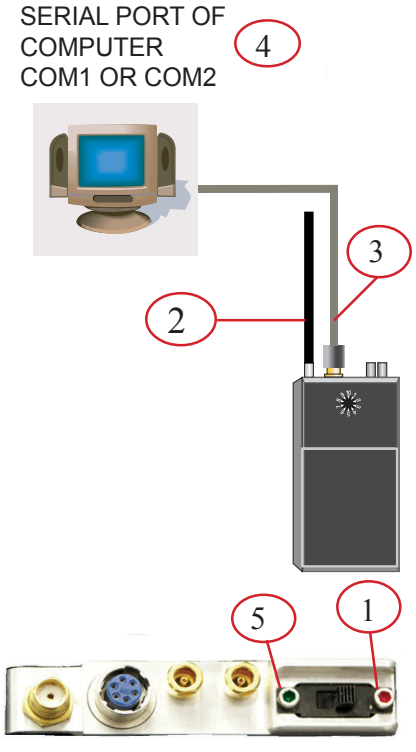
10 Double click on the setup.

11 Follow the install wizard screens.

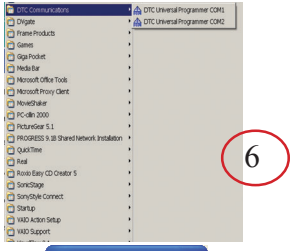
Your programming software is installed.

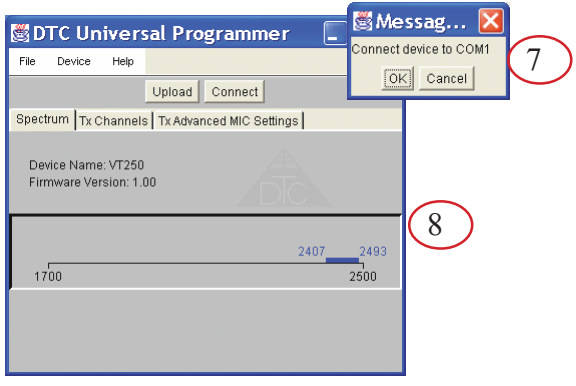


PROGRAMMING



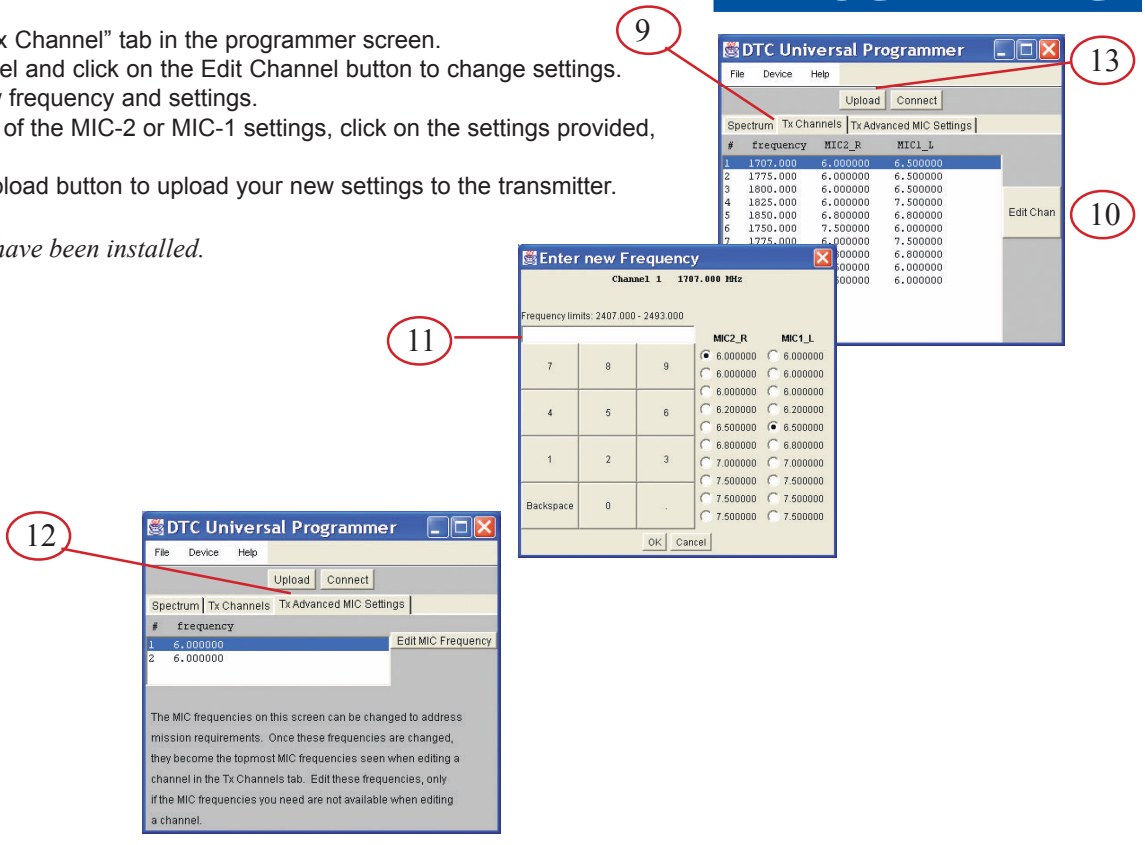
1. Make sure the video transmitter ON/OFFswitch is set to OFF. The red dot is OFF.
2. Make sure the transmitter has an antenna installed into the antenna connector prior to programming.
3. Install the programming cable into the Multi I/O connector on the transmitter.
4. Plug the serial cable of the programming cable into the COM1 or COM2 port of your computer.
5. Turn the transmitter switch to ON. The green dot is ON.
6. Select Start, programs, DTC communications on your computer.
7. The system allows you to select device COM1 or COM2, depending on which serial port you are connected to.
8. Follow the instructions on the DTC Universal Programming screens to begin the download process.





9 Click on the “Tx Channel” tab in the programmer screen.
10 Select a channel and click on the Edit Channel button to change settings.
11 Enter your new frequency and settings.
12 To change any of the MIC-2 or MIC-1 settings, click on the settings provided, then click OK.
13 Click on the Upload button to upload your new settings to the transmitter.

Your new settings have been installed.



APPENDIX A

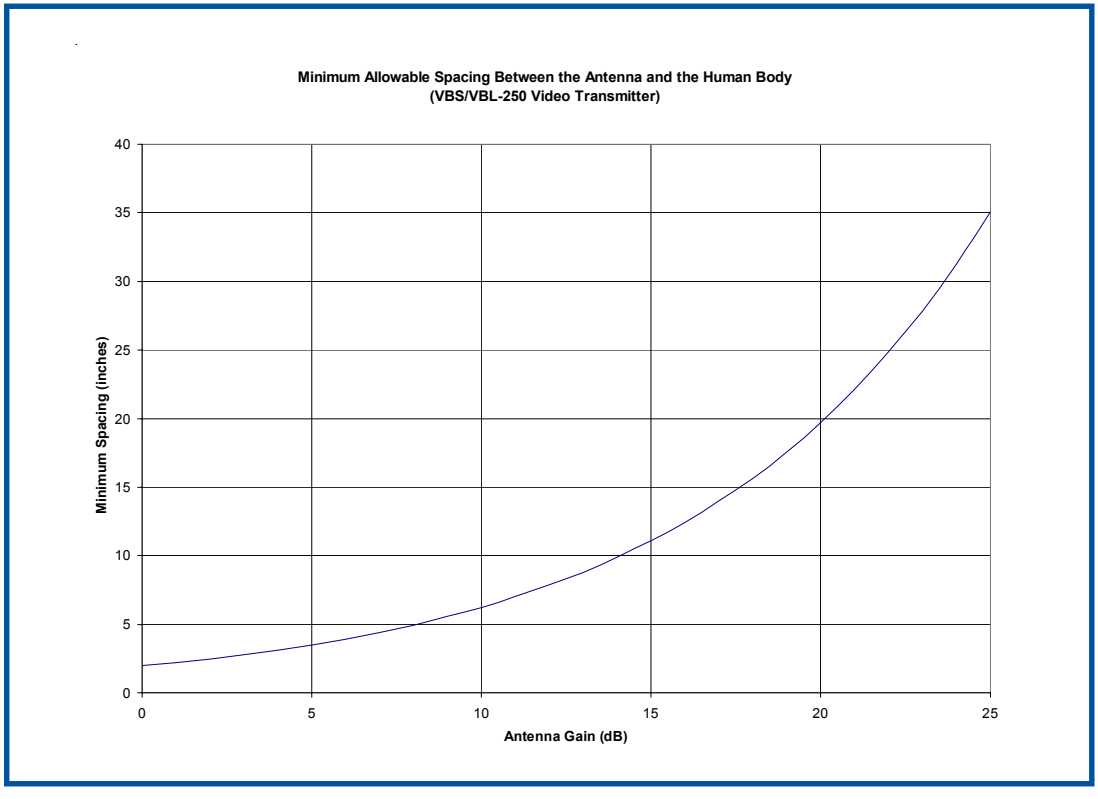
Using Antennas with the VBS/VBL-250 Video Transmitter

Bodyworn applications:

When the VBS/VBL-250 video transmitter is to be worn on the body, only the DTC VidiWire antenna system should be used. This antenna has been extensively tested and found to be safe when used as directed. The antennas used in the VidiWire system are clearly labeled as to which side of the antenna should be placed against the body. These directions must be observed to insure safe and effective operation.

Non-portable applications:

In fixed location applications any suitable antenna may be used. However, to insure safe operation, it is imperative that proper spacing be maintained between the radiating surface of the antenna and any persons body. The required spacing depends on the RF output power of the transmitter and the gain of the antenna being used. The chart below shows the correct minimum spacing for antennas used with the VBS/VBL-250 transmitters. If the gain of the antenna is unknown, contact the manufacturer of the antenna for this information. To insure that proper spacing is maintained, locate the transmitter or arrange physical barriers in such away that people are prevented from approaching too closely.


Minimum Allowable Spacing Between the Antenna and the Human Body
(VBS/VBL-250 Video Transmitter)
Minimum Spacing (inches)
0
5
10
15
20
25
30
35
40
Antenna Gain (dB)
0
5
10
15
20
25

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