



Radio Engineering Industries

BUS-WATCH®

**User Manual
Installation Manual**

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 **REI**
Proprietary/Uncontrolled
Document

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BUS-WATCH®

INTRODUCTION

Thank you for purchasing the BUS-WATCH® surveillance system by Radio Engineering Industries, Inc. This manual is intended to provide the user with the information required for proper installation, initial setup and explanation of the individual programming options. If you have any questions, or need assistance, please call the:

SERVICE HOT LINE
1-877-726-4617 Toll Free USA & CANADA
SALES HOT LINE
1-800-228-9275 Toll Free USA & CANADA
1-402-339-2200

FEATURES

- On screen menu system to program system options.
- Video head cylinder heater prevents frost build up in cold weather.
- Non-volatile memory with 10-year retention.
- Automatic VCR power shut off.
- Up to 16 character Route ID.
- Ten - 24hr programmable timers set automatic record start and stop times without user (driver) intervention.
- Date, Time, and Route ID at the bottom of the picture so detail at the top of the picture is not hidden.
- Infra red light sources to enhance low light operation
- Automatic Leap Year correction
- Programmable options include:
 - Repeat record mode
 - 0-35 minute record delay
 - Daylight savings time correction
 - 12/24 hour clock format
- Choice of user defined monitor points on vehicle.
- Backward compatible with previous BUS-WATCH® models.
- System information screen tracks system history.
- On screen display reminds user to service VCR.
- Audio and video out jacks located on the front of VCR for easy access.
- Small volume CCD camera.
- VCR cabinet may be mounted on floor or under seat.

System Components

- Industrial grade VCR mounted in metal security cabinet
- Slide Mount Bracket with Blind Mate Wiring Connectors
- Choice of CCD cameras - Low Light 700552 (8mm B&W), 700578 (8mm Color), 700553 (decoy), 700555 (4mm B&W), 700554 (4mm B&W Conduit)
- Camera to VCR cable - 510781
- VCR cabinet power cable - 510880
- Mounting kits - 060094 and 060113
- (Optional) BW Options harness - 511617
- (Optional) Vehicle speed sensor kit- 750086

BUS-WATCH®

INITIAL SET UP

The BUS-WATCH® system may be installed and operate out of the box without any user setup with the default settings, however, it may not show the correct date and time. To set the correct date and time and program the system operation to your requirements, please refer to the **MENU** section of this manual.

It is suggested the user purchase a small, portable video monitor to assist in the system set up.

Installation Tips

- Read the entire Instruction Manual before beginning the installation.
- Connect the green "MEMORY" wire directly to the positive battery terminal.
- Connect the black "GROUND" wire directly to the negative battery terminal or the vehicle frame.
- Provide extra care to avoid piercing the camera cable during installation – Refer to #9 in the **Troubleshooting Guide**.
- Completely check the system operation before dressing and hiding wires.

SYSTEM OVERVIEW

BUS-WATCH® is a superior surveillance system specifically designed for rugged school bus applications. The system consists of an industrial grade VCR encased in a tamperproof, lockable steel security cabinet and a surveillance camera of sturdy steel housing. As an option, the BUS-WATCH® can monitor and record vehicle functions such as warning lamp operation, brake, vehicle speed, and two user defined points. Figure 1 shows each component and a typical hookup.

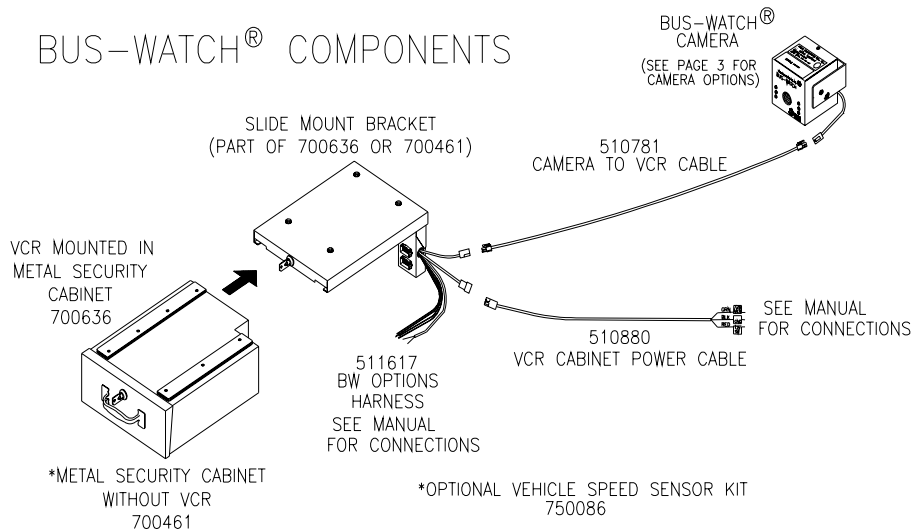


Figure 1

BUS-WATCH®

VCR Security Cabinet

The VCR security cabinet should be mounted horizontally on the floor or under the seat with the VCR right side up. The VCR should not present a trip hazard or head impact hazard and not interfere with the seating, safety, or comfort of the passengers.

BUS-WATCH® Cameras

The cameras use solid-state image transducers to capture live action for the VCR. The cameras employ an array of infra red light sources to enhance low light operation. Cameras are available in a variety of configurations including black & white, color, 8mm and 4mm.

Reset Button

If the VCR does not respond to user commands or does not operate properly, a reset button is provided. The button is located near the rear connector as shown in Figure 2.

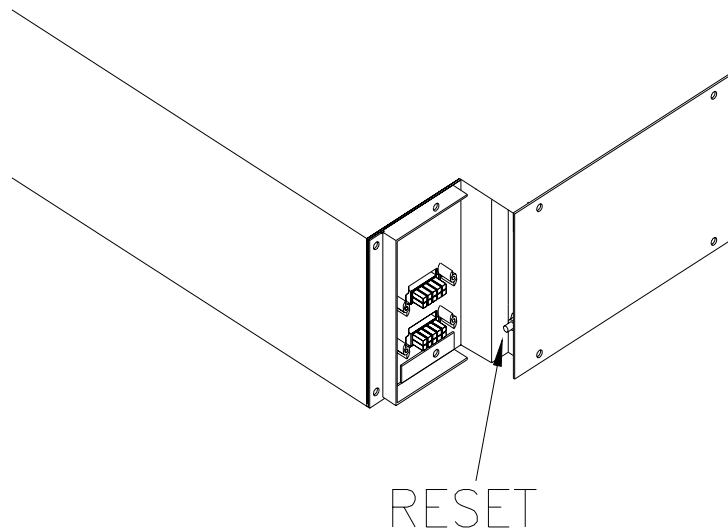


Figure 2

BUS-WATCH®

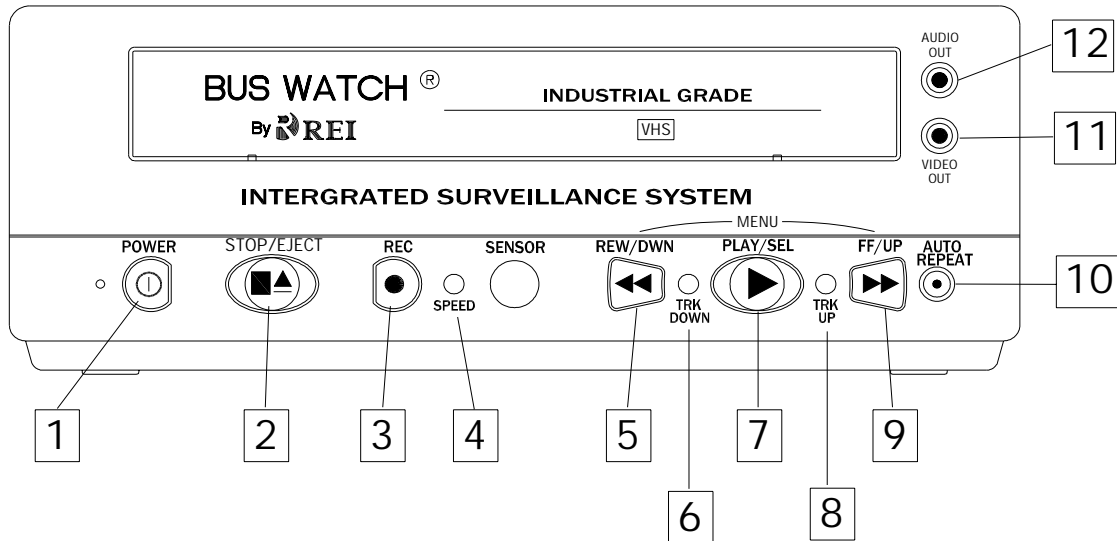


Figure 3

- [1] POWER – Press to turn power on & off, or a specific function
- [2] STOP/EJECT – Press to stop or eject tape
- [3] REC – Press to manually initiate record mode
- [4] SPEED – Press to change record speed from EP to SP mode
- [5] REW/DWN – Press to rewind tape or move cursor down in menu mode
- [6] TRK DOWN – Press to manually adjust tracking
- [7] PLAY/SEL – Press to play tape or make selections in menu mode
- [8] TRK UP – Press to manually adjust tracking
- [9] FF/UP – Press to fast forward tape or move cursor up in menu mode
- [10] AUTO REPEAT – Not in use
- [11] VIDEO OUT – To be connected to monitor for system set-up
- [12] AUDIO OUT – To be connected to monitor during playback

Tape Loading and Unloading

WARNING

If tape does not load when inserted, do not force tape. If excessive force is used, damage to the loading mechanism may occur.

Loading with the ignition switch off: Press the **POWER** button [1] to turn on the VCR. With the **POWER** indicator lit [1] insert a blank tape into the VCR. Push the **POWER** button [1] to turn off the VCR. The power light will go out in 10 seconds.

Loading with the ignition switch on: With the VCR in the **Manual** record mode, insert the blank tape. The VCR will accept the tape and immediately begin recording.

Note: if **Automatic** mode is selected and the day and time falls within any timer range, the VCR will begin recording.

Unloading with the ignition switch off: To eject the tape, press the **POWER** button [1] to turn on the VCR. Press the **STOP/EJECT** button [2]. The tape will eject. Press the **POWER** button [1] to turn off the VCR. The power light will go out in 10 seconds.

Note: If the VCR is cold (below forty degrees Fahrenheit), the **POWER** indicator [1] will flash indicating that the internal heater is activated. The VCR will not operate until the indicator stops flashing.

System Record

Manual Mode

To begin recording, turn on the ignition switch. The VCR will begin recording after a 10 second power up delay.

To stop recording, turn off the ignition switch. The VCR will shut off after 10 seconds. If the OFF DELAY 0-35 minute option is enabled the VCR will continue to record until the delay has timed out.

Automatic Mode

The VCR will automatically start and stop recording during the times set by the programmable timers. This mode will operate independent of the ignition switch position.

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Automatic Heater Function

To prevent the possibility of malfunction during cold periods, the VCR is equipped with an automatic heater. The heater is activated for a predetermined time when the VCR temperature falls below forty degrees Fahrenheit and the user attempts to turn on the VCR or place it in record. During this time all VCR functions are disabled. The **POWER** indicator light [1] will flash until the VCR is able to operate.

Automatic Shut Off

The VCR will automatically shut off after 15 minutes of inactivity.

Service Reminder

A flashing clock symbol  in the upper right corner of the screen will appear after 100 hours of record time. This indicates the VCR requires routine service. The clock symbol may be reset by entering the SET OPTIONS menu, moving the cursor to RESET SERVICE TIMER and press either the **FF** or **REW** button. The SERVICE TIME display in the first SYSTEM INFORMATION screen will also be reset to 000. Once reset, the on-screen reminder will reappear after the next 100 hours of record time.

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SYSTEM INSTALLATION

WARNING
REMOVE VEHICLE BATTERY VOLTAGE BEFORE INSTALLING
SYSTEM WIRING

System Wiring

Note: All cables should be hidden from view.

For the basic system (see fig. 4), there are two cables; power (510880) and camera (510781). For additional vehicle monitoring, the BUS-WATCH® Options harness (511617) is available.

Connect the camera to the VCR using cable P/N 510781. There is no specific direction for this cable to be installed.

Connect power to the VCR using cable P/N 510880. The black wire connects to the negative terminal of the battery. The green wire (labeled 12V MEM) connects directly to the positive terminal of the battery. **The green wire should be fused at 4 amps.**

IF THE SYSTEM OPERATES IN THE MANUAL RECORD MODE, connect the red wire (labeled 12V SW), to the switched side of the ignition switch. **The red wire should be fused at 2 amps.** The red wire is disabled in the automatic record mode.

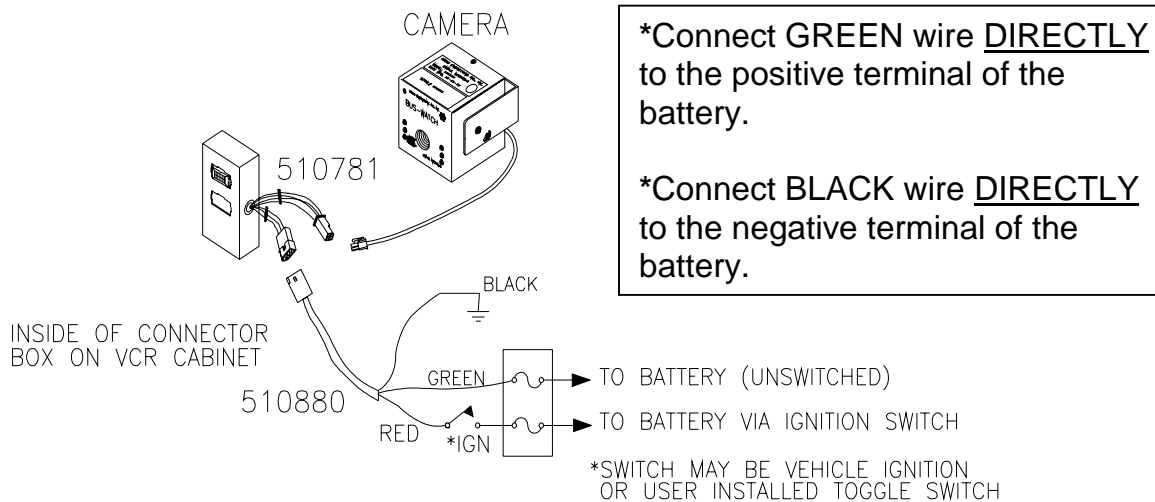


Figure 4

Note: Green wire fused @ 4 Amps, Red wire fused @ 2 Amps

BUS-WATCH®

(Optional) BW Options Harness

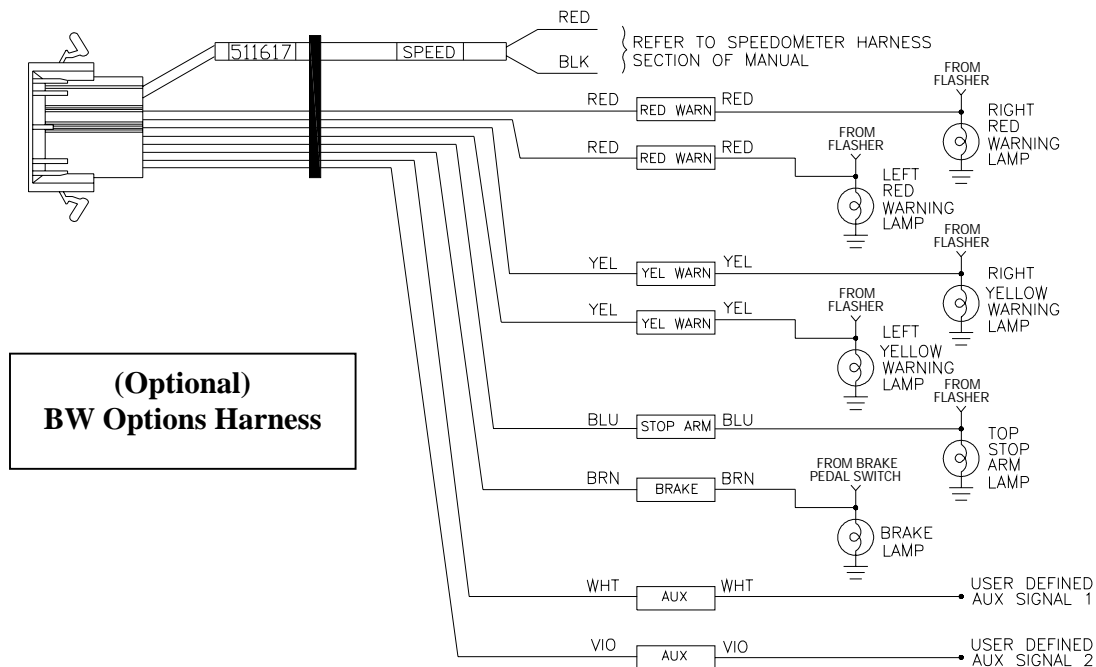


Fig.5

The BUS-WATCH® Options Harness (see fig. 5) connects to various locations in the vehicle to provide on-screen information regarding vehicle performance.

The monitored points in the vehicle are:

- Vehicle speed
- Brake activation
- Amber warning lamp operation
- Red warning lamp operation
- Stop arm lamp operation
- Optional points with AUX 1 & AUX 2 (Aux 1 & Aux 2 are user defined and may be used to monitor points such as turn signals, rear and front doors, etc.)

When using this option, the BUS-WATCH® “learns” the off state of each monitored point. All monitored points must be in the off position upon initiating a record sequence for the first time to properly set polarity.

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(Optional) BW Options Harness Mounting Instructions

Install the BUS-WATCH® Option Harness (see fig. 6) into the VCR security cabinet.

1. Remove the four mounting screws connecting the tower to the slide bracket.
2. Remove the four screws holding the connector box to the tower.
3. Insert the BW Options Harness by snapping it into place.
4. Route the excess harness through the provided hole
5. Assemble the connector box back onto the tower. Observe proper alignment of connector when inserting into box.

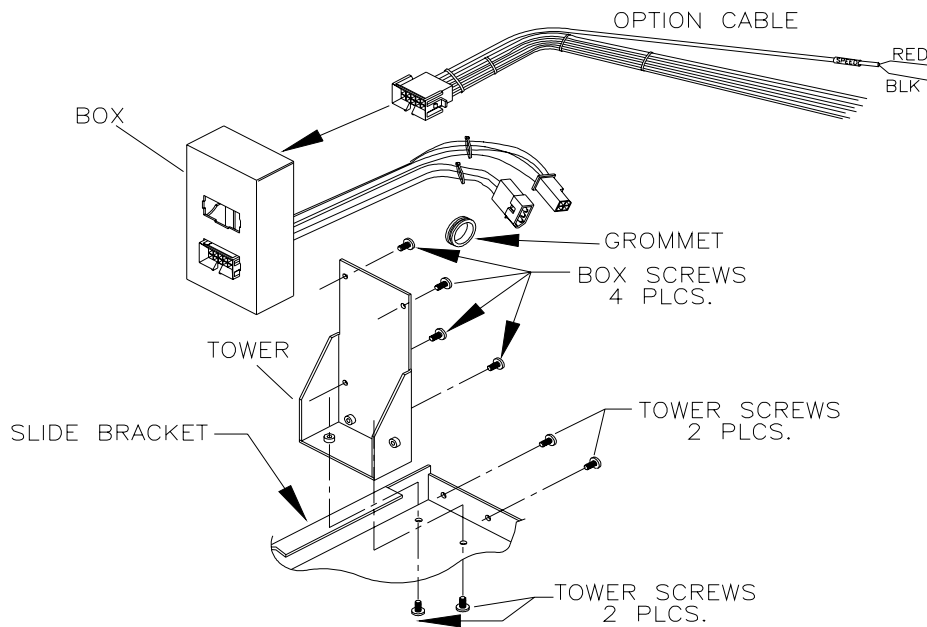


Figure 6

Speedometer Harness

Refer to the vehicle service manual for speedometer type, exact wire location, and transmission manufacturer warnings.

The BUS-WATCH® speedometer input wires are designed to be spliced directly onto the transmission speedometer transducer wires. In some installations, this may not be possible (i.e. mechanical speedometer, transmission manufacturer warnings, etc.). The BUS-WATCH® Vehicle Speed Sensor Kit (P/N 750086) may be required.

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(Optional) BW Options Harness Wiring Instructions

WIRE COLOR	WIRE DESCRIPTION
(2) YELLOW	RIGHT & LEFT YELLOW WARNING LAMP BANK
(2) RED	RIGHT & LEFT RED WARNING LAMP BANK
BLUE	STOP ARM LAMP
BROWN	BRAKE PEDAL LAMP
WHITE	AUX SIGNAL 1
VIOLET	AUX SIGNAL 2

Yellow Warning Lamps

Connect one YELLOW wire to one of the Warning Lamp Flasher's Yellow lamp outputs. Connect the other YELLOW wire to the other Yellow lamp output.

Red Warning Lamps

Connect one RED wire to one of the Warning Lamp Flasher's Red lamp outputs. Connect the other RED wire to the other Red lamp output.

Stop Arm Lamps

Connect the BLUE wire to the switched side of the top stop arm lamp.

Brake Lamp

Connect the BROWN wire to the switched side of one brake lamp.

On-Screen Information with (Optional) BW Options Harness

The BUS-WATCH® Surveillance system, when equipped with the BW Option Harness, will display information on-screen when the vehicle's monitored switches are activated and signals are applied to the monitored sensors.

ACTIVE SWITCH OR SIGNAL	ON-SCREEN DISPLAY
BRAKE APPLIED	B
STOP ARM DEPLOYED	S
LEFT YELLOW WARNING LAMPS ON (SEE NOTE 1)	* Y
RIGHT YELLOW WARNING LAMPS ON (SEE NOTE 1)	Y *
LEFT RED WARNING LAMPS ON (SEE NOTE 1)	* R
RIGHT RED WARNING LAMPS ON (SEE NOTE 1)	R *
SPEEDOMETER (SEE NOTE 2)	XXX MPH

NOTES:

1. The "*" symbols will alternately appear on each side of the "Y" or "R" in concert with the active lamp bank.
2. The three XXXs represent the vehicle speed (i.e. 035).

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Mounting Options

The VCR security cabinet should be mounted horizontally on the floor or under the seat with the VCR right side up. The VCR should not present a trip hazard or head impact hazard and not interfere with the seating, safety, or comfort of the passengers.

The standard mounting configuration for the BUS-WATCH® 700636 is to the under side of a seat. The standard mounting configuration for the BUS-WATCH® 700636FM is directly to the vehicle floor.

The minimum clearance area for the VCR security cabinet installation is shown in Figure 7.

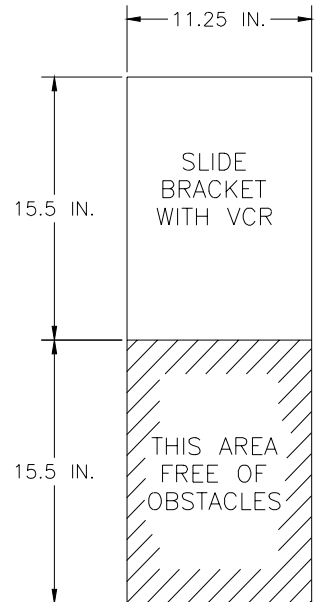


Figure 7

VCR Under seat Mount – 700636 (see Fig. 8)

1. Find a suitable location under the first or second seat behind the driver.
2. An area 15-1/2 inches should be unobstructed in front of the slide bracket to allow sliding the VCR security cabinet onto the slide bracket.
3. If necessary, modify the positions of the tower, connector box, and slide rails to match picture below.
4. Position the slide bracket on the frame of the seat in the desired location. Drill four 5/16th inch holes through the frame using the slide bracket as a guide.
5. Attach slide bracket to seat frame using nuts and bolts.

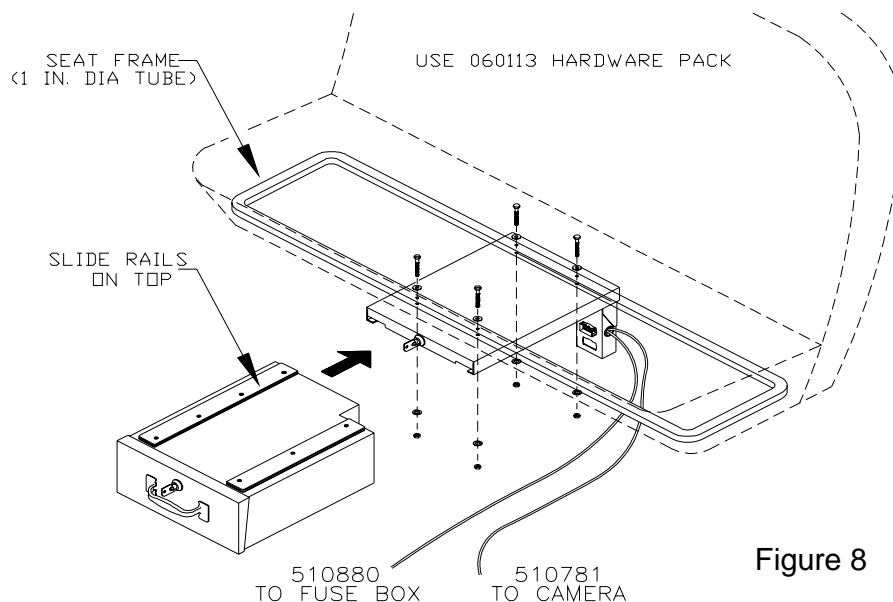


Figure 8

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VCR Floor Mount – 700636FM (See Fig. 9)

Find a suitable location to mount the slide bracket on the floor. The VCR should not present a trip hazard or head impact hazard and should not interfere with the seating, safety, or comfort of the passengers.

1. An area 15 and 1/2 inches should be unobstructed in front of the slide bracket to allow sliding the VCR onto the bracket.
2. Position the slide bracket on the floor and drill four 3/16th inch holes into the floor using the mounting holes as a guide.
3. Set aside the slide bracket. Position four rubber shock mounts over the pilot holes.
4. Place the slide bracket over the rubber shock mounts. Align the mounting holes to the center of the shock mounts.
5. Secure slide bracket to the floor using four lag bolts.
6. Carefully slide the cabinet onto the slide bracket being sure to check alignment of the connector. Lock to secure.

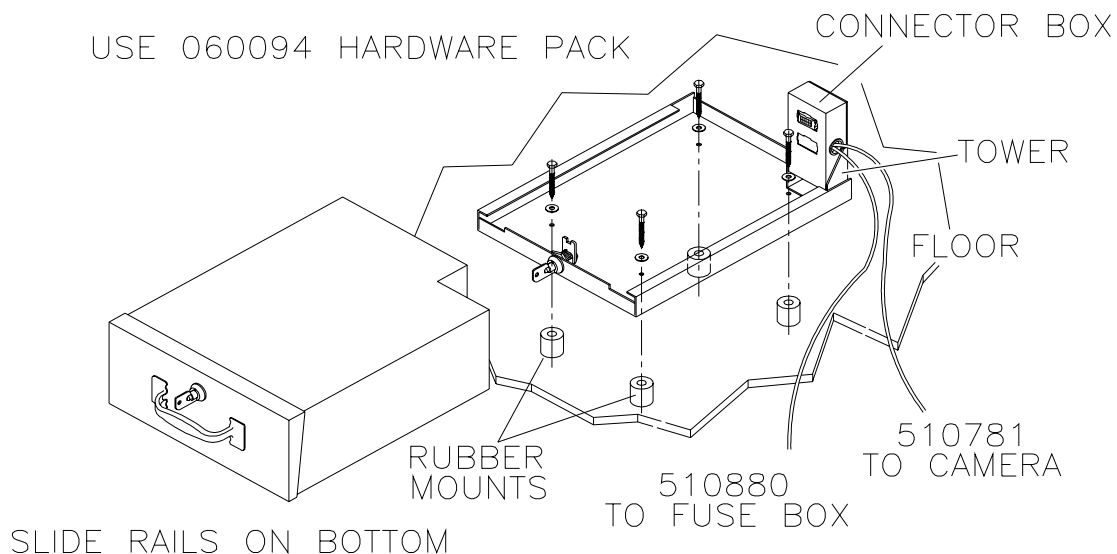


Figure 9

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Mount Conversion

Either BUS-WATCH® models, 700636 or 700636FM, may be converted to mount in the other method. The slide bracket and the VCR security cabinet must be modified.

Slide Bracket Modification (see Fig. 10)

1. Remove tower from slide bracket using four cap screws [1].
2. Slide tower to other side of bracket.
3. Reattach tower to slide bracket using four cap screws [1].
4. Remove connector box from tower using four screws [2].
5. Rotate connector box such that the rubber grommet is on the outside edge of the tower.
6. Reattach connector box to tower using four screws [2].

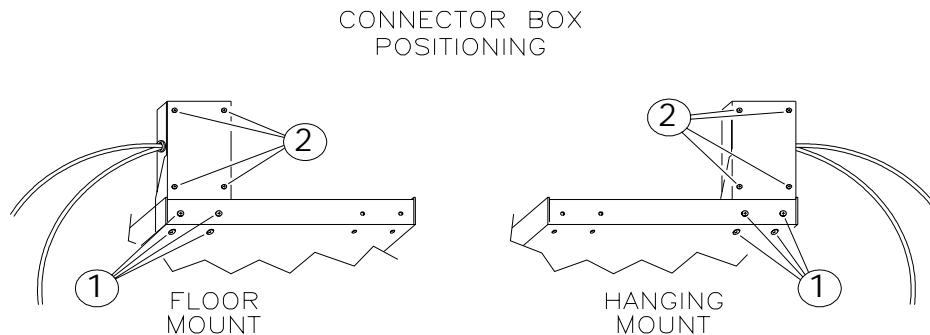


Figure 10

VCR Cabinet Modification (see Fig. 11)

Reverse the placement of the slide rails with screws and washers [1] from top to bottom of VCR.

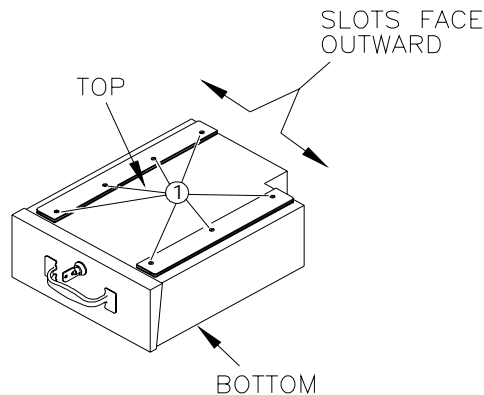


Figure 11

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Camera Placement

Mount the BUS-WATCH® camera securely in the center of the front header panel or ceiling panel. Stable support is essential to avoid excessive vibration. Connect a monitor (User supplied - optional monitor available from REI - P/N 690193) to the VCR using the front jacks labeled **AUDIO OUT** [12] and **VIDEO OUT** [11] to set the camera angle and test the audio (see Fig. 12).

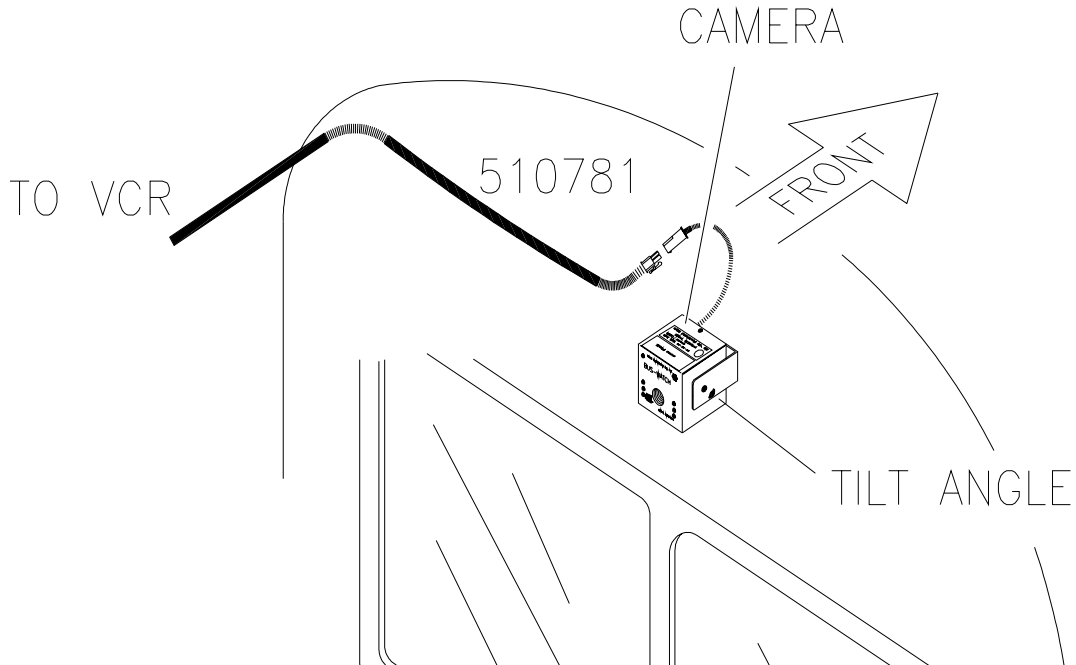


Figure 12

MENU SYSTEM

The menu allows the user to program the system operating parameters. Connect a monitor to the VCR using the front jacks labeled **AUDIO OUT** [12] and **VIDEO OUT** [11] to view the menu screens. The end user supplies the monitor and cable for connection to the VCR. Optional monitor available from REI, P/N 690193.

Controls

There are three dual function buttons controlling the menu system. (see fig 13)

- **REW/DWN** [5] - this button moves the cursor down or decreases the alpha/numeric value during programming.
- **FF/UP** [9] - this button moves the cursor up or increases the alpha/numeric value during programming.
- **PLAY/SEL** [7] – use this button to select the menu item to be changed. This button acts as the “enter” key.

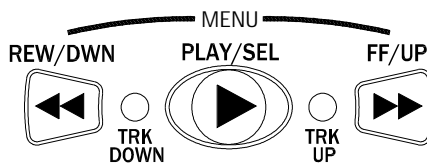


Figure13

Menu Operation

To activate the menu system, press the **POWER** button [1] to turn on the VCR. Insert high quality VHS video tape. Press and hold the **REW/DWN** [5] and **FF/UP** [9] buttons at the same time until the menu screen appears. The first screen is the main menu (see fig.14). The cursor should be flashing on the CALIBRATE SPEEDOMETER line. To select which function to program, press **REW/DWN** [5] until the cursor is flashing on the desired line. Press **PLAY/SEL** [7] to select the screen.

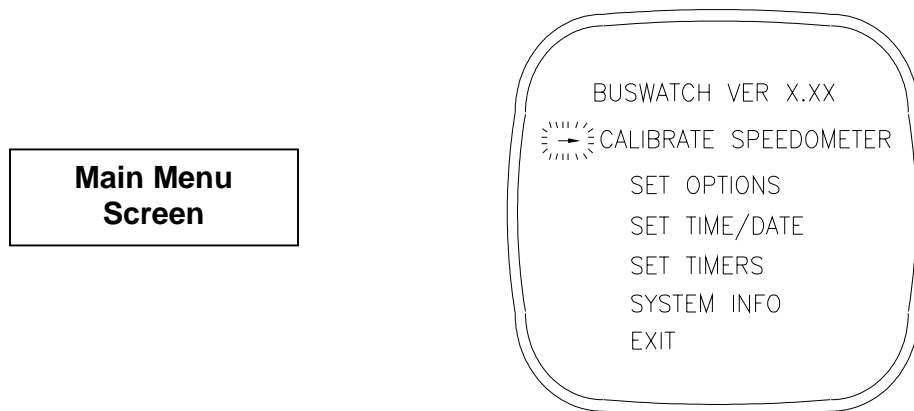


Figure 14

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The CALIBRATE SPEEDOMETER screen is used to program the system speed display on the VCR to match the actual speed of the vehicle.

The SET OPTIONS screen is used to program the OFF DELAY, REPEAT RECORD, DAYLIGHT SAVING TIME, etc. by the user.

The SET TIME/DATE screen is used to program the correct time and date.

The SET TIMERS screen is used to program the start and stop record times for the ten programmable timers.

The SYSTEM INFO screen displays the current software information, system record time, hi/low voltages and hi/low enclosure temperatures. This screen may not be viewed when the bus ignition switch is on or if the VCR is recording.

EXIT returns the VCR to live camera video.

Calibrate Speedometer (Requires two individuals – driver and programmer)

The CALIBRATE SPEEDOMETER screen (see fig. 15) is used to program the system speed display to match the actual speed of the vehicle. With the vehicle in motion, press the **FF/UP** [9] or **REW/DWN** [5] buttons to adjust the speed displayed.

In order to start the calibration process over, press the POWER button [1] in order to restore the factory calibration settings.

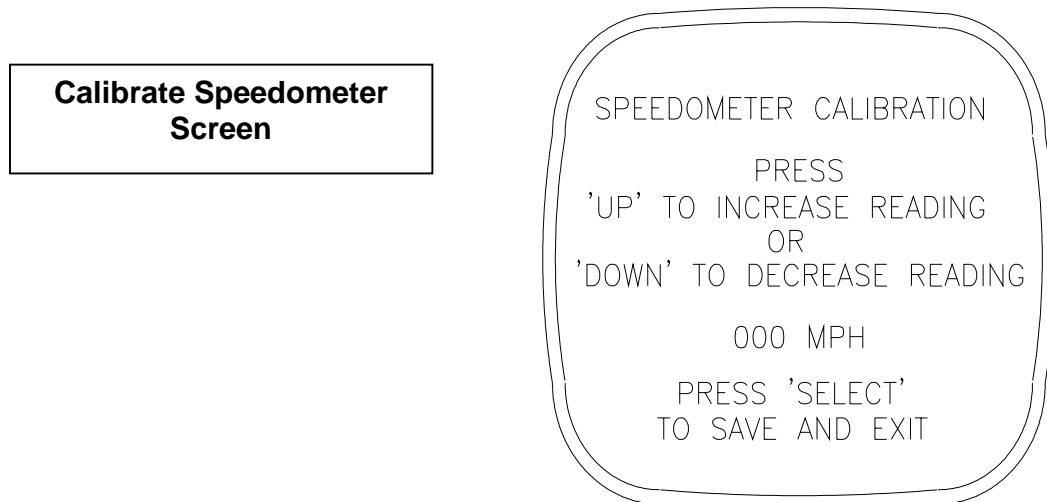
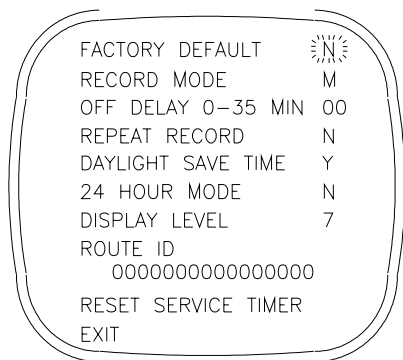


Figure 15

Set Options

The SET OPTIONS screen (see fig.16) allows the user to program the system to specific individual requirements or return to the factory default settings. Press the **FF/UP** [9] or **REW/DWN** buttons [5] to change the item. Press the **PLAY/SEL** [7] to save the change and go to the next item. Exiting this screen will return to the main menu screen



**Screen Set
Options**

**Press "POWER to escape
from this menu at anytime**

Figure 16

Factory Default

When set to **Yes**, the unit will default to the following factory presets: Off Delay changes to **00**, Repeat Record changes to **Yes**, Record Mode changes to **M**, Daylight Saving Time changes to **Yes**, 24 Hour Mode changes to **No**, the Display Level changes to **6**, and the menu drops to Route ID.

When set to **No**, the user may change any option to individual preferences.

Record Mode

When set to **Automatic**, record times are set by the enabled programmable timers only. The ignition switch will **NOT** place the unit into record when the **Automatic Mode** is set.

When set to **Manual**, recording is controlled from the ignition switch.

Off Delay 0-35 min

When set to **00** the VCR will stop recording immediately after the ignition switch is turned off.

When set from **1-35**, the VCR will continue to record for the selected time after the ignition switch is turned off.

Note: Off Delay is disabled when in **Automatic mode**

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Repeat Record

When set to **Yes**, the VCR will automatically rewind the tape and record over the previous material when the end of the tape is reached.

When set to **No**, VCR will stop recording at the end of the tape. Tape does not rewind. When the end of the tape is reached, there is no indication to the driver that the VCR is not recording.

****AUTO REPEAT** button [10] is disabled from the front of the VCR and can only be accessed through the above menu.

Daylight Save Time

When set to **Yes** the VCR clock will automatically adjust for daylight saving time. Power must be applied to the memory (green) wire for the system to update.

When set to **No**, then the clock will not update.

24 Hour Mode

When set to **Yes** the clock will be displayed in a 24hr format.

When set to **No** the clock will be displayed in a 12hr format. All timers and clocks are set in the 12hr format.

Display Level


The display level allows the user to select the information that is displayed over the live camera video. The settings are:

- 0 - Display nothing
- 1 - Display time only
- 2 - Display calendar only
- 3 - Display time and calendar only
- 4 - Display route ID only
- 5 - Display route ID and time only
- 6 - Display route ID, time, and calendar only
- 7 - Display time, calendar, and switch between route ID, and temp & voltage
- 8 - Display time, calendar, temp & voltage

Route ID

The characters may be set by pressing the **REW/DWN** [5] or **FF/UP** [9] buttons to step through the characters. When the desired character appears, press the **PLAY/SEL** [7] button to enter and save the selected character and move to the next character position.

Reset Service Timer

When 100 hours of recording time has elapsed, a flashing clock symbol  will appear in the upper right corner of the display. A flashing "Y" will also be displayed on the RESET SERVICE TIMER line. Press the **REW/DWN** [5] or **FF/UP** [9] buttons to reset the service timer and turn off the "Y".

Note: Be sure to service the VCR regularly.

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Exit

Returns the display to the main menu screen.

Set Time / Date

The time and date will appear at the bottom of the screen (see fig. 17).

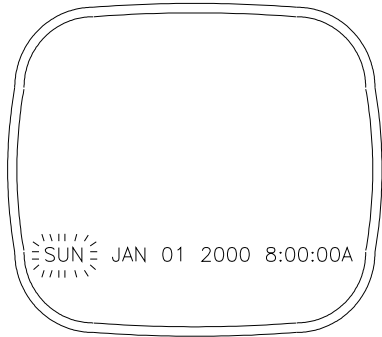


Figure 17

Set Time/Date Screen

Press "POWER to escape
from this menu at anytime

The BUS-WATCH® system
automatically corrects for
Leap Year

Press the **REW/DWN** [5] or **FF/UP** [9] buttons to step through the days of the week. When the correct day appears, press the **PLAY/SEL** [7] to enter and save the selection and move to the next item.

Continue using the same buttons as above to set the month, date, year, hours, minutes, seconds, and the AM/PM indicator. Press **PLAY/SEL** [7] to exit the screen and return to the main menu.

Set Timers

There are ten timers labeled T0 through T9. Each timer may be programmed for the day of the week, start time, stop time, and enable (Y) or disable (N).

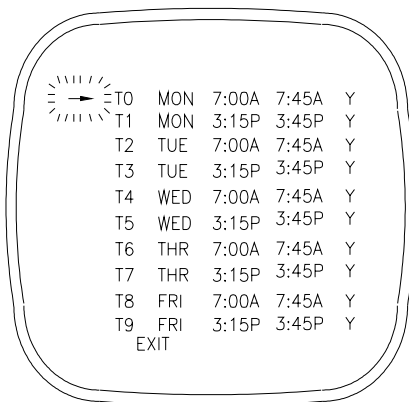


Figure 18

Set Timers Screen

Press "POWER to escape
from this menu at anytime

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Use the **FF/UP** [9] and **REW/DWN** [5] buttons to move the cursor to select the timer. Press the **PLAY/SEL** [7] to select the timer and move to set the day of the week.

Use the **FF/UP** [9] or **REW/DWN** [5] buttons to change the day of the week. When the desired day is displayed, press the **PLAY/SEL** [7] to enter and save the data and move to the start time.

Press the **FF/UP** [9] or **REW/DWN** [5] buttons to change the hour. When the desired hour is reached press the **PLAY/SEL** [7] to enter and save the change and go to the next field. Continue setting the start minutes, start am/pm, stop hour, stop minute, stop am/pm, and the enable flag (Y/N) and return to the timer number. Press the **FF/UP** [9] or **REW/DWN** [5] button to move to the next timer or EXIT. Press **PLAY/SEL** [7] to select the next timer or exit.

Note: All timers should be set prior to recording.

Note: If the start time is set equal to the stop time the timer will not start

System Information

There are two system information screens. (see figs. 19 &20). The first screen shows the SOFTWARE VERSION number, SPEEDOMETER CALIBRATION factors, TOTAL RECORD TIME in hours, and the SERVICE TIMER. Press the **REW/DWN** [5] button to display the next screen or the **PLAY/SEL** button [7] to exit.

The second screen displays the minimum and maximum voltages and enclosure temperature readings taken when the BUS-WATCH® is recording. The temperature and voltage data may be reset by pressing the **POWER** button [1]. Press the **REW/DWN** [5] button to display the previous screen or the **PLAY/SEL** button [7] to exit.

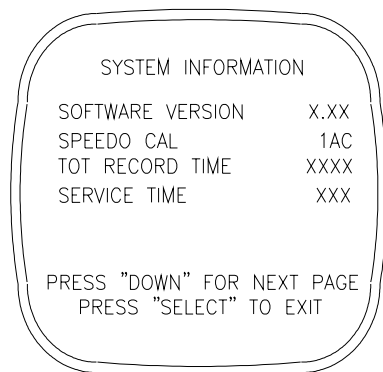


Figure 19

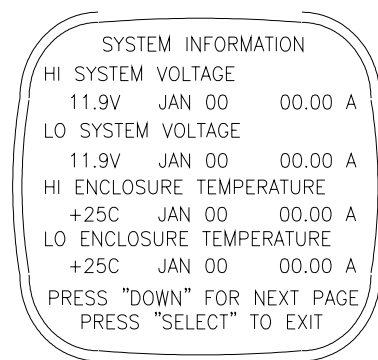


Figure 20

BUS-WATCH®

SPECIFICATIONS

VCR Security Cabinet

Size (with slide bracket)	
Height	6 inches maximum
Width	11-1/4 inches maximum
Depth	15-1/2 inches maximum
Weight (without bracket)	25 pounds
Power Consumption	
Standby	36 mA
Recording	1100 mA
Heater	1900 mA

Slide Bracket

Height	1.23 inches
Width	9.76 inches
Depth	13.34 inches
Weight	4 LB 14 oz

Camera

Image device	1/3 inch
Focal length	8 mm, 4mm
Angle of view (D x H x V)	40.1' x 32.6' x 24.7'
Luminance Sensitivity	0.1 Lux
Electronic Iris	1/100,000 sec
Power Supply	12V
Power consumption	145 mA
Height	3 inches
Width	3 inches
Depth	3 inches
Weight (with bracket)	20.7 ounces

VCR Specifications

Format	VHS NTSC Standard
FF/REW Time	Less than 7 minutes with T120 tape
Video Output	1Vp-p, 75 Ohm unbalanced
Audio Output	-5dBm, 600 Ohm unbalanced
Operating Temperature	-30° F to 150° F

Maximum switch/sensor input voltage

15 VDC (any input)

Speedometer

Electronic	
2 - 15 Volt Pulse	
30 - 70% Duty cycle	
Design criteria - 16 pulses/revolution	
Mechanical	
Design criteria - 1000 revolutions/mile	

BUS-WATCH®

TROUBLESHOOTING GUIDE		
PROBLEM	POSSIBLE CAUSE	CORRECTION
1 VCR DOES NOT TURN ON	<ul style="list-style-type: none"> • NO VCR POWER • NO GROUND • INSERT HIGH QUALITY VHS VIDEO TAPE 	<ul style="list-style-type: none"> • CONNECT GREEN WIRE TO +BATTERY • CONNECT BLACK WIRE TO VEHICLE GROUND
2 VCR WILL NOT RECORD WHEN BUS IS RUNNING	<ul style="list-style-type: none"> • NO VOLTAGE ON RED WIRE • VCR DOES NOT TURN ON • VCR IN AUTOMATIC RECORD MODE • NO TAPE IN VCR • RECORD TAB BROKEN ON TAPE 	<ul style="list-style-type: none"> • CONNECT RED WIRE TO SWITCHED SIDE OF IGNITION • SEE #1 • SET VCR TO MANUAL RECORD MODE • INSERT TAPE • REPLACE TAPE
3 VCR DOES NOT RESPOND TO USER COMMANDS	<ul style="list-style-type: none"> • VCR DOES NOT TURN ON • MICROCONTROLLER PROGRAM 	<ul style="list-style-type: none"> • SEE #1 • PRESS RESET SWITCH
4 VCR DOES NOT RECORD WHEN PROGRAMMED	<ul style="list-style-type: none"> • VCR DOES NOT TURN ON • TIMER ENABLE SET TO "N" • VCR IN MANUAL RECORD MODE • NO TAPE IN VCR • RECORD TAB BROKEN ON TAPE 	<ul style="list-style-type: none"> • SEE #1 • SET TIMER ENABLE TO "Y" • SET VCR TO AUTOMATIC RECORD MODE • INSERT TAPE • REPLACE TAPE
5 ON SCREEN VEHICLE OPTIONS DO NOT DISPLAY	<ul style="list-style-type: none"> • CHECK INSTALLATION OF CONNECTOR • CHECK ELECTRICAL CONNECTIONS 	<ul style="list-style-type: none"> • TURN CONNECTOR OVER IN POWER BOX • MEASURE ACTUATION VOLTAGE – REPAIR AS NEEDED

BUS-WATCH®

TROUBLESHOOTING GUIDE		
PROBLEM	POSSIBLE CAUSE	CORRECTION
6 VEHICLE SPEEDOMETER QUILTS WHEN BUS-WATCH® SPEEDO CIRCUITRY APPLIED	<ul style="list-style-type: none"> BUS-WATCH® SPEEDO CIRCUITRY LOADING THE VEHICLE COMPUTER SYSTEM 	<ul style="list-style-type: none"> INSTALL BUS-WATCH® SPEEDOMETER ATTENUATOR
7 BUS-WATCH® SPEEDO DISPLAY READS 3-10MPH WHEN VEHICLE IS IDLING	<ul style="list-style-type: none"> NOISE INDUCED ON THE SPEEDO PICKUP WIRE 	<ul style="list-style-type: none"> INSTALL BUS-WATCH® SPEEDOMETER ATTENUATOR
8 VCR STOPS RECORDING WHEN VEHICLE COMES TO A STOP OR IS IDLING	<ul style="list-style-type: none"> MEMORY WIRE (GREEN) VOLTAGE FALLS BELOW 9V 	<ul style="list-style-type: none"> CHECK VOLTAGE AT GREEN WIRE CONNECTION POINT WHILE THE VEHICLE IS IDLING GREEN WIRE NOT CONNECTED DIRECTLY TO +BATTERY
9 RECORDED AUDIO HAS HUM OR ALTERNATOR NOISE	<ul style="list-style-type: none"> CAMERA CABLE HAS BEEN PIERCED CREATING A GROUND LOOP 	<ul style="list-style-type: none"> REPAIR CAMERA CABLE INSTALLATION
10 NO VIDEO	<ul style="list-style-type: none"> VCR DOES NOT TURN ON NO POWER APPLIED TO CAMERA 	<ul style="list-style-type: none"> SEE #1 CHECK CAMERA CABLE CONNECTIONS
11 NO VIDEO – ONLY ON SCREEN INFORMATION	<ul style="list-style-type: none"> CAMERA IRIS IS CLOSED CAMERA IS OUT OF FOCUS 	<ul style="list-style-type: none"> RESET CAMERA IRIS REFOCUS CAMERA
12 POOR PICTURE OR AUDIO QUALITY ON PLAYBACK	<ul style="list-style-type: none"> DIRTY VCR RECORD HEADS 	<ul style="list-style-type: none"> SERVICE VCR

BUS-WATCH®
