300E Series

MULTIPLE CHANNEL DIGITAL FIBER OPTIC VIDEO/AUDIO/DATA TRANSPORT SYSTEM

BROADATA COMMUNICATIONS, INC.

SAFETY INSTRUCTIONS AND COMPLIANCE DECLARATIONS

PLEASE OBSERVE THE FOLLOWING SAFETY PRECAUTIONS AS OUR PRODUCTS CONTAIN

CLASS I LASER PRODUCTS

WARNING

Do not disconnect the fiber optic connector while the unit is powered up. Exposure to laser radiation is possible when the laser fiber optic connector is disconnected while the unit is powered up.

Although the fiber optic connectors in this product emit only Class 1 energy that is below the levels considered to be hazardous, one should never stare directly into a fiber optic connector or an unconnected fiber end unless one can be certain that no exposure to laser energy could occur.

CAUTION

This manual is intended for use by trained service personnel. The use of controls, making adjustments, or performing operations other than those specified may result in hazardous radiation exposure.

The following label or equivalent is located on the surface of laser products. This label indicates that the product is classified as a CLASS 1 LASER PRODUCT.

SURGE PROTECTION DEVICE RECOMMENDED

This product contains sensitive electrical components that may be damaged by electrical spikes, surges, electric shock, lightning strikes, etc. Use of surge protection systems is highly recommended in order to protect and extend the life of your equipment.

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1.0 PRODUCT DESCRIPTION

The 310E/320E systems provide simultaneous transmission of multiple channels of digitized stereo audio, video and/or data over one or one pair of fiber. The standard 310E system transmits these video/audio/data channels in one direction. The 320E system transmits and receives these video/audio/data channels in both directions. The standard 310E/320E system comes with 4- and 8-channel versions with each channel containing one (1) NTSC/PAL/SECAM video, two (2) audios, and one (1) serial data (RS-232/RS-422). Versions up to 16-channel video/audio/data are also available for unidirectional links. In addition, the 310E/320E has an option for S-video, and up to 8-channels of S-video can be accommodated. The 310E/320E system is also capable of adding/dropping video/audio/data channels in a ring or bus network configuration. Please consult us for your custom design.

The 310E/320E features a digital fiber optic transmission technology, capable of providing sharper video and crisp audio, little or no maintenance, high functionality reliability, and low operating cost. The quality of video, audio and data transmission in BCI's digital designs is much superior to the analog transmission (based on amplitude or frequency modulation) designs used by other manufacturers. No user adjustments are required in the 310E/320E system, enabling quick setup and trouble-free operation.

The 310E/320E comes in a rugged, standalone, and compact unit. Panel connectors are provided for video (BNC), audio (terminal block), and data (terminal block), and fiber connection (FC-type for singlemode fiber or ST-type for multimode fiber). They are also easily monitored by separate LED indicators for power, optical link, and channel activity.

Due to its digital transmission design, the 310E/320E is capable of addressing a variety of non-standard configurations. Figure 1-1 shows the front and rear panels of the 300E Series.

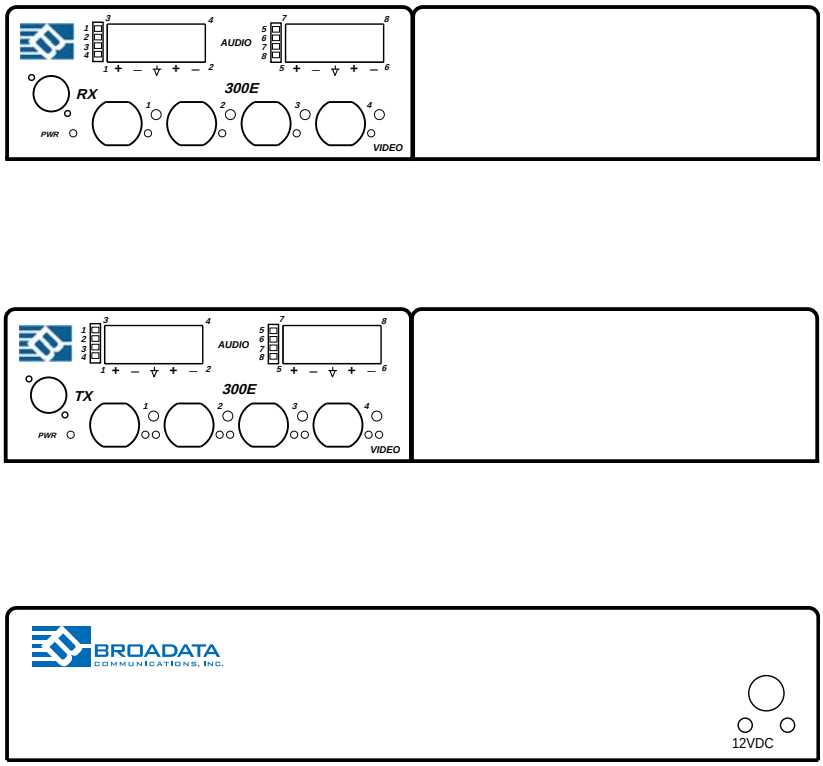


Figure 1-1
300E Front/Rear Panels

2.0 SETUP

The BCI 300E Series units are used in pairs. In a unidirectional system, one 310E transmitter is located at the near-end and connected to a 310E receiver located at the far-end, through a single fiber. In a bi-directional system, one 300E transceiver unit is located at the near-end and connected through two optical fibers to an identical 300E transceiver located at the far-end of the link. Each unit provides a separate electrical interface connector for the various audio, video and data signals. Connections are one to one between the two units. Figure 2-1 depicts two typical installations.

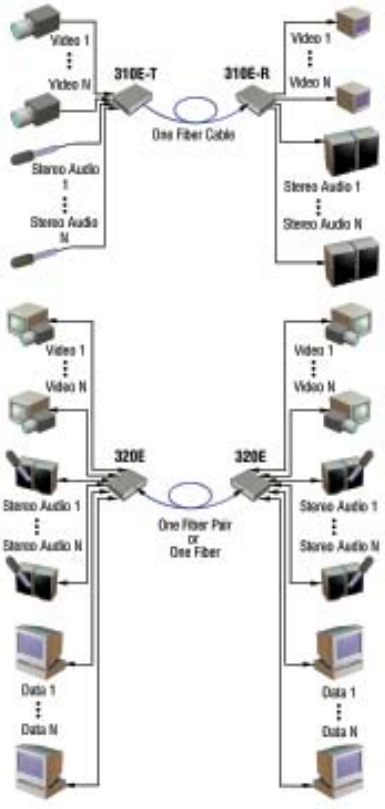


Figure 2-1
310E/320E Setup

2.1 Mounting

Before installing the units into your housing, make sure there is enough space to pull and connect both the electrical and optical cables without stressing them beyond the manufacturer's limitations (also known as the bend radius minimum). Rack Mount kits are available through special order.

2.2 Cabling and Connectors

In order to setup the BCI 300E properly, make sure to observe the following instructions when installing the proper cables. The 300E requires two parts to the cabling setup: the electrical and the optical. For the optical part, observe the following procedures, as there are various types of optical connectors as illustrated on the following page.

2.2.1 Electrical Cable Connection

On the electrical side, it is required that the following steps be observed when connecting the various audio, video and data terminal devices, as they all require special attention, and are the only available electrical connections. They are described in the following steps.

2.2.2 Optical Fiber Connection

Most cable manufacturers identify individual fibers in the fiber cable. Select an appropriate terminated fiber. Each unit's optical ports in the system are specified for use with Multimode (62.5/125 micron) fiber, or Singlemode (9/125 micron) fiber. Follow the ensuing instructions for installing and connecting the fiber optic links:

1. Ensure the power is off before proceeding with the fiber optic cable installation.

2. Prior to connecting the fiber optic cables, remove and save the dust caps from the optical port of both the 300E units and the user's device. Clean the fiber optic connector and use a lint-free cloth dampened with alcohol to thoroughly wipe the side and end of the ferrule.

3. Cross-connect the fibers from one unit to the other, connecting the near end 300E unit's optical TX port to the far end 300E unit's optical RX port, as illustrated in Figure 2-2. Observe the type of connector you have and connect the optical connector by following the instructions and guidelines from the legend provided in Table 1.

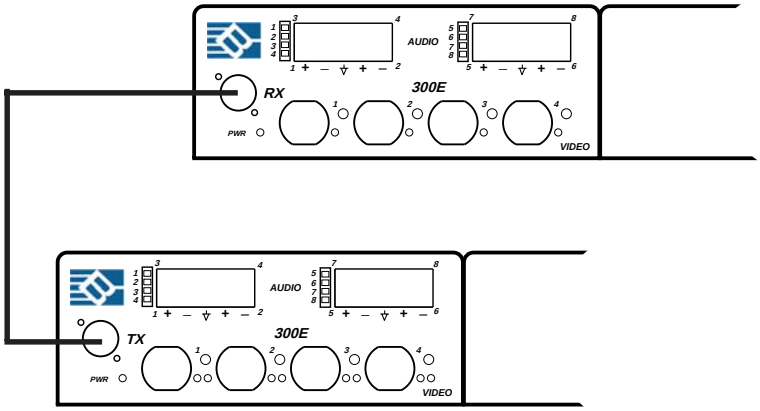


Figure 2-2
Fiber Optic Connection

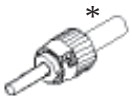
Connector	Illustration	Description
ST	 ST Connector	Hold the connector by the strain-relied boot* and insert the connector ferrule into the port. Rotate the boot until the "key" engages in the slot of the coupling. Push the connector housing forward until it can be turned clockwise to latch to the port.
FC	 FC Connector	Hold the connector by the strain-relied boot* and insert the connector ferrule into the port. Rotate the boot until the "key" engages in the slot of the coupling. Push the connector housing forward and screw clockwise until it is tight.

Table 1
Fiber Optic Connector Legend

2.2.1.1 Audio Connection

Perform the following steps to insure a proper audio connection (See Figure 2-3):

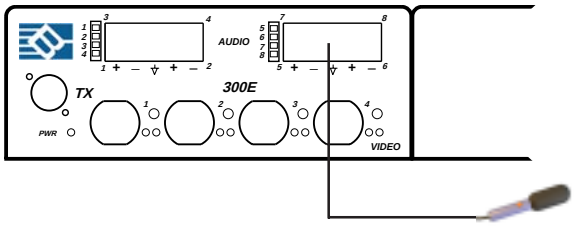


Figure 2-3
Audio Connection

1. Audio connections are made possible by the provided terminal blocks (See Figure 2-4). Use 22-18 standard wire (22-18-AWG) to connect between the user's audio equipment and the 300E unit. Use a flat head screwdriver to tighten the terminal screws. Follow the proceeding instructions to install the audio connections.

2. At the near end (the transmitter unit), connect the user's audio sources to the 300E unit's audio input ports.

3. At the far end (the receiver unit), connect the user's audio receivers to the corresponding audio output ports on the 300E receiver unit.

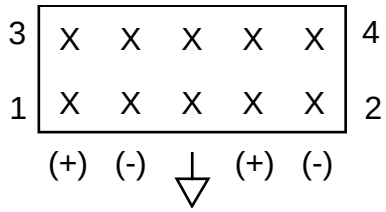


Figure 2-4
2 x 10 Position Terminal Block

For balanced audio signals,
Connect the (+), (-) and (G) of the 300E's terminal block to the corresponding terminal user's equipment.

For unbalanced audio signals,
Connect the (-) and (G) of the 300E's terminal block as well as the (+) terminal to the (+) terminal of the user's equipment and (-) or (G) of the 300E unit to the ground terminal of the user's equipment.

2.2.1.2 Video Connection

The 300E video connectors accept 75 ohm coaxial cable terminated by a BNC connector (i.e., RG 59U with a BNC connector). Use the following steps to connect the video cables.

1. At the near end, on the transmitter unit, connect the user's video sources to the video-input ports of the 300E unit. Also, connect the user's video receivers to the video output ports of the 300E-receiver unit. (See Figure 2-5).
2. Repeat this procedure for the far end unit.

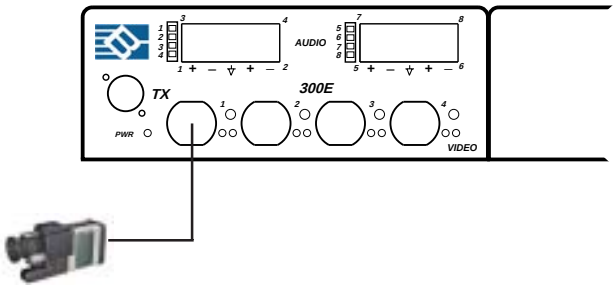


Figure 2-5
Video Connection

Note: Make sure the video channels match on both ends.

2.2.1.3 Serial Data Interface (320E bi-directional series only)

Each 320E unit is equipped with either an RS-232 or an RS-422 interface, which is preset at the factory. Follow the proceeding instructions depending on what data type you have installed.

RS 232 unbalanced data
The 320E units transport unbalanced data signals with handshaking control, and are compatible with Full Duplex RS-232 (C, D, and E) type devices. Use the following steps for connecting data transmission equipment:

1. Connect your serial data cable to the user's RS-232 device. (See Figure 2-6).
2. Connect the other end of this cable to the front panel RS-232 female DB9 connector of the 320E TX unit.
3. Repeat step 1 and 2 for the 320E RX unit.

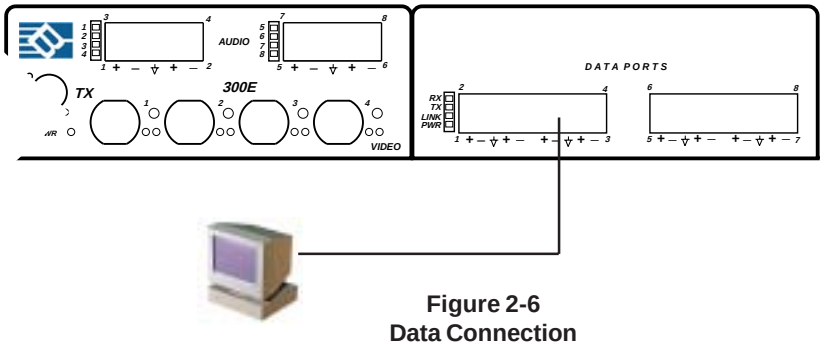


Figure 2-6
Data Connection

Figure 2-7 shows pin connections between the 320E Series unit (as a DCE unit) for Channel 1.

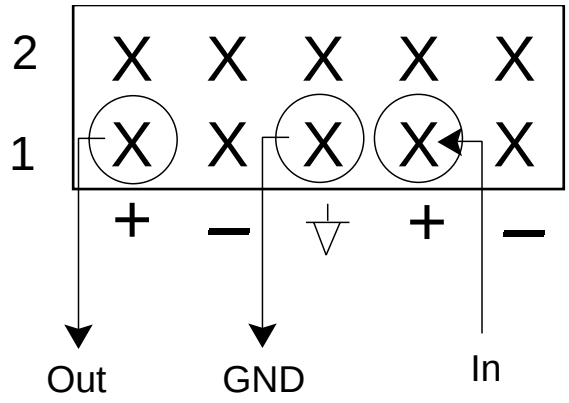


Figure 2-7
Pin Connections Between the 320E Series Unit and the User's RS-232 Device

RS-422 differential serial data

The 320E units transport differential data signals with compatible Full Duplex RS-422 type devices. Note that RS-422 does not support handshaking control signals. Use the following steps when connecting data transmission equipment:

1. Connect your serial data cable to the user's RS-422 device. (See Figure 2-6).
2. Repeat step 1 for the 320E RX unit.

Figure 2-8 shows pin connections between the 320E Series unit (as a DCE unit).

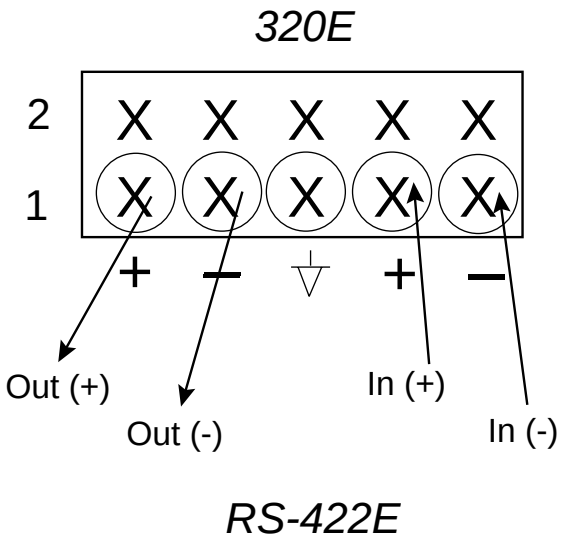


Figure 2-8
Pin Connections Between 320E Series Unit and User's RS-422 Device

2.3 AC Power Connection

Congratulations! You are now ready to power up the BCI 300E and set up your network connection. In order to make sure that you have a proper installation, please observe the following:

1. Your AC jack has power.
2. Your electrical system has proper grounding (this ensures that your power supply does not suffer from voltage variations).
3. **Power Surge Protection. This is optional**, but highly recommended. A UPS system provides voltage regularity as well as prevents spikes from occurring, thus protecting your 300E from sensitive voltage conditions.

The 300E derives power from an internal power supply. This power supply is a 110-240 VAC, 50-60 Hz, at 2.2A. This power supply comes standard for the 300E unless otherwise specified.

To provide power to the 300E, simply connect the power cord, already provided with the units, and connect it to the wall jack. (You will find one power cord per unit). Once the power cord has been connected to the wall jack, connect the other end of the cord to the unit and turn the switch on (I).

If you have any problems or concerns, regarding the installation, make sure that you have taken the proper steps to ensure a proper power connection. Otherwise, feel free to contact us for any questions you may have.

3.0 OPERATION

After the installation procedure is completed, the units are ready for operation. To operate the BCI 300E units, simply apply power as indicated in the previous step. Note that the front panel link status indicator, shown in Table 2, will be activated.

4.0 MAINTENANCE AND TROUBLESHOOTING

4.1 Maintenance

There is no operator maintenance other then keeping the units clean. However, observe the following light indicators to make sure that the unit is working properly:

TX Power	This RED LED on the transmitter indicates that the unit is properly powered.
RX Power /Link	The RED or GREEN LEDs on the receiver indicates that the unit is properly powered. When the LED changes from RED to GREEN color, the receiver unit is optically linked and operating properly
VIDEO Detection TX/RX	The GREEN LED indicates that each of the video input (TX) or output (RX) connectors are active.
VIDEO Clip Alarm TX	The RED LED indicates the signal level at each of the video input (TX) signal are over-ranged beyond 1.2Vpp.

Table 2
Status Indicators

4.2 Troubleshooting

If the BCI 300E units do not operate properly after installation, check for possible cable breaks, loose connections, and incorrect cable connections. If a problem exists on the fiber link, please check your fiber connectors for improperly cleaned fiber cables and connectors. If problems persist that may be fiber related, contact BCI at 1-800-214-0222 for further assistance.

For electrical problems, perform the following troubleshooting procedures:

1. **If the POWER indicator is OFF, check for the following:**

   a. The line cord is plugged into the unit and your outlet has power.

   b. The 300E unit is switched on.

   c. Check for blown fuses (located in the rear panel-entry module).

2. **If the POWER indicator is ON, but the Optical Link indicator is OFF, check for the following:**

   a. Make sure the appropriate (Singlemode or Multimode) fibers are being used.

   b. Fiber and fiber connectors are not broken. Ensure that the optical loss does not exceed the specified optical power attenuation (see Section 5.0 Specifications for the optical power budget).

   c. For each unit, the transmit (TX) fiber is connected to the other unit's receiver (RX).

3. If the POWER indicator and Optical Link indicator are ON, but the audio/video channels are not operating, then:

a. Check to see that the attached user equipment is turned on.

b. Both ends of the link are connected to the corresponding equipment and to the same corresponding channel port.

c. Cable connections at both the video/audio channels are securely fastened to each connector. Turn the power off, then back on to reset the link.

d. Output levels of the user's video and audio sources are not above the allowed input levels of the 300E units (see Section 5.0 Specifications).

5.0 SPECIFICATIONS

Video

Video Format	NTSC, PAL, S-Video
Channel Capacity	4, 8, or 16* (NTSC or PAL) 2, 4, or 8* (S-Video)
Bandwidth	8 MHz
Modulation Resolution	10 Bits (12 Bits optional)
Video Level	1.2Vp-p @ 75 Ohms
Differential Gain	<1%
Differential Phase	<0.7°
SNR (Weighted)	>70dB
Connector	BNC

Audio

Channel Capacity	8, 16, or 32*
Operating Mode	Balanced or Unbalanced
Input/Output Impedance	600 Ohms/600 Ohms (Balanced)
Max. Input/Output Level	+10 dBm (Balanced)
Magnitude Freq. Response	20Hz to 24kHz
THD+N	>85dB @ 1kHz (Balanced)
Connector	Terminal Block

Serial Data

Channel Capacity	4, or 8
Signal Format	RS-232 or RS-422
Data Rate	Up to 128 kbps (RS-232) Up to 256 kbps (RS-422)
Connector	Terminal Block

Physical

Dimension: (H x W x D)	
Standalone Unidirectional Versions:	1.72" x 8.58" x 12.0"
Standalone Bi-directional Versions:	1.72" x 17.03" x 12.0" (2/4 ch) 3.46" x 17.03" x 12.0" (8 ch)
Power (Unidirectional 2/4/8 TX/RX)	12VDC @ 25/25/50W

Power (Bi-directional 2/4/8 TX/RX)	110-240 VAC @ 60/60/120W
Operating Temperature	0 to +50°C
Humidity	0 to 95% RH, non-condensing
Status Indicators	Power, Optical Link, Video Activity

Optical

Fiber Type	Multimode and Singlemode
Number of Fibers	2 or 1
Wavelength	850, 1310 and/or 1550 nm
Fiber Optic Connector	ST (for Multimode) FC (for Singlemode)

*The 16-ch video/32-ch audio option comes with unidirectional links only (i.e., bi-directional links are not available)

Typical Power Budget and Transmission Distance

Application	Power Budget (1)	Typical Distance KM (2)	Typical Distance Miles (2)
Multimode Fiber	8	0.5	0.3
Singlemode Fiber	14	25	16
Multimode Long Distance	14	2	1.25
Singlemode Long Distance	20	60	37

(1) These are typical values for the 310E/320E Series. The actual values may vary.

(2) These are typical distance coverage figures. The maximum distance coverage may be greater than these typical numbers, depending on fiber type, fiber bandwidth, connector splicing losses, chromatic dispersion, environmental factors, etc.

6.0 SERVICE PROCEDURE

6.1 Replacement Policy

Standard products found defective on arrival (DOA) will be replaced, based on availability, within 24 to 48 hours anywhere in the U.S. Please call Customer Service at **800-214-0222** for information.

6.2 Return/Repair Service

The 310E System contains no user serviceable components. If you have a problem with your unit, please contact the Customer Service Department. To facilitate our return/repair processing please contact Broadata Communications, Inc. to obtain a Return Material Authorization (RMA). Please include the following information:

- Product model number
- Serial Number
- Complete description of problem
- Hardware installation description

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2545 West 237th Street, Suite K
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1-800-214-0222
(310) 530-1416
(310) 530-5958 (Facsimile)
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Website: www.broadatacom.com

7.0 LIMITED WARRANTY

Broadata Communications, Inc. (BCI) warrants, for a period of one year from date of shipment, each product sold shall be free from defects in material and workmanship. BCI will correct, either by repair, or at BCI's election, by replacement, any said products that in our sole discretion prove to be defective and are returned to the manufacturing location within 30 days after such defect is ascertained. All warranties are limited to defects arising under normal use and do not include malfunctions or failure resulting from misuse, abuse, neglect, alterations, electrical power problems, usage not in accordance with product instructions, improper installation, or damage determined by BCI to have been caused by the Buyer or repair made by a third party. Limited warranties granted on products are to the initial customer end-user and are not transferable. OUR LIABILITY UNDER THIS WARRANTY SHALL IN ANY CASE BE LIMITED TO THE INVOICE VALUE OF THE PRODUCT SOLD AND BCI SHALL NOT BE LIABLE TO ANYONE FOR CONSEQUENTIAL OR INCIDENTAL DAMAGES ARISING FROM THE USE OF ITS PRODUCTS OR THE SALE THEREOF. We make NO WARRANTY AS TO THE MERCHANTABILITY OF ANY GOODS, OR THAT THEY ARE FIT FOR ANY PARTICULAR PURPOSE OR END APPLICATION NOR DO WE MAKE ANY WARRANTY, EXPRESSED OR IMPLIED OTHER THAN AS STATED ABOVE.

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