RCA

Broadcast Equipment

Tape Editing Programmer

Installation and Operation

IB-32160

Broadcast Equipment

Instructions

Tape Editing Programmer

Installation and Operation

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INTRODUCTION

This manual contains six sections covering the operation and installation of the Tape Editing Programmer (TEP) in the TR-70, TR-22HB, TR-4HB/50, and TR-60/70B Tape Recorder machines.

Section I, General Information, provides preliminary installation and operational data which includes the TEP cable connections and power requirements.

Section II, TEP Operating Procedures, gives a description of the front panel controls and indicators and details the TEP operating instructions after the TEP is installed into the machine. Included also are modification procedures for remote operation of the TEP.

Sections III through V contain the TEP installation procedures for a specific machine. These procedures are divided into two main parts, one for installing the TEP modifications and the other for installing the 15 Hz Edit Pulse modification kits (MI-591736) into the machines.

NOTE: The 15 Hz Edit Pulse kit is normally installed first followed by the TEP modification. However, after the installation of either kit, the machine is ready for operation (without TEP).

Section VI, Diagrams, contains the assembly, schematic, and wiring diagrams of the module boards and circuitry affected by the various modifications on the machines. Reference should be made, as applicable, to these diagrams when performing the installation procedures.

SECTION I

GENERAL INFORMATION

GENERAL

This section provides general information covering TEP cable connections and power requirements which should be referenced prior to installing the TEP into a machine. The TEP is installed into a TR-70, TR-22HB, or TR-4HB/50 machine using the appropriate modification kit and installation procedures provided in Sections III through V. No modification kit is required to install a TEP into the TR-60/70B machines (refer to Modifications for Remote Operation in Section II). The TR-60 can be operated directly with a TEP unit without changes unless remote control operation is desired.

The TR-70B must have a jumper added in the #601 Erase Oscillator module to short out diode CR16 in order to operate with TEP.

TEP CABLE CONNECTIONS

Connector J1

TEP connector J1 contains the main signal and control logic and is connected to the TEP connector on the Tape Recorder as follows:

1. TR-70/70A/70B—12J27
2. TR-22HB—12J27
3. TR-4HB/50—16J8
4. TR-60—6J16

The cable for this connector is supplied with the TEP unit as item 1 of MI-591733. The cable is 50 ft. long. If it becomes necessary to modify the length of the cable, note that pins 1 to 32 on the TEP connector are connected to pins 1 to 32, respectively, on the Tape Recorder connector.

Connector J2

TEP connector J2 contains the cue channel input to the TEP and is terminated in the TEP with 600 ohms balanced to ground. This connector is connected to one of the following Tape Recorder connectors:

TR-70/70A/70B—12J25

TR-22HB—12J23

TR-4HB/50—16J5

TR-60—16J16

The cable for this connector is supplied with the TEP as item 2 of MI-591733. It is a shielded twisted pair cable with the shield connected to pin 1 and the twisted pair connected to pins 2 and 3.

NOTE: The TR-22HB cue output connector has the shield connected to pin 3 and the twisted pair to pins 1 and 2. It is recommended that this connector (12J23) be modified by reversing the wires on pins 1 and 3 to maintain uniformity.

Connector J3

TEP connector J3 contains the bridging cue output signal. This connector is connected in parallel with J2 and is intended to be used with a monitor amplifier and speaker such as the MI-11450A with a bridging input (high impedance). Pin 1 of J3 is the shield and pins 2 and 3 are the signal lines. A mating connector for J3 is also provided (item 3 of MI-40698).

Connector J4

This connector supplies the control signals for the auxiliary equipment used with TEP such as the auxiliary Tape Recorder, Camera or film chain.

A mating 12 pin connector is supplied with the TEP as item 2 of MI-40698. The signals available at this connector are as follows:

Pin 1—Wind Trig. #2 or Standby Trig. #2 +70 volt pulse for Tape Recorder #2 that is generated at the end of a TEP cycle. If this signal is to be used as a standby trigger on a TEP modified machine, refer to the appropriate Appendix.

Pin 3—Cue Mark Bias #2 signal goes from −26 V to ground during special cue marks generated in Preview-Re-Edit mode of TEP (refer to Operating Procedures, Section II).

Pin 4—Cue Mark Osc #2 signal supplies −26 V to operate cue mark oscillator for special cue marks in TEP Preview-Re-Edit mode (refer to Operating Procedures, Section II).

Pin 7—Advance Cue signal goes from normal −26 V to ground at 2, 4, or 8 seconds before in-splice point programmed in the TEP. This will light the TEP ON indicator on an auxiliary Tape Recorder or may be used to sink a maximum of 100 mA from any other source equipment. Contact will stay at ground until out-splice point is reached.

Pin 9—Play Trigger #2 signal, a +70 V trigger pulse used to start an auxiliary Tape Recorder. This pulse will occur exactly 8 seconds ahead of the in-splice point except in the Preview-Re-Edit mode (refer to Operating Procedures, Section II).

P11—Ground (frame)

Auxiliary Tape Recorder Connections

If an auxiliary Tape Recorder has been wired for TEP, the following connections should be made:

TEP Connector J4 (Pin No.)	*Function*	*TEP Connector on Machine (Pin No.)*
1	Wind Trigger #2	26
1 (alternate)	Standby Trigger #2 (refer to Appendix)	14
3	Cue Mark Bias #2	32
4	Cue Mark Osc #2	31
7	Advance Cue	21
9	Play Trigger #2	30
11	Frame Ground	23

If an auxiliary Tape Recorder has *not* been wired for TEP, the following connections may be made at the Remote Mode plug:

NOTE: The machine is not required to be in the Remote mode for TEP control. The special cue-marks generated in the Preview-Re-Edit mode of the TEP are not available with this connection.

TEP Connector J4 (Pin No.)	*Function*	*Remote Mode Control Plug (Pin No.)*
1	Wind Trigger #2	20
1 (alternate)	Standby Trigger #2 (refer to Appendix)	21
9	Play Trigger #2	22
11	Frame Ground	32

POWER REQUIREMENTS

The TEP is normally delivered with its power supply connected for 115 V 50-60 Hz operation. It may be used on 230 V 50-60 Hz by changing the connections on the power supply. Refer to the power supply label on the TEP for specific instructions. Power required is 65 watts.

SECTION II

TEP OPERATING PROCEDURES

GENERAL

The TEP operating procedures provide a description and illustration of the front panel controls and indicators, procedures to setup and operate the TEP after it is installed in the machine and modification procedures for remote operation. Throughout these

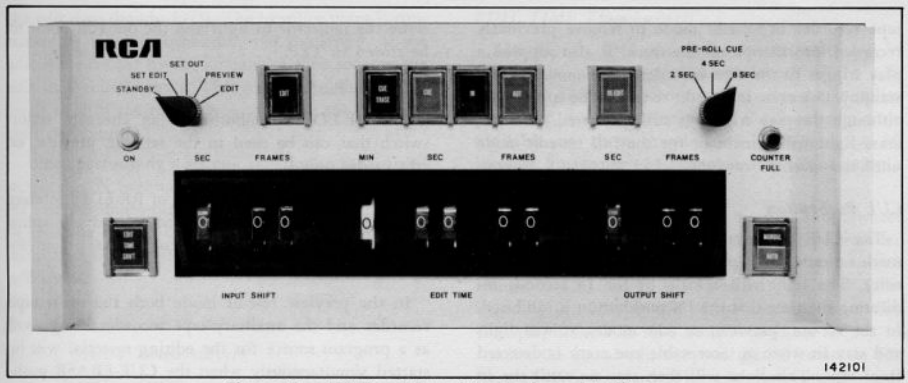

Figure 1—TEP Front Panel Controls and Indicators

procedures references will be made to the machine which may be a TR-4HB, TR-22HB, TR-50, TR-60, TR-70, or TR-70B provided the machine has been modified for TEP.

FRONT PANEL CONTROLS AND INDICATORS

The TEP front panel controls and indicators consist of a MODE Selector Switch, PRE-ROLL Cue Switch, pushbuttons and indicators, and thumbwheels. A view of the TEP front panel is provided in figure 1.

MODE Selector Switch

STANDBY Position

In the STANDBY position, all functions are inhibited and the machine will function normally in any mode. The Edit Cue pulses may be manually generated by pushing the CUE pushbutton on the TEP.

SET-EDIT Position

The SET-EDIT position is used for erasing the cue track of the tape and for recording the cue mark on tape. In splice and out splice timing points are selected with reference to the cue mark and stored in the TEP.

SET-OUT Position

The SET-OUT position is used for establishing an out splice point while observing information to be inserted. It requires the presence of a previously selected in-splice point.

PREVIEW Position

The PREVIEW position is used for previewing the timing selected in the set-edit mode. In splice and out splice points may be moved by ±2 sec 29 frames using input and output shift thumbwheels. An advance cue is generated for the insert program source as well as a play trigger for a second tape recorder.

EDIT Position

The EDIT position performs edit on tape at the times selected in set edit mode or as modified by input and output shift thumbwheels in preview mode. As a safety feature the EDIT pushbutton must be pushed after selecting this position to initiate the edit mode.

The edit mode also places the tape recorder in the proper mode for editing (switchlock).

PRE-ROLL CUE Switch

The PRE-ROLL CUE switch selects the time of the advance cue to the insert program source. The time may be 2, 4 or 8 seconds ahead of the in-splice point. This switch will not affect the play trigger to the second tape recorder which is always 8 seconds ahead of the in-splice point.

Pushbuttons and Indicators

EDIT Pushbutton

The EDIT pushbutton is used only in edit mode. This will start the tape recorder and the button will light (red) indicating that TEP is in Edit mode. The tape will be edited with program timing as set up in TEP during set edit and preview mode.

CUE ERASE Pushbutton

The CUE ERASE pushbutton actuates cue erase in

tape recorder in set-edit mode to remove previously recorded information on cue track. It also supplies a play trigger to the tape recorder in all modes except standby. Cue erase in set-edit re-edit mode is inhibited although the play trigger is still generated. The cue-erase light will remain lit for the full set-edit mode until the machine rewinds.

*CUE Pushbutto*n

The CUE pushbutton generates a 2.5 second cue mark on tape when pushed in set-edit mode (not re-edit). The light will remain lit for 14 seconds indicating the time that the IN pushbutton is inhibited. In the set-out, preview, or edit modes, it will light and stay lit when an acceptable cue mark is detected from tape. This light will then stay on until the in splice point is reached. The indicator may light for short periods of time on cue marks shorter than 2 seconds long.

The cue pushbutton will also generate short edit cue marks (2 frames long) when the recorder is playing and TEP is in the standby mode.

IN Pushbutton

When in the set-edit (not re-edit) mode, the actuation of the IN pushbutton will store the time in the TEP that has elapsed after the cue button was depressed. The indicator will light at this time and remain lit until the tape recorder starts to rewind. The button may be pushed more than once in a cycle but only one number, the last one, will be stored. In the set-edit re-edit mode the button is depressed before the edit cue mark is received from tape. The next edit cue mark from tape will light the indicator and that time will be stored in the TEP. In the set-out, preview, and edit modes, the indicator will light when the in splice point is reached. In all cases, it stays lit until the tape recorder rewinds.

OUT Pushbutton

The OUT pushbutton is similar to the IN pushbutton, except it stores the time of the Out Edit point as referenced to the cue mark. Pushing this button in the set-edit (not re-edit) or set out modes stores the out edit point time which lights the indicator. In the preview and edit modes, the indicator will light at the out edit point. In all modes the indicator will remain lit for four seconds and then go out, at which time the recorder is placed in the rewind mode. In the set-edit re-edit mode, the pushbutton will be pushed in advance of the edit cue mark on tape that is to be used as the out edit point. Reception of the next edit cue mark after depressing the button will cause the indicator to light and the out edit point to be stored in TEP.

RE-EDIT Pushbutton

The RE-EDIT pushbutton is an alternate action switch that can be used in the set-edit, preview, or edit modes only.

In the set-edit mode, selection of RE-EDIT inhibits cue-erase and allows selection of in and out splice points to be made from edit cue marks previously recorded on the tape.

In the preview re-edit mode both the main tape recorder and the auxiliary tape recorder being used as a program source for the editing material will be started simultaneously when the CUE-ERASE pushbutton is depressed. In addition, a 1 second burst of 1 frame on, 1 frame off cue marks will be recorded on the tape of the auxiliary recorder at a point 8 seconds ahead of the in splice point. These short bursts can be used for accurately "cueing up" the auxiliary machine to a 1 frame accuracy.

In the edit-re-edit mode, the use of RE-EDIT inhibits the recording of edit cue marks on tape at the in and out splice points. This is used when making close edits such as in animation to prevent a group of edit cue marks from appearing as a cue mark.

EDIT TIME SHIFT Pushbutton

The EDIT TIME SHIFT pushbutton is used to shift the input splice point by an amount equal to the time set in the edit-time thumbwheels. This shift can be done in any mode but standby, but the auto/manual switch must be in the manual position and the tape recorder must be stopped.

The indicator will light when the button is pushed indicating that the shift has taken place. The light will remain on until the tape recorder is again put in the play mode. The shift of the in splice time will only take place when the pushbutton is first depressed, subsequent actuation of the pushbutton when the light is on will not have any effect. The actual time required for the shift to take place is a maximum of one second for a 10 minute shift.

AUTO/MANUAL Pushbutton

The AUTO/MANUAL pushbutton is an alternate switch which allows selection of either the automatic or manual mode of operation. In the automatic mode, the out splice point is determined by the time that was selected by depressing the OUT pushbutton in the set-edit or set out modes. In the manual mode the out splice point is determined by the time set in

the edit time thumbwheels. The in splice point is controlled by the IN pushbutton and the length of the edit is controlled by the amount of time set into the edit time thumbwheels. TEP must be in the manual mode to shift the in splice by means of the edit time shift pushbutton.

When performing a set edit function in the manual mode, the IN pushbutton sets the in splice point and the out pushbutton is pushed at any convenient time to start the rewind cycle. The out splice time is not controlled by the edit time thumbwheels in the set edit mode.

Thumbwheels

INPUT SHIFT Thumbwheels

The INPUT SHIFT thumbwheels are calibrated in one frame increments from +2 seconds 29 frames to −2 seconds 29 frames and will move the in splice point by the calibrated amount from the point selected in the set-edit mode. Positive (+) direction will make the in splice point later in time with respect to the cue mark.

The input shift thumbwheels are inoperative in the set edit mode and the time selected in set edit is equivalent to the thumbwheels having been set on zero. Any number set into the input shift thumbwheels will affect the in splice point in the set out, preview, or edit modes and in automatic or manual modes.

The amount of time set into the input shift thumbwheels will not affect the out splice point in the automatic mode. In the manual mode, since the out splice point is a fixed time after the in splice point, the out splice point will also move with the in splice point. Note that in using TEP with 625 line standards that the range is limited to 1 frame less than 3 seconds or a total range of ±2 seconds, 24 frames.

OUTPUT SHIFT Thumbwheels

The OUTPUT SHIFT thumbwheels have a similar effect on the out splice point that the input shift thumbwheels had on the in splice point. The range is also from +2 seconds, 29 frames to −2 seconds, 29 frames (525 line standard). However, the output shift thumbwheels are only effective in the preview and edit modes when automatic operation has been selected. The out splice point can be moved, using these thumbwheels, independently from the in splice point.

In the manual mode, the out splice point is controlled solely by the edit time and input shift thumbwheels and the output shift thumbwheels become inoperative.

EDIT TIME Thumbwheels

The EDIT TIME thumbwheels are used only in the manual mode to control the length of the edit time, that is the elapsed time between the in splice point and the out splice point. The maximum time available on these thumbwheels is 9 minutes, 59 seconds, 29 frames (24 frames in 625 line standard) in one frame steps.

If the time selected on the edit time thumbwheel is less than the editing capability of the tape recorder caused by the erase head to record head spacing (18 frames in 525 line/15 IPS standard), the TEP automatically provides an edit of the minimum time. For example, if the edit time thumbwheels are set for 10 frames, the actual edit time will be 18 frames in 525 lines/15 IPS standard. The edit time thumbwheels can also be used to shift the in splice point by the time set into the thumbwheels as detailed under edit time shift pushbutton. This is done in the manual mode with the tape recorder stopped and TEP in any mode but standby.

TAPE RECORDER SETUP FOR TEP

The Tape Recorder to be used with TEP is setup for normal splice operation with three exceptions as follows:

Pixlock/Switchlock

The machine may be in the pixlock mode during all operations with TEP. During the Edit mode of TEP, the machine is automatically switched to the switchlock mode. However, the machine can also be used in the switchlock mode if desired.

15 Hertz Edit

To maintain proper color sequence between edits, particularly short, repeated edits, such as animation, the tape should be prerecorded with 15 hertz edit pulses on the control track and should be played during editing with the switch on the 634 NPC or 323/C11 Color Sense module, whichever applies, in the 15 hertz edit pulse position. Both record and playback functions are performed with this switch.

Video and Audio, Video Only, or Audio Only Edits

The edit can be performed on the video and audio signals, the video only, or the audio only by means of the audio control switch (4S13) on the record control panel (Monitor and C6 modules of TR-4HB/50 machines).

With this switch in the NORM position, both

audio and video will be previewed and edited. With the switch in the OFF (Audio OFF) position, only the video will be previewed and edited. The audio on the tape will be retained. With the switch in the EDIT position, the audio will be previewed and edited and the video will be retained. Note that in the audio only edit mode the machine will stay in the Pixlock mode during editing, if that mode was originally selected.

All other functions of the Tape Recorder and the normal adjustments for splicing remain unchanged. Refer to the instruction manual on the Electronic Splicing Accessory for these adjustments.

TEP OPERATION

Automatic Edit

The Automatic Edit operation will insert new material in a previously recorded tape being played on the editing tape recorder (machine #1). The following are functions of the Automatic Edit.

Preliminary Location of Edit

During this function the tape is first played with TEP in the standby mode to determine the area to be edited. The machine is then rewound to a spot approximately 20 seconds or more ahead of the desired in-edit point.

Set-Edit

The tape recorder must be in the insert mode and a selection made with the audio mode switch on the record panel for the type of edit to be made, that is audio and video, video, or audio. (See Tape Recorder setup). The TEP is then switched to the SET EDIT mode, automatic, and not re-edit. Pressing the CUE ERASE button will start the tape recorder and initiate cue-erase. The CUE ERASE indicator will light and remain lit until rewind is started at the end of the cycle. After the tape recorder locks up (approximately 5 seconds) and at least 14 seconds before the desired in-edit point, the CUE button is pressed momentarily. This records the 2.5 second cue bench mark. The CUE indicator will remain lit for 14 seconds. After the light goes out the IN pushbutton is depressed while observing the tape playback at the desired in-edit point. The IN light will remain on until rewind is initiated. The OUT pushbutton can now be depressed at the desired out splice point. The OUT light will light and will remain on for 4 seconds at which time the machine will rewind beyond the cue bench mark and stop.

In the SET-EDIT mode, the IN pushbutton will light as soon as it is depressed. The time entered into the TEP memory is the time that it was pushed. Holding the button down will have no effect. However, the button may be pushed more than once and the time that is finally entered into the memory is the *last* time the IN button is depressed. The IN pushbutton can be depressed anytime before the out button is actuated.

The OUT pushbutton may be depressed anytime after the IN pushbutton and again, like the IN button, can be pressed more than once. It will also register the last time that it was actuated. However, it is limited in time to four seconds after it was first depressed since the machine will then rewind.

The time limit on depressing the OUT pushbutton is 10 minutes after the CUE pushbutton was actuated. At the time limit of 10 minutes, the COUNTER FULL indicator will light and further actions of TEP will be inhibited. If the COUNTER FULL light comes on, TEP must be switched to STANDBY to clear the counter.

Preview

The TEP mode selection is now switched to the PREVIEW position. The material to be inserted is also cued up. If the insert material is on another tape machine, (machine #2) it should be set for a preroll cue 8 seconds in advance of the material to be inserted. This machine should be placed in the standby mode. The editing machine (machine No. 1) is now placed in the play mode by pushing the CUE ERASE pushbutton on TEP or by the machine's local or remote play button. If the TEP CUE ERASE is used, it will not light since only the machine starting feature was used.

After the machine is locked up and the cue bench mark is detected, the CUE light will light. At a point 8 seconds before the in splice point, the second machine (if used), will start. If some other program source is used, TEP will provide a 2, 4, or 8 second pre-roll cue, depending on the setting selected on the PRE-ROLL CUE switch. At the in splice point the CUE light will go out and the IN light will come on. The material at the output of the machine will now switch from the playback of machine #1 to the playback of machine #2 or other source of program material. This preview will be exactly timed to the way that the edit will be made. The preview is also made on the audio and video, video only, or audio only depending on the selection made earlier in the set edit operation.

When the time is reached that the OUT button was

depressed in SET-EDIT mode, the OUT indicator will light and the output of machine #1 will revert to its own playback. It will continue playing for four seconds at which time the IN and OUT indicators will go out and the machine will rewind beyond the cue bench mark and stop.

If the preview was satisfactorily timed, proceed directly to the edit mode. If it was not satisfactorily timed, the in-edit and out-edit points can be moved by ±2 seconds 29 frames (24 frames in 625) by using the input shift and output shift thumbwheels. The preview cycle may be repeated as often as necessary to obtain the exact timing desired. In this mode, the in-edit and out-edit points are completely independent of each other. The moving of the in-edit point wil not affect the time of the out-edit point.

The timing of the material being inserted is dependent on the cueing point to which the insert source is set. This can be changed as desired.

If the correction in edit time points exceeds 3 seconds, it will be necessary to repeat the SET-EDIT mode. It is not necessary to create a new cue bench mark unless it is desired to use a different position. To use the same bench mark, do not use the CUE-ERASE button to start the tape recorder since this will also erase the mark. Instead, start the tape recorder in PLAY by using the machine control, either local or remote. The TEP will detect the old cue mark and after the CUE light goes out in 14 seconds, new IN and OUT points may be selected. The preview cycle may now be repeated.

Edit

After the desired edit has been previewed and judged satisfactory, the editing of the tape can be done. The TEP mode switch is set to the EDIT position and the material to be inserted is again set up to the same point used in the satisfactory preview. The EDIT pushbutton is then depressed. The machine will start and the EDIT indicator (pushbutton) will light. The TEP controlled tape recorder will be in the PLAY mode and SWITCHLOCK but since the vacuum guide is not energized, no output video will be present. The Audio and Cue channels will be present. In the audio only mode, the vacuum guide will engage and the machine will play video in the PIXLOCK mode when selected. Again, when the cue bench mark is passed, the CUE indicator will light. Eight seconds before the in-edit point, tape recorder #2 (if used) wil start. Four seconds before the in-edit point, the vacuum guide on tape recorder #1 will engage and video will be present at its output. This machine will be triggered to the record mode at the proper time so that the in-edit point agrees with that chosen in the set-edit and preview modes. Again, at the proper time with respect to the out edit point, the machine will be triggered back to the play mode and the vacuum guide will again be withdrawn.

The machine will continue for four seconds and then rewind to the cue bench mark. The edit is now complete and the TEP should be switched to STANDBY to review the tape using the normal machine controls. If the TEP selector switch is inadvertantly left in the EDIT mode, the machine will play in the preview mode.

In addition to the edit that was made above, there are two additional edit cue marks recorded on the cue channel at the in-edit and out-edit points. These cue marks are again a 400 hertz tone, the same as the cue bench mark, but are only 2 frames or 1/15 of a second long. These can be used for later re-editing.

The time selected and programmed into the TEP are still available. If for some reason the edit was not satisfactory, it can be edited again by repeating the foregoing Edit steps. The program will remain in the TEP as long as the power to TEP is not interrupted or a new program inserted.

Manual Edit

The manual edit mode is used when the material to be inserted is of a known length of time. The following are functions of the manual edit operation.

Preliminary Location of Edit

With TEP in the standby mode, the tape recorder with the tape to be edited (machine #1) is played to determine the approximate in-edit point. It is then prerolled to a point approximately 20 seconds or more ahead of this point.

Set-Edit

The TEP is now switched to the SET-EDIT mode, the RE-EDIT indicator should not be on, and the MANUAL indicator should be on. The tape recorder mode should be selected as in the automatic edit procedure, i.e., PIXLOCK or SWITCH LOCK, Video and Audio, Video Only, or Audio Only. (Controlled by audio record switch OFF-NORMAL-EDIT.)

The CUE-ERASE button is now depressed to start the tape-recorder and to clear the cue channel with cue-erase. The CUE push button is depressed at least 14 seconds ahead of the anticipated in-edit point. After the CUE indicator light goes out, the IN push-button may be depressed at the time of the desired in-edit point. To this point the action of the TEP is

identical to the automatic mode. However, since it is already known what time is desired between the in-edit point and the out-edit point, the OUT push-button may be arbitrarily depressed at any time after the IN pushbutton. Four seconds later, the CUE-ERASE, IN, and OUT indicator lights will go out and the tape recorder will rewind beyond the cue-bench mark and stop.

Preview

The manual thumbwheels, marked EDIT-TIME, should now be set for the desired length of time between the in-edit and out-edit points. After advancing the TEP mode switch to PREVIEW and preparing the material to be inserted, the tape recorder can be put in PLAY by normal machine controls or by pushing the CUE-ERASE button on the TEP. The TEP and the tape recorder will now go through the same cycle as it did in the automatic mode. That is, the CUE light will come on when the cue-bench mark is detected. The second tape recorder, if used, will start eight seconds before the in-edit point or a 2, 4, or 8 second pre-roll cue will be supplied to another program source. The IN light will come on and the CUE light will go out at the in-edit point as the output of machine #1 is switched to its input signal. The OUT light will light at the end of the time set in the EDIT-TIME thumbwheels as the machine output reverts to its own playback. The IN and OUT lights will remain on for four seconds and then go out as the machine rewinds to the cue-bench mark. If the timing of the preview was satisfactory, the actual editing may be done after re-cueing the insert material signal source.

If the timing was not satisfactory, changes may be made in the timing. The timing of the in-edit point can be shifted ±2 seconds 29 frames (24 frames in 625 line standard) by the INPUT-SHIFT thumbwheels. The out-edit point is now controlled by the time entered into the EDIT-TIME thumbwheels. This edit time is the time after the in-edit point. Consequently a shift in the in-edit time will also cause an identical shift in the out-edit time unless the edit time is also moved a corresponding time in the appropriate direction.

If it becomes necessary to move the input point more than 3 seconds, it will be necessary to return to the SET-EDIT mode.

The minimum splice time that can be selected using the EDIT-TIME thumbwheels is dependent on the tape speed and television standard in use. The minimum times are as follows:

Tape Speed	*TV Standard*	*Minimum Time*
15 I.P.S.	525 Lines	18 Frames
15 I.P.S.	625 Lines	17 Frames
7½ I.P.S.	525 Lines	34 Frames
7½ I.P.S.	625 Lines	33 Frames

If a time less than the minimum time is set into the thumbwheels, the preview and the edit will be performed at the minimum time listed above. The maximum time that can be set on the Edit-Time thumbwheels is 9 minutes, 59 seconds, and 29 frames. This time capability is in addition to the time from the cue-bench mark to the in-edit point. In this resepct the manual mode is different from the automatic mode. Whereas in the automatic mode the maximum time available to the out splice point is 10 minutes, in the manual mode this applies only to the in-edit time and another 10 minutes is available between the in-edit and out-edit points.

Edit

After achieving the desired preview, the actual editing is done in the same manner as the automatic mode. The program source to be inserted is again cued to the same point used in preview. The mode switch is set to EDIT position and the EDIT pushbutton is depressed. The EDIT pushbutton will light and the CUE light will come on when the bench mark is detected on the tape. The tape recorder will be playing but the vacuum guide is not engaged so that the video from the tape is not present. Four seconds before the in-edit point, the vacuum guide will engage. At the in-edit point, the tape recorder will record and the IN light on TEP will light. At the out-edit point, the tape recorder will go to PLAY and the OUT light on TEP will light. The vacuum guide will again drop out so that no video will be present and four seconds later the tape recorder will rewind to the cue-bench mark and all indicator lights on TEP will go out. TEP should now be switched to standby to review the edited tape. If TEP is not switched to standby, and is left in the edit mode without the edit pushbutton depressed, the TEP will function as it did in the preview mode.

Automatic Set Out Mode

This mode is used to select editing times where the position of the out-edit point is determined by the material that is being added to the tape being edited rather than the material on the tape to be edited. This is particularly useful when the tape is being made of segments from other sources.

corder is stopped. The EDIT TIME SHIFT pushbutton is pushed at which time it will light and remain on. The next step of animation material is prepared and the EDIT pushbutton is again actuated. This will record the second step of animation leaving 5 frames of the first step on tape. If desired, each step of animation may be previewed but it usually is not necessary. The EDIT TIME SHIFT and the EDIT pushbuttons are the only ones that need to be actuated for the sequence.

When more than about 10 edits of short durations are made in a sequence, the TEP should be in the RE-EDIT mode during the EDIT cycle. This prevents the recording of edit cue marks on the cue channel which could cause a false stop in the rewind cycle since many short cue marks together could be mistaken for a cue bench mark.

Set Edit Re-Edit Mode

The RE-EDIT mode of operation of TEP with the selector switch in SET EDIT will allow the recovery from a previously edited tape of the exact time of the edit. This method can be used to replace a segment on tape with new insert material of the same length. The requirement is that the edit cue marks, the short 2 frame 400 hertz tones, at the start and end of each edit made, using TEP, are still present on the tape. The original cue bench mark is not required since a new one can be generated, although the old cue-bench mark can be used if present.

Preliminary Review of Tape

The tape should be played and the cue channel from the tape monitored for presence of edit cue marks at the start and finish of the section of tape to be re-edited. Also, if there is a cue-bench mark at least 14 seconds ahead of the in edit point, its location should also be noted. The location of the marks with respect to program material on the tape timer should be noted. The presence of additional edit cue marks in the section of tape under review is not important since individual marks can be chosen by the TEP operator.

Procedure With Old Cue Bench Mark

The TEP selector switch is set to the SET EDIT position and the RE-EDIT button is pushed which will light the indicator. The AUTO mode is also selected by its pushbutton. With the tape on the tape recorder cued to a point at least 5 seconds (lock-up time) ahead of the cue bench mark on tape, the CUE ERASE pushbutton is depressed which will start the tape recorder in the Play mode. The CUE ERASE indicator will not light. When the cue bench mark is detected from tape the CUE indicator will light. Fourteen seconds later the indicator will go out.

After the cue indicator goes out, and before the desired edit mark is expected from tape, the IN pushbutton is depressed momentarily. The IN indicator will not light but when the next edit cue mark is received, the IN indicator will indicate that the time to that mark has been stored in the TEP unit.

Similarly, before the desired out edit cue mark is received, the OUT pushbutton is depressed momentarily. The next edit cue mark from the tape will now cause the OUT indicator to light and the time to that mark to be stored in TEP.

Any number of edit cue marks may be skipped for either the in or out edit points. The TEP will only accept the next edit cue mark after the in or out pushbuttons have been actuated.

After selecting the in and out splice points as above, the RE-EDIT switch should be turned off by again depressing it. The TEP can now be set to PREVIEW and a normal preview made with the new material to be inserted on tape. If correction or modification of the time is required, the in and out edit points selected may be changed with the Input Shift and Output Shift thumbwheels. All other TEP functions are now normal and the same as described in the Automatic Edit section. That is, RE-EDIT SET EDIT is used to select the time stored in the TEP based on edit cue marks on the tape rather than the time determination by the pushing of a button. After that has been done and re-edit turned off, all other functions are identical.

Procedure With New Cue Bench Mark

If a cue-bench mark is not available on tape or it is located too far ahead of the section of tape to be re-edited, a new cue-bench mark should be recorded. This can be done by selecting a spot for the cue bench mark that is at least 14 seconds ahead of the section to be edited, and in a clear area of the cue channel. The TEP is switched to the SET-EDIT mode and the RE-EDIT is off. The CUE ERASE pushbutton is depressed which starts the machine and erases the cue channel. At the desired spot, the CUE pushbutton is depressed and this records the cue-bench mark. The TEP is immediately switched to RE-EDIT after the end of the cue bench mark, which can be heard on the cue channel output.

CAUTION: Care must be exercised to turn TEP to RE-EDIT before the edit cue marks are reached, otherwise they will be erased.

The IN and OUT pushbuttons may now be depressed, before the in and out edit marks, in exactly the same manner as was used with the old cue bench mark above.

Preview Re-Edit Mode

This mode of operation is used for transferring material from one tape to another where the same audio is recorded on both tapes or other similar material that allows accurate cueing between the tapes.

If the same audio track is on two tapes with different video, it permits editing of the first tape with material from the second, thus achieving accurate inserts without disturbing the audio continuity.

When RE-EDIT is selected in the PREVIEW mode, both machines are started simultaneously and at the normal point where the second tape recorder would start, a series of short bursts of 400 hertz are recorded on the second tape cue channel.

These burst consist of one frame on and one frame off of the 400 hertz cue tone. They will last for one second and are recorded 8 seconds ahead of in-edit point selected for the first machine. These short bursts are used to manually cue the second machine to a one frame accuracy.

Procedure for Preview Re-Edit

The tape to be edited will be on the Tape Recorder (#1) controlled by TEP and the second tape will be on the auxiliary tape recorder (#2). The tape on tape recorder #1 is reviewed and the in and out edit points selected in any of the normal modes detailed above and stored in the TEP unit in a SET EDIT mode. The TEP is then switched to the PREVIEW mode and the RE-EDIT button depressed turning on the RE-EDIT indicator. Both machines are then cued up to an identifiable mark or a distinctive sound in the audio channel. Both machines are placed in the STANDBY mode. Then the CUE-ERASE pushbutton is depressed which will start both machines simultaneously. Tape recorder #1 will go through its normal preview cycle but at the time of eight seconds ahead of the in-edit point, the burst of 400 hertz tones will be recorded on the tape in tape recorder #2, provided tape recorder #2 has been modified for TEP operation.

At the completion of the TEP cycle, tape recorder #2 can now be cued to one of the short bursts on the cue channel. Selecting a point near the end of the third burst or the start of the fourth should be the proper mark so that when the machine is started from a STANDBY mode, exact coincidence will be obtained with tape recorder #1. The RE-EDIT on TEP is now turned off and after achieving a proper preview the edit can be made with audio synchronization.

Edit Cue Marks

Edit cue marks are normally generated by TEP when an edit is being made at the in and out edit points. These can then be used for re-editing the tape at some later time. These marks are short bursts of 400 hertz lasting for 2 frames.

In addition, TEP can be used to generate these marks without actually performing the edit. These marks can be put on tape to indicate points at which edits are to be made at a future time.

This is accomplished by playing a tape to be edited with TEP in the STANDBY mode. Each time the CUE pushbutton is depressed, a 2 frame mark will be recorded on the tape. The length of the mark is constant and is independent of the amount of time the button is held in.

These marks can then be used to establish in and out edit points by using the SET EDIT RE-EDIT mode above after inserting a cue bench mark at the proper location.

Long Duration Splices

The TEP can be used to make splices that have a time duration of greater than 10 minutes, the normal limit of TEP. Using TEP in this manner, the in-edit point can be programmed into the TEP unit, but since the out-edit point will be later than the storage capability of TEP, the out-edit point will have to be *manually actuated*. To obtain this type of operation, it is necessary to set an out-edit point into the TEP register at a time earlier than the in-edit point.

To operate TEP in this manner, switch TEP to the automatic mode and proceed to the normal set-edit mode. Locate the in-edit point in the normal manner but leave a sufficient amount of time between when the cue light goes out and the In pushbutton is actuated so that the out-edit point may be later located in this time slot. A period of at least 5 seconds should be allowed which means that the cue bench mark should be at least 19 seconds ahead of the planned in-edit point. After selecting the in-edit point, the OUT pushbutton may be actuated at any convenient time and the machine will rewind and stop.

It it is desired to only preview the in-edit point, without previewing the whole section to be inserted or added-on, the TEP may be switched to preview and

the in-edit point previewed before moving the out point. Before performing the edit, or if it is desired to preview the complete splice duration, it will be necessary to move the out-edit point to at least 3 seconds ahead of the in-edit point. This is done by returning to the set-edit mode of TEP and with the machine "cued-up" ahead of the cue bench mark, start the machine with the machine or remote control PLAY button, *not* the CUE-ERASE button on TEP. This maintains the originally selected in-edit point, and if the In button is not depressed again, that point will remain undisturbed. The CUE indicator will light when the cue-bench mark is detected. As soon as the CUE indicator goes out, in 14 seconds, actuate the OUT pushbutton. This indicator will light and in 4 seconds the machine will rewind and stop.

Now there is both an in-edit and an out-edit point stored in TEP but since the out-edit point is earlier in time than the in edit point, the TEP will not look for the out point until after the in-edit point is reached. Therefore, TEP will continue to run in the preview or edit mode with the IN light on for as long as desired. At a point ten minutes after the cue-bench mark, the COUNTER FULL light will come on but if the mode switch is not disturbed, it will continue to preview or edit until the tape recorder is stopped using its own controls.

After performing a cycle in this manner, it is necessary to return TEP to the standby mode to clear the counter full indicator.

MACHINE MODIFICATIONS FOR TEP REMOTE OPERATION

If it is necessary to use the TEP with a Tape Recorder controlled by a remote control panel, additional changes may be required in the Tape Recorder. These changes are dependent on the presence of a splice mode control switch at the remote control panel. If there is a splice mode control switch at the remote location no further machine modifications are necessary.

If a splice mode control switch (normal-insert-add-on) is not available at the remote control panel, certain changes should be incorporated into the Tape Recorder. The following changes will enable the Tape Recorder to retain local control over the splice mode selector when the machine is switched to remote operation.

TR-70/70A/70B Machines

To modify the TR-70/70A/70B machines for remote operation, connect a jumper between pin 59 and pin 60 on the 3A2 Standard Switch module board.

TR-4HB/50/22HB/60 Machines

To modify the TR-4HB/50/22HB/60 machines for remote operation, move the cathode of CR16 from pin X on the board to pin 12 of the connector on the 3A4 Splice Control module (4A1 in the TR-22HB machine).

SECTION III

TR-70 TEP INSTALLATION

GENERAL

The installation procedures for the TR-70 TEP consists of the following parts:

1. 1A5 Audio Only Edit board installation
2. Installation of TR-70 TEP modification harness
3. Installation of Lower Channel harness
4. Installation of Upper Channel harness
5. Record Panel and Matrix harness modifications
6. 3A2 Standard Switch installation
7. 4A1 Record Panel modifications
8. "COLOR-OFF-TEP ON" insert installation
9. 431/434 Audio/Cue Playback modules modification
10. 433 Video Output module modification
11. 504 Microphone module modification
12. 629 CATC Video module modification
13. 601 Erase Oscillator module modification
14. Additions and modifications to 501, 503, and 618 modules
15. 611 Tonewheel Servo module modification
16. 15 Hz Edit Pulse modification

When performing the installation procedures reference should be made to the equipment list, Table 1, the modification kit items listed in MI-591730, and the diagrams of the modified units in Section VI.

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