Operator Instruction Manual
for Videotape Inspector/Cleaners

for Models **TapeChek 460**
TapeChek 470
TapeChek 480
TapeChek 490

RESEARCH TECHNOLOGY INTERNATIONAL CO.
4700 Chase Avenue ● Lincolnwood ● Illinois ● 60712 ● USA

IMPORTANT SAFETY INSTRUCTIONS

Read these instructions and the operating instructions before attempting to operate the machine. These cautionary statements are to protect you, the equipment, and your videotapes.

1. Make sure that your TapeChek machine is plugged into the proper source of power as indicated on the nameplate on the rear of the machine.

2. Make sure that all packing materials, adhesive tape and shipping clamps or bands have been removed from inside and outside the unit before operating.

3. Save these instructions for later use.

4. Follow all warnings and instructions marked on the product and in this manual.

5. Unplug this product from the wall outlet before cleaning. Use only a damp cloth for cleaning. Do not use harsh or abrasive cleaning agents.

6. This product contains a very sharp Sapphire burnishing post. Exercise care in cleaning the burnisher and around the burnisher to prevent cuts or personal injury. Do not allow hard objects to strike the sapphire. Inspect the sapphire burnisher regularly for chips or imperfections as these may be harmful to your videotapes.

7. Do not use this product near water. It may cause electrical shock.

8. Do not place this product on an unstable cart, stand or table. The product may fall, causing personal injury. Place on a level, horizontal and stable surface for best results.

9. Slots and openings in the cabinet are provided for ventilation. To insure reliable operation of the product and to protect it from overheating, these openings must not be blocked or covered. This product should not be placed in a built-in installation unless proper ventilation is provided.

10. This product is equipped with a three wire grounding-type plug, a plug having a third (grounding) pin. This pin will only fit into a grounding-type power outlet. This is a safety feature. If you are unable to insert the plug into the outlet, contact your electrician to replace your obsolete outlet. Do not defeat this grounding plug.

11. Do not allow anything to rest on the power cord. Do not locate this product where persons will walk on the cord.

12. If an extension cord is used with this product, make sure that the total of the ampere ratings of the products plugged into the extension cord do not exceed the extension cord ampere rating.

13. Never push objects of any kind into this product through cabinet holes as they may touch dangerous voltage points that could result in a risk of fire or electric shock. Never spill liquid of any kind on this product.

14. Before operating the unit, on a routine basis, place a spare tape in the unit to verify proper and smooth tape handling. This should be done daily for the protection of your tape collection and the unit.

15. Hands, clothing, and equipment must be kept clear of the mechanism during its operation.

16. For safety and accurate defect detection, the lid of the machine must be kept closed during the inspection of the videotape.

17. Research Technology International Company, shall not be liable for any damage to recordings or materials processed, cleaned or inspected with this product.

18. Do not use VHS-C "mini-cassettes" cassettes in this machine.

19. SAVE THE SHIPPING CONTAINER AND PACKING MATERIALS. FOR FACTORY SERVICE, YOU MUST RETURN THE UNIT IN THIS SHIPPING CONTAINER WITH MECHANISMS SECURE.
YOU MUST CALL RTI SERVICE DEPARTMENT FOR A RETURN AUTHORIZATION BEFORE RETURNING A UNIT FOR SERVICE.
Phone: 1-800-323-7520 or **1-708-677-3000**
Use **1-847-677-3000** after February 1996.

WARRANTY ON NEW
RTI TAPE EVALUATING
AND CLEANING EQUIPMENT

RTI warrants its new videotape inspection and cleaning equipment to be free from original defects in materials and workmanship under normal use and service for a period of 3 months from the date of shipment of purchased unit from RTI, and will, at its option, repair or supply a replacement for any defective part, assembly, or portion thereof (F.O.B. RTI's shipping point) except for expendable materials such as cleaning and burnishing supplies plus lamps, fuses, etc.

RTI shall not be responsible for any warranty, if, in the opinion of RTI, the equipment/material has been damaged due to misuse, neglect, accident, unauthorized alteration and/or repair, use of chemicals or supplies other than those manufactured by RTI or which are compatible with RTI's equipment.

Extended warranties are available from RTI and some dealers. Call RTI or dealer for details.

RTI Phone: 1-800-323-7520 or **1-708-677-3000**

after February 1996:
1-800-323-7520 or 1-847-677-3000

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INSTALLATION PROCEDURE

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1. Lift the RTI TapeChek Inspector/Cleaner with its custom foam packing cushions out of the carton. Inspect the machine and the carton for any signs of abuse or shipping damage. If any damage to the cabinetry is found, contact RTI before operating the machine.

2. Remove the spare cleaning tissues, etc. from the carton and store in a safe place for future use. Set the power cord aside for now.

3. Lift the top lid of the cabinet to expose the transport mechanism. Carefully remove all packing materials such as the rubber band that secures the roller threading arm. Remove the block of foam that is wedged into the middle (cassette loading) area in the front of the machine. The carrier flap door will then pop up into its normal position.

4. **Place all packing materials back into the carton and store for future use. If the unit ever needs to be returned for factory service, you must pack the machine securely in this RTI carton!**

5. Make sure your main power agrees with the power specification on the nameplate located on the rear of the machine. You are now ready to attach the power cord to the rear of the unit and plug the machine into your power outlet. Only use a properly wired 3-contact grounded outlet.

Read sections B, C, and D before running tape in the machine !

On 220 Volt models, an interlock switch cuts off power when the beige, middle portion of the machine is opened. Do not lift this cabinet with videotape in the machine.

GENERAL DESCRIPTION AND SPECIFICATIONS

TapeChek 460, 470, 480, 490

Your 400 series Inspector/Cleaner will inspect your video cassettes, at high speed, for physical tape damage such as wrinkles, creases and edge damage. These physical defects can ruin the performance of the tape during playback or recording. They can also be detrimental to the heads of the VCR being used.

Automatic Operation

The machine is designed to be used in the automatic mode. A cassette is loaded and the operator presses AUTO. The tape is threaded into the cleaner and defect detection assemblies. It is run fast-forward to the end of the tape and automatically rewound back to the beginning. The cassette is then ejected.

Smart Defect Detection

The detector has multiple sensors that detect defects optically. This means there is no risk of altering the pre-recorded signals on the tape. When a physical defect is found, that section of tape is counted as a "defective section" (a section equals *one second* of tape at standard play speed.) This system insures that the results shown on the display will be meaningful. If the machine counted every bump in a section of continuous edge damage, it could count hundreds of bumps in a few seconds of tape. Seeing these large counts would lead the operator to mistakenly think that the whole tape is ruined!

Multiple Sensors

The 460 and 470 models have two detector sensors. Models 480 & 490 have three sensors across the width of the tape. If a crease all the way across the tape is detected, it will cause all channels to count, but only one (1) defect is counted in the "TOTAL" counter. The "Audio" sensor is near the top edge of the tape and the "Control" track sensor is near the bottom edge. On three channel models the "Video" track sensor inspects the middle of the tape. The optional CCD detector has 64 optical sensors. Twelve for each edge channel and 40 for the middle channel.

Thorough Cleaning

The cleaning system in the 400 series units will greatly benefit your tapes! Repeated cleaning of a tape will continue to reduce video dropouts until all loose debris is removed from the tape. You can actually restore tapes to their former condition and performance. Even hundreds of cleanings will not harm the recorded program.

How do tapes get "dirty"? Every time you play or record on a tape, the video head and other parts of the VCR will generate some loose oxide and expose the tape to airborne dust and debris.

Two Cleaning Systems

The TapeChek unit uses a specially formulated tissue and a burnishing station. The cleaning tissue wipes off lose oxide, dust and debris from the tape's oxide surface. The cleaning tissue advances slowly, under motor drive, so that clean tissue is always presented to the videotape.

Precision Burnisher

The cleaning system is further enhanced by the precision sapphire burnisher (polisher) post. Under very light pressure, the tape is polished smooth. This insures intimate contact between the tape and the heads of the VCR. The audio and video signals are thus improved. The sapphire material of the burnisher is extremely hard and is manufactured to optical standards for a perfectly smooth (and sharp) edge.

Dropouts Removed

"Dropouts" are losses in the video and/or audio signals. Video drop- outs look like snow or white streaks in the picture. Audio dropouts are noticed as brief periods of "missing" sound. Most dropouts are caused by rough tape surface and debris on the oxide that separates the tape from the video or audio heads. All of these problems are eliminated by routine cleaning with the TapeChek.

Better Recordings

TapeChek cleaning also improves the performance of tape in a VCR during the recording process. When copies of tapes or new recordings are made, any dropouts in the signals get "recorded-in" and can never be removed by future cleaning. Therefore. it is best to clean your tapes before recording on them!

Professional Design

The entire operation of the TapeChek machine is controlled by a microcomputer in the unit. In addition to supplying data to the digital displays and an optional printer, the micro-processor also controls all motors and mechanisms of the machine, This allows totally automatic operation after insertion of the cassette including the threading of the tape, inspection, cleaning, rewinding and the ejection of the cassette.

Rugged Construction

The mechanisms of the TapeChek are built to precise standards. Rugged steel and aluminum are used throughout to insure years of reliable service. The high speed of the TapeChek machines dictated high quality bearings, motors and sensors to feed information to the microprocessor electronics. These systems insure fast, gentle tape handing.

Available Options

The 400 series TapeChek units are complete tape inspection and cleaning systems. To complete the benefits of the TapeChek units, RTI offers an optional Erase feature that prepares a tape for re-recording and a printer port that delivers defect information to an external printer. This provides complete reports including the Tape number, Date, A-B-C Condition, and a graphic printout of defect locations.

TapeChek 400 Series Feature Comparison Chart

TapeChek Model	460	470	480	490
Cleaning Tissue/ Burnishing	Yes	Yes	Yes	Yes

Speed (Relative to standard play speed	45X	75X	45X	75X
Display Formats	2	2	6*	6*
Diagnostics Display	No	No	Yes	Yes
Total Defect Counter	Yes	Yes	Yes	Yes
Tape Length Counter	Yes	Yes	Yes	Yes
Defect Location Display	No	No`	Yes	Yes
Damaged Section Display	Yes	Yes	Yes	Yes
No. of Defect Channels	2	2	3	3
"A-B-C" Grade Indicators	Yes	Yes	Yes	Yes
Printer Output Port	Option	Option	Yes	Yes
Computer Data Output	No	No	Option	Option
Data Entry Keyboard	No	No	Yes	Yes
Defect Search Option	No	No	No	Option
Erase Function	No	No	Option	Option

*=Plus one diagnostic display.

MACHINE SPECIFICATIONS

Tape Transport System:	Model 460,480: 45 times SP Speed (59 IPS) Model 470,490: 75 times SP Speed (98 IPS) Capstanless dual-motor spindle drive. Infra-red leader detection and tape speed sensing system. Tape accumulator prevents excess tape tension and provides gentle handling. Tape speed and tension are constantly monitored by microprocessor electronics.
Displays:	Five(5) LED's indicate machine operating modes Three(3) LED "Tape Condition" indicators. LCD display (2 line x 16 Character) provides operator messages and tape data. TC480 & TC490 have back-lighted display for viewing in darkened rooms.
Cleaning System:	Sapphire burnishing station and automatic advancing cleaning tissue (10 RPH) motor. Cleans and polishes tape in both forward and rewind modes.
Detection System:	Touchless, non-erasing, infra-red optical defect sensing system on all TapeChek 400 series. TC460 & TC470 : Two edge area sensors TC480 & TC490 : Two edge area sensors, plus center area detection sensor TC490-CCD : 64 element CCD sensor, 3 ch.
Operator Controls:	On all 400 Models: *STOP, AUTO, EJECT FORWARD, REWIND, RESET, CLEAR, DISPLAY, " O ", " Δ ".* Additionally, on Models 480 & 490: *12 Key Numeric Keypad, TAPE #, SET-UP, PRINT, OPERATOR #, SEND* plus two switches labeled "*X", "Y*"

Electronics:	Microprocessor (8085) based control system with 256K ROM and 64K RAM memory devices. Digital electronics control all the motors, transport system defect detection, keyboard, displays and optional printer or data outputs. The memory stores defect data and information for one videotape at a time.
Diagnostics System:	The status of sensors and mechanisms in TapeChek 400 Series machines is monitored and, on some models, displayed on the LCD display.
Printer Port Option:	This optional electronics package provides the data for Centronics standard, parallel data, line printer through the 25 pin connector on the rear of the unit. Most line printers using this data standard are suitable for use with the TapeChek 400 Series machines. This printer port is designed for an 80 column wide printout.
Erase Option:	When the optional erase feature is included in the TapeChek machine, it will provide a full-width erasure of the tape. It is selected by the front panel controls. The machine indicates when tape is actually being erased by a visual LED and an audible beeper.
Power:	117 VAC, 60 Hz. Standard 220 VAC, & 240 VAC, 50 Hz. Optional
Overall Dimensions:	20"W x 18"D x 8-1/2"H
Net Weight:	48 lbs.

OPERATOR CONTROLS

For TapeChek Models 460, 470, 480, 490. These switches (keys) are located on the right hand control panel.

STOP When a tape is loaded, this key causes the tape to thread. If tape is already running, it will stop the tape. This key has priority over other keys. You must wait until the STOP light (LED) goes out before pressing other keys.

AUTO The AUTO key causes the tape to run forward to the end and automatically rewind. After rewind, the cassette will eject. Inspection for defects occurs during the rewind mode.

FWD The FORWARD key will cause the tape to move from the left spindle to the right until stopped or the end leader occurs.

REW Depressing the REWIND key will rewind the tape until the beginning leader is sensed.

EJECT This key causes the cassette to eject. If the tape is running, the tape is stopped and then the cassette is automatically ejected.

RESET The RESET key clears all data including the tape length and defect information, except the DATE and OPER.# data.

CLEAR The CLEAR key will only zero out the data that is seen on the display when the CLEAR key is pressed.

DISPLAY The DISPLAY key selects different displays to be seen with each depression of the key:

Display 1) Shows defects and tape length
Display 2) Shows defects in the Control,
Video, and Audio areas plus the Total.
(TC 480, 490 only)
Display 3) Shows damage in 15 min. sections
of tape
Display 4) Shows each defect location, using
the "*X*" and "*Y*" keys.
(TC 480, 490 only)
Display 5) Permits selection of printout
using the " O " Key. (On models

TC 460, 470 only)

" O " The " O " key is not used for normal operation on the 480 and 490 Models. It is used for printing reports on the 460 and 470 Models.

" Δ " The " Δ " key is not used for normal operation.

Display Contrast: This control is located inside the black metal perforated cover near the detector sensitivity controls. Adjust this to provide the best contrast on the LCD display to accommodate different viewing angles.

Erase (Optional): If the machine has the optional erase feature, this key is used to select the ERASE mode. A special procedure is required to prevent accidental erasure. The ERASE feature only works in the AUTO mode. To choose the ERASE function:

Press *ERASE*, then *AUTO*, and then *ERASE* again. <u>You must depress these keys within about 3 seconds for the machine to accept it as a legitimate ERASE command.</u> If the keys are pressed in the wrong order or too slowly, the machine will ignore the ERASE command and go into the regular non-erasing AUTO mode.

Displays

Various displays can be seen by depressing the *Display* key one or more times:

Press once:

DEFECTS LENGTH
012 62:59

This display is automatically shown after a tape has been inspected. It shows total locations that contain damage and total tape length in minutes and seconds.

Press Twice:

CTL VID AUD TOT
12 09 11 012

This shows details of damage counts in the Control (lower area), Video (middle area), and Audio (upper area) of the tape plus the Total sections of damaged tape.
(one section = one tape second)
This display on TC 480, and TC 490

Press three times:

DEFECTS / 15 MIN
3-0-1-0-0-0-0-6

This display shows the number of damaged sections in each 15 minutes of tape inspected. Many times the damage in a tape is just in the first part of a tape. This display quickly shows where the damage is.

Press four times:

DEFECT LOCATIONS
X=PREV Y=NEXT

This message instructs the operator how to show the exact defect locations as seen below. Pressing the "*Y*" key will display the next damage location; pressing the "*X*" will show the previous damage location in the tape.
(TC 480 and 490 only)

C V A LOCATION
X X 19:32

This shows, for example, that defects in both the lower (control) and upper (audio) areas of the tape were found at 19 min. 32 sec. from the beginning of the tape.
(TC 480, 490 only)

Set-Up Procedure for A,B,C Conditions

(For TC 480, 490 only)
Press "Set Up" key when the machine is idle (not running tape.) Always enter a two-digit number when changing the condition values. i.e.: 02, 04, 12, etc.

Pressing SET-UP once shows this display:

MAX.DEFECTS FOR CONDITION A= 02

You may type in a new 2-digit value if desired. "02" means if the tape has 0, 1 or 2 total defects, the "A" LED will light

Press SET-UP again for:

MAX.DEFECTS FOR CONDITION B= 09

If the tape has 3 through 9 defects, the "B" LED will light. For many users, tapes in this condition may be re-used for non-critical applications. Using the "*X*" and

Press SET-UP a third time and the display shows:

MIN.DEFECTS FOR CONDITION C= 10

No input is necessary here. The machine automatically sets this value as one higher than the Max. defects for "B" tapes.
(i.e.: "B" value + 1)

Diagnostic Display

(TC-480,490 only)

Press "SET-UP" key <u>while tape is running</u> and this display is seen:

```
24 94 85 D1

LRCoIEt   32:59
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For diagnosing problems in the tape transport mechanism, this display helps the RTI and dealer technician. The specific meanings of the displays are known to them. The general significance of the above sample is:

"24" - TAPE SPEED; 24=75X and 40=45 times play speed.
"94" - MACHINE MODE; Auto, Fwd, Rew, etc. in code numbers
"85" - LEFT MOTOR POWER;
"80" =idle spindle speed,
"E9" =maximum power.
"D1" - RIGHT MOTOR POWER
(same as for left motor)

Machine sensors are involved with most all aspects of the TapeChek transport system. It is these sensors that tell the microprocessor what is happening. The diagnostic display reads the status of these sensors to allow the technician to verify proper operation.
When an individual letter is capitalized, it means that function is "true". i.e.: When the right-hand leader sensor is sensing that leader is present, it is capitalized (**R**). When videotape is present, the letter is shown as lower case (**r**).

```
24 94 85 D1

LRCoIEt   32:59
```

The letters mean:

L= Left leader sensor
R= Right leader sensor
C= "Cassette down" microswitch
O= Threading arm is "Out"
I= Threading arm is "In"
E= Erase Tab sensor
T= "Out-of-tissue" sensor
Note: For normal displays press SET-UP while tape is running.

LED (Light Emitting Diode) Indicators

There are two groups of LED indicator lights on the right hand switch panel of the TapeChek 400 units. The first group of LED's indicate the tape transport mode. When the machine is in the AUTO mode running forward, the AUTO LED and the FWD LED are illuminated. On units with the erase option, The ERASE LED will light when the proper erase command has been given by the operator.

Tape Condition LED's

The second group of LED 'indicators show the relative tape condition of the videotape after it has been inspected. An "A" grade tape has fewer defects and is, therefore, judged better than "B", or "C" tapes. These tapes are usually good enough for all but very critical uses. "B" grade tapes might need further analysis and "C" tapes are usually in need of repair or removing the tape from service. In the TC-460, 470 units, the "A", "B", "C" values are factory set as follows:

"A"= 0-2 Total defects
"B"= 3-9 Total defects
"C"= 10 or more defects

Detected tape flaws

Keep in mind that the machine is inspecting the tape for gross physical flaws such as wrinkles and creases in the tape - not magnetic dropouts. Therefore, the values for A-B-C parameters will usually be fairly low. Tapes in a good quality collection will usually show zero defects. As an added feature, the machine ignores any defects found in the first and last 30 seconds of tape since there is rarely valuable program material in these areas. Sometimes there will be a little damage at the beginning due to previous VCR misthreading but the program is not affected. These unimportant counts are not displayed.

Auxiliary Control Panel

(TC-480,490 only)
The cluster of switch keys on the left-hand side of the unit control some of the more deluxe features of the 400 series units
. Obviously, the number pad permits the entry of numeric data into the memory of the machine. This data is then available to be printed on reports. If you make a mistake in entering the data, press CLEAR and only the data you are entering will be erased so you can re-enter the correct Tape #, etc. The following describes the special function keys:

DATE After pressing DATE, enter today's date. If today is March 14, 1993; enter 03 14 93 (or 14 03 93 in some countries.) The Date is held in memory until the machine power is turned off. Type in all 6 digits!

OPER Press OPER plus any number (up to 4 digits) to identify the operator, if desired.

TAPE Press TAPE # plus the tape ID number(up to 8 digits.) Do this only <u>after</u> the tape has been inspected but <u>before</u> printing a report.

PRINT This sends the data to the external parallel printer on units with the printer option. See section on Optional Printer.

SEND This key sends all the data seen on the reports through the serial port connector on those units equipped with the serial port option. (TC-480,490 only)

X, Y These keys are used with other functions such as the Defect Location Display

HELPFUL HINTS:

Store your tapes in a cool, dust-free place.

Do not drop cassettes and avoid rough handling.

Inspect the cassette shell for dirt build-up or broken parts inside too.

If possible, copy bad tapes onto good tape stock, then discard the damaged cassette.

QUESTIONS ABOUT TAPECHEK ?

CALL YOUR TAPECHEK DEALER OR RTI . . .

WE ARE HAPPY TO ANSWER ALL OF YOUR QUESTIONS AND FILL YOUR NEEDS.

Call 1-800-323-7520

OPERATING PROCEDURES

CAUTION:

1) Read the Installation Procedures and Safety Instructions before using your TapeChek 400 series unit.

2) Machine performance can be affected by high heat and humidity conditions. Store videotapes and operate unit in air-conditioned environment if possible.

3) Always remove video cassettes from the machine before turning off the main power to the machine.

Procedure

Turn on main power switch (under front of cabinet.) The displays will show zeros. Cassette carrier will eject as the machine goes through the power- up sequence. Let this sequence finish before trying to load a cassette!

Step 1
If the cassette carrier is down, press the EJECT key. With the carrier up, just insert a cassette (cassette door away from the operator.) Push it in all the way until it stops.

Step 2
Firmly, but not rapidly, depress the black metal carrier (not the cassette itself) down until it latches in the down position.

Step 3
If desired, select the ERASE function as previously discussed, otherwise . . . . .

Step 4
Depress the AUTO key. This will cause the tape to thread, run forward and automatically rewind back to the beginning. The tape is automatically cleaned and inspected. When the head leader is detected, the tape will automatically stop and the cassette will eject.

Step 5
For a printout of the inspection results, turn on the printer, set it to "on-line", enter the Date, Tape #, etc. into the TapeChek. Then, if the unit has the printer port option, press PRINT or the "O" key on some models. See section on printer option (page 20.) You may send data to the serial port, on those models with that option, by depressing the SEND key.

NOTE: The TapeChek stores the Tape #, defect data, etc. for one tape at a time! Once a new tape is run, the old data is lost. The Date and Operator # are not lost, however, until the machine power is turned off.

MAINTENANCE PROCEDURES

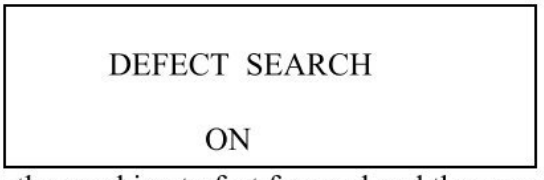
The TapeChek system is very reliable and needs little maintenance. It does require routine maintenance. Daily cleaning of the unit will allow the machine to clean your tapes more effectively. The transport panel and all tape guides should be wiped with a damp cloth. Window cleaner solution works well. Take care so cleaning cloth does not catch on sensors, light bulbs or other electronic components. In some cases, these are accurately aligned devices and should not be distrubed. Also, remember to wipe off the Erase head, if the machine is equipped with this option.

If a build-up of dust is seen, use a vacuum cleaner to remove the accumulated debris. Cleaning of the burnisher is also required as it is actively removing dirt from the tapes being processed. Clean it carefully with a dry cloth or a soft brush. Be very careful not to strike the sapphire with a ring, jewelry or other hard object. The sapphire is also hard but it could be chipped.

DEFECT SEARCH OPTION INSTRUCTIONS

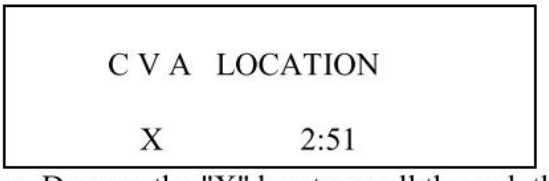
TC 490 Only:
Use the "SETUP" key to enter the routine that toggles the DEFECT SEARCH option "ON" and "OFF." With the machine at idle, with no tape movement, press the SETUP button 4 times. Cycle through the defect condition settings to the "Defect Search" setup display. When the following display is seen, press the "0" number key to toggle the "Defect Search" on or off.

With the Defect Search option ON (as described), load the tape to be inspected. Then press the

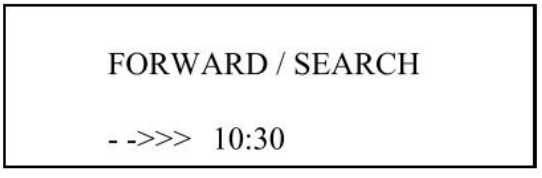


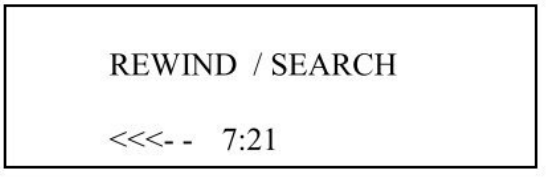
AUTO key which causes the machine to fast forward and then rewind the tape. After the tape is cleaned and inspected, if it has no defects, it is ejected as it would be in normal AUTO cycle. If the tape has defects, however, it is not ejected. It is left in the machine, ready to search for defects.

Now, by pressing the "Y" key twice, the first defect location and type will show on the display: Repeated depression of th "Y" key will scroll the various defects (in ascending tape location



order) through the display. Depress the "X" key to scroll through the memorized defect locations in descending order. When the desired defect location is shown on the display, press the SEND key to move the tape to the defect location and stop. Any number of defects may be viewed by repeating these steps. The unit will go to whatever tape location is shown prior to pressing SEND.





After you are done using the Defect Search Option, press REWIND and EJECT to return the cassette to "ready-to-use" condition. After ejecting the cassette, the display will not show the correct defect counts or tape length until the next tape is evaluated.

DETECTOR OPERATION

The defect detection system in the TapeChek 400 Series machines is a unique infra-red optical system for detecting physical tape damage such as wrinkles, creases, and various kinds of edge

damage. Normal tape is flat and straight. Deviations in reflected infra-red beams caused by creases, etc. are detected by the multi-channel sensors. Some videotape stock is brown and some is black. The TapeChek system, however, auto-compensates for different types and colors of videotape stock to produce uniform defect detection results.

It is important to realize that tapes may have problems other than physical damage,. Physical defects, however, cause major disruption of audio and video that can make a tape unusable. The TapeChek finds these faults before the tape fails in the user's VCR.

Adjustment control knobs are located on top of the electronics cage inside the machine. The defect detection sensitivity controls are factory adjusted for normal operation. Adjustment of the sensitivity controls by the operator is discouraged. Turning these controls clockwise causes the sensitivity of each channel to be increased. i.e. Increasing the sensitivity causes the machine to detect and count smaller sized wrinkles and defects. CAUTION: The defect detector may not operate properly when the top lid of the machine is opened, since room light may interfere with the sensors. Settings between "2" and 4" are typical. If the sensitivity controls are changed too much (to over "7" for instance) inaccurate defect detection can result. If problems arise, call RTI Service for assistance.

For Machines with OPTIONAL CCD Defect Detector:

This revolutionary defect detector uses an optical system for detecting physical damage in videotape. It finds defects that would cause major disruption of the video and/or the sound during recording or playback. It is can be used on blank and pre-recorded tapes since it does not record any signal on the tape or alter existing recorded programming. When physical damage occurs, it causes the tape to lose contact with the heads of the VCR and this usually causes a big loss in video or audio information.

> It should be remembered that some tape problems are magnetic in nature, such as missing oxide or bad recordings. However, the more common and more severe damages that prevent a tape from being used are usually the result of physical defects in the tape .

The system bounces light from a halogen light source off the videotape, through a lens and on to the CCD (charge-coupled-device.) The CCD is an array of 64 matched photocells that “looks” at virtually the entire width of the videotape. When wrinkles, creases and other physical defects come by the detector, the normal light path is disturbed and the CCD “sees” an increase or decrease in light intensity. If the duration of the disturbance exceeds the detector settings, a signal is sent to the machine’s microprocessor and a defect is counted on the display.

Defects that are detected

Physical defects in videotape, such as wrinkles and creases vary in length, width, angle of slope, severity, etc. There are two basic kinds of defects: transverse and longitudinal. The transverse creases run across the width of the tape while the longitudinal creases run along the length of the tape. Until now most tape inspection machines were able to pick up the transverse creases very well but had some trouble identifying longitudinal ones. The CCD detector, however, excels in detecting these lengthwise creases. It also detects edge damage and transverse creases very well.

Detector channels

As mentioned before, the CCD has 64 photo sensors compared to many detection systems that have only 2 or 3. On the TapeChek 490-CCD model, these 64 elements are divided into the Top, Middle, Bottom channels. The top 12 elements are designated for the TOP Channel, the middle 40 elements are for the MID Channel and the bottom 12 are for the BOT channel. Of course, these approximate the recorded placement of the Audio signals near the (TOP) edge of the tape, the Video signals(MID) and the Control Track signals located near the (BOT) bottom edge of the tape.

Identifying the location of the defects by channels as well as by position along the length of the tape (Mins.& Secs.) provides better information to the operator. Many people are not as concerned about defects to the Audio edge of the tape as much as defects in the Video (MID) area. Looking at the channel defect data on the machine display can provide a more refined evaluation of the usability of a tape.

Detector sensitivity settings

The CCD detector system is very complicated and sophisticated. There are many controls on the Control/Detector Circuit Board in the TapeChek unit that effect the sensitivity of the defect detection. These adjust the scan rate of the detector, reference voltages, positive and negative thresholds, plus defect length controls for Top, Middle, and bottom channels. Due to the complexity of the circuitry these controls should be adjusted by a factory trained technician. The units are typically adjusted to detect and count defects that cause a change of reflected light by 50% or more and last for 50/1000 of a second or more. If a minor adjustment is required immediately. Call the RTI service department or local authorized dealer for adjustment procedure information. You will need a technician with a digital voltmeter and small adjustment screwdriver for the procedure. To make the TapeChek CCD detector more sensitive or less sensitive, factory adjustment is recommended. Return the unit (in it's original shipping container) to RTI or your local service dealer for this adjustment.

CLEANING SYSTEM

The TapeChek machine cleans the tape with special cleaning tissues in both the forward and reverse directions. The cleaning tissues are advanced be a slowly turning motor. After inspecting several hundred cassettes, an arm will sense that the cleaning tissue is running out. When this happens, the machine will beep and the display will indicate "Replace Tissue."

To replace the cleaning tissue follow the instructions on the label inside the lid of the machine. Different machine models have different threading paths for the tissue. Do not wrap the tissue around the sapphire burnisher or in any way different than the threading diagram. Secure the end of the new tissue to the metal take-up spindle with a piece of masking tape. Do not try to put the used carboard core on the take-up spindle.

In addition to cleaning the tape with the cleaning tissue, TapeChek also provides a precision sapphire burnishing post to polish the oxide of the tape. The sapphire burnishing post is very hard and very sharp. Typically it will last for about one year before it needs to be replaced. RTI recommends that you replace it only with the sapphire post assembly sold by RTI.

While the burnisher will last a very long time (up to 30,000 cassette cleanings), it needs to be wiped clean on a daily basis. Heavily used tapes are usually dirtier than new tapes and, therefore, an increased deposit of debris may appear around the edges of the sapphire. Keeping the burnisher post clean will assist in the cleaning/polishing of your video cassettes. Use only a soft brush or soft cloth to clean the burnishing sapphire. Be careful, the edges can be easily damaged if struck by a hard object such as rings, jewelry or tools.

CAUTION : CLEAN THE POST CAREFULLY TO AVOID PERSONAL INJURY AND DAMAGE TO THE SAPPHIRE. EDGES ARE VERY SHARP!

OPTIONAL PRINTER PORT

On models that have the optional printer port feature, you can obtain a printed evaluation report after inspecting each videotape. Included in this optional feature are the 25-pin printer connector on the rear of the unit and all of the software/hardware components required to drive the printer. The printer itself can be purchased from RTI or your local computer equipment vendor. It must be an 80 column line printer with "Centronics parallel input." For 8 1/2" x 5 1/2" paper or 4" x 6" index card printouts, use the Epson LX-810 or equivalent printer.

The printed report contains the tape identification and all defect data from the last video cassette inspected. During the AUTO run, data from the previous videotape is erased from the memory in the machine. Therefore, if a printout is desired, it must be selected by the operator immediately after the AUTO inspection cycle.

The standard printed report looks like this:

```
                    - - - TAPECHEK 490 PHYSICAL DEFECT REPORT ---

TAPE #: 206452

CONDITION: " C "  LENGTH: 032 MIN.  DATE:05/04/94           OPER: 7        TOTAL
          +---+----+----+----+----+----+----+----+----+----+----+----+--   -----

CONTROL>  1___11___1______11________1___                                     07
  VIDEO>  1____1___1_______1_____1__1___                                     06
  AUDIO>  1___11___1_1____11_1______1___                                     09

          +---+----+----+----+----+----+----+----+----+----+----+----+--
          1   5    10   15   20   25   30   35   40   45   50   55   60

TOTAL LOCATIONS WITH PHYSICAL DEFECTS = 010
SET VALUES ARE: A= 02, B= 09, C= 10                  "*" = MORE THAN 9 DEFECTS
```

As you can see, the report prints out the inspection data as well as a graphic representation of the locations of defects found and the total tape length (in minutes of playing time, SP speed).

The following paragraphs describe the procedure for getting a printed report of the videotape inspection. Remember, the printer must be plugged into the TapeChek unit with an appropriate printer cable, plugged into AC power, Power ON and in the "On-Line" mode. Also, for proper line spacing and paper handling, consult the printer's own manual.

LOADING PAPER (for typical line printers)

1) Turn on printer power
2) Switch printer to "Off- Line"
3) Press "Form Feed"
4) Load 8 1/2" x 11" paper with perforation at cutoff bar
5) Press "On-Line" or "Select" for operation with TapeChek unit

For the Epson LX-810 printer (This printer enables you to get reports on 8 1/2" x 5 1/2" paper and 4" x 6" index card stock also.):

1) Load paper in left and right tractors. Front edge of paper should be about 1/2" forward of the tractor.
2) Press "Off-Line"
3) Press "Load"
4) Printer is now ready to use when switched to "On-Line"

NOTE: Tractors may have to be adjusted left or right for different size paper. Never use the "micro line adjust" feature of the Epson LX-810 printer.

VARIABLE SIZE REPORTS

The TapeChek units are capable of being connected to a variety of printers. The standard 8 1/2" x 11" paper printout is available on virtually any parallel printer with 8 1/2" x 11" pin feed paper capability. Other size printouts can be produced, but only with the Epson LX-810 model printer. These other formats contain the same data and tape information but they are printed on smaller paper sizes. These smaller sizes use pin feed indexing like the full size 8 1/2" x 11" paper.

TO SELECT PAPER SIZE

The TapeChek unit has to be told what size paper is being used. Typically, you will adopt one size of paper and stay with it. The following procedure allows you to set up any of the TapeChek 400 series machines for the proper paper size:

Keyboard	Display Shows:
Press: " △ "	"TAPECHEK 470 REV. 4.0"
Then, " △ " again	PRESS CIRCLE FOR 8.5 x 11 PAPER
or, " △ " again	PRESS CIRCLE FOR 8.5 x 5.5 PAPER
or, " △ " again	PRESS CIRCLE FOR 6 x 4 PAPER
or, " △ "	READY TO LOAD/RUN

NOTE: Pressing " O " selects the paper size as seen on the display. It also returns the machine to normal operation. Pressing "RESET" also returns the unit to normal, but it also clears all data that may be in the machine.

TO PRINT A REPORT

For Models 460, 470
The TapeChek unit will send inspection data to the printer after pressing the " O " key on the switch panel of the machine. Before pressing the " O " key make sure that the AUTO cycle has been completed. The TapeChek stores the data for one videotape inspection at a time. Therefore, if you want a printout, you must call for it before running the next video cassette.

For Models 480, 490
These TapeChek models have a left-hand keyboard that allows the entry of the tape number, date of inspection, etc. Also located on this keyboard is the PRINT key. The inspection data will be sent to the printer after pressing the PRINT key. Before calling for a printed report, make sure you have entered today's date, the tape number and operator identifier number if you want this information to appear on the report.

OPTIONAL ERASE FEATURE

If your machine has been fitted with the Optional Erase feature capability, you will be able to fully erase videotapes. This removes all previously recorded signals so tapes are ready for re-

recording. Erasing the tape prior to re-recording will insure better quality recordings since signals that can cause interference will have been erased.

To prevent accidental erasures, the TapeChek unit has several safeguards built into it. First, the TapeChek unit senses the presence of the erase tab on the VHS cassette shell. If the tab is missing, the TapeChek unit will not erase the tape. Secondly, the ERASE/AUTO/ERASE command keyboard sequence must be done properly by the operator as described in the Operator Controls Section of this manual. Thirdly, the LED light next to the ERASE switch visually indicates when the erase function has been selected. Fourth, a series of audible beeps will alert the operator that the cassette is "erase protected."
Actual erasing of the tape occurs during the rewind portion of the AUTO run cycle. Therefore, if the operator selected ERASE but then changed his/her mind during the forward run of the tape, the operator can press STOP and then AUTO again to continue inspecting and cleaning but without erasing.

To insure good tape erasure, clean the face of the erase head with Head Cleaning Solution and a soft cloth. This solution is available from RTI. As with other parts of the transport system, dirt will build up on the surface of the erase head. Therefore, the erase head should be cleaned once per week whether the unit is used to erase tapes or not.

ELECTRONICS

Your TapeChek machine runs the tape smoothly and safely at up to 75 times normal playing speed while detecting defects and cleaning the tape. It is able to do this largely due to the sophisticated electronic control system built into the unit. The microprocessor monitors and controls all aspects of the machine, including defect detection, tape transport, keyboards and display. Since all of the control circuitry uses digital techniques, the TapeChek will provide continuous, trouble free operation. The electronic systems are embodied in the following circuit boards:

CONTROL BOARD

The Control Board contains all the circuitry to receive input signals from all of the tape transport switches and sensors, including tape speed and tape tension monitoring. It also processes the signals from the defect detector pick-up and provides sensitivity control adjustments on this board. The circuit board also conditions the signals from the microprocessor out to the power transistors.

MICROPROCESSOR BOARD

The Microprocessor Board contains the microprocessor chip and its associated digital circuits and memory. This is the heart of the TapeChek control circuitry. In addition to the tape transport system, the "micro" also controls the operation of the keyboards and digital display. When the optional printer port or the optional RS 232 output port features are included in the machine, their associated circuitry is located on this board. The Microprocessor Board receives input signals from the Control Board, processes this information and sends the appropriate motor signals, etc. through the Control board to the Power Board.

POWER BOARD

This board is located under the transport panel and contains all the power transistors and devices necessary to control the motors and other high current devices. Also located on this board are several power supplies that generate the DC voltages necessary for the machines assemblies. Fuses for these power supplies are located on this circuit board. In addition, LED indicators verify the presence of various power supply voltages. For ease of service, most of the power devices on this board are in sockets for easy replacement. This is also true for the integrated circuit devices on the other boards.

ERASE BOARD

The Erase board contains the electronics to drive the erase head on the transport panel. This board generates a high-frequency and very high voltage signal which is used to erase the tape at high speeds.

CAUTION: HIGH VOLTAGES APPEAR ON THE ERASE BOARD AND ON THE REAR OF THE ERASE HEAD ITSELF (OVER 500 VOLTS). TURN OFF MACHINE POWER BEFORE SERVICING. REFER SERVICE TO QUALIFIED SERVICE PERSONNEL !

ELECTRONICS SERVICING AND MAINTENANCE

Due to the high reliability of digital electronics and the superior design of the electro-mechanical systems of the TapeChek units, servicing and maintenance will seldom be required. Almost all of the active electrical components are in sockets for easy replacement, however, only qualified service technicians should attempt service repairs by component replacement. Most service problems are best addressed by replacement of a circuit board or mechanical assembly. Replacing circuit boards can usually be accomplished easily in the field, however, if any malfunction is experienced with the machine, CALL RTI SERVICE OR YOUR LOCAL SERVICE DEALER BEFORE ANY REPAIRS ARE ATTEMPTED. Many problems can be diagnosed on the telephone with our service personnel. Thus, you can save time and money as well as preventing personal injury.

ROUTINE MAINTENANCE

The TapeChek machines are very reliable but, like most equipment, must be kept clean to work well. This is especially true for an instrument designed to "clean" videotape. The first concern is the burnisher and tape guides. These should be wiped off daily. For safety, unplug the machine before cleaning it. Wipe off the machine, the transport panel and all tape guides with a damp cloth. Glass cleaner works quite well. Avoid using any harsh abrasives on the unit. If a buildup of dirt is seen in the base of the cabinet, use a vacuum cleaner to remove the debris.

MACHINE DIAGNOSTICS

On some of the TapeChek 400 Series models, diagnostic information can be displayed on the LCD display of the machine. See page 16 of this manual. These displays will show the status of various sensors in the machine, such as the leader sensors, tape speed, threading arm and other sensors of the transport system. These diagnostic displays can help our service department analyze what part of the machine is malfunctioning and, therefore, greatly reduce the down time of the unit.

RTI Service Department
Phone: 1-847-677-3000
1-800-323-7520(Toll-Free)

FAX: 1-847-677-1311

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