

**Fostex<sup>®</sup>**

**Model 4030/4035**  

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**SYNCHRONIZER/CONTROLLER**  
**Owner's Manual**

The 4030/4035 software is protected by copyright of Fostex Corporation and cannot be copied or modified without permission.



The lightning flash with arrowhead symbol, within an equilateral triangle, is intended to alert the user to the presence of uninsulated "dangerous voltage" within the product's enclosure that may be of sufficient magnitude to constitute a risk of electric shock to persons.



The exclamation point within an equilateral triangle is intended to alert the user to the presence of important operating and maintenance (servicing) instructions in the literature accompanying the appliance.

### "WARNING"

"TO REDUCE THE RISK OF FIRE OR ELECTRIC SHOCK, DO NOT EXPOSE THIS APPLIANCE TO RAIN OR MOISTURE."

## SAFETY INSTRUCTIONS

1. **Read Instructions** – All the safety and operating instructions should be read before the appliance is operated.
2. **Retain Instructions** – The safety and operating instructions should be retained for future reference.
3. **Heed Warnings** – All warnings on the appliance and in the operating instructions should be adhered to.
4. **Follow Instructions** – All operating and use instructions should be followed.
5. **Water and Moisture** – The appliance should not be used near water – for example, near a bathtub, washbowl, kitchen sink, laundry tub, in a wet basement, or near a swimming pool, and the like.
6. **Carts and Stands** – The appliance should be used only with a cart or stand that is recommended by the manufacturer.
7. **Wall or Ceiling Mounting** – The appliance should be mounted to a wall or ceiling only as recommended by the manufacturer.
8. **Ventilation** – The appliance should be situated so that its location or position does not interfere with its proper ventilation. For example, the appliance should not be situated on a bed, sofa, rug, or similar surface that may block the ventilation openings; or, placed in a built-in installation, such as a bookcase or cabinet that may impede the flow of air through the ventilation openings.
9. **Heat** – The appliance should be situated away from heat sources such as radiators, heat registers, stoves, or other appliances (including amplifiers) that produce heat.
10. **Power Sources** – The appliance should be connected to a power supply only of the type described in the operating instructions or as marked on the appliance.
11. **Grounding or Polarization** – The precautions that should be taken so that the grounding or polarization means of an appliance is not defeated.
12. **Power Cord Protection** – Power supply cords should be routed so that they are not likely to be walked on or pinched by items placed upon or against them, paying particular attention to cords at plugs, convenience receptacles, and the point where they exit from the appliance.
13. **Cleaning** – The appliance should be cleaned only as recommended by the manufacturer.
14. **Nonuse Periods** – The power cord of the appliance should be unplugged from the outlet when left unused for a long period of time.
15. **Object and Liquid Entry** – Care should be taken so that objects do not fall and liquids are not spilled into the enclosure through openings.
16. **Damage Requiring Service** – The appliance should be serviced by qualified service personnel when:
  - A. The power supply cord or the plug has been damaged; or
  - B. Objects have fallen, or liquid has been spilled into the appliance; or
  - C. The appliance has been exposed to rain; or
  - D. The appliance does not appear to operate normally or exhibits a marked change in performance; or
  - E. The appliance has been dropped, or the enclosure damaged.
17. **Servicing** – The user should not attempt to service the appliance beyond that described in the operating instructions. All other servicing should be referred to qualified service personnel.



An appliance and cart combination should be moved with care. Quick stops, excessive force, and uneven surfaces may cause the appliance and cart combination to overturn.

We appreciate your purchase of the Model 4030/4035 Synchronizer/Controller. Model 4030/4035 is a full fledged audio sweetening system for syncing two MTR's, a audio deck with a video deck or in some cases, two video decks. The system can be expanded to include one master and three slaves. Each slave will require a 4030 and for more than one slave, an 8710 will be required between the 4035 and the synchronizers. Fully expanded, the system becomes a one master three slave system which can widely comply to the requirements of various production jobs.

Before operating, please thoroughly read this manual so that you can obtain full performance for many years to come.

## T A B L E O F C O N T E N T S

1. The controls and their functions .....	4
2. Connecting examples with various equipment .....	13
2-1 Sync system of two audio decks .....	13
2-2 Basic audio sweetening system .....	14
2-3 System setup using the 4010 as a high speed reader .....	15
2-4 Example of code only master .....	16
2-5 Example of using a VTR for the slave .....	17
2-6 One master three slave system .....	18
2-7 Sync with a movie projector using bi-phase interface .....	18
3. Preparation before operating .....	19
3-1 Setting the rear panel DIP switches .....	19
3-2 Damping selector .....	20
3-3 Slave servo adjusting and servo characteristic learning ...	21
4. 2nd mode .....	25
4-1 What is 2nd mode? .....	25
4-2 Memory initialized condition .....	25
4-3 List of 2nd mode functions .....	26
4-4 Details of 2nd mode functions .....	27
5. Operating the 4030 .....	39
6. Operating the 4035 .....	40
6-1 Transport control functions .....	40
6-2 Basic operation up to locking .....	41
6-3 Editing and storing of data .....	42
6-4 Locate function .....	45
6-5 Review function .....	46
6-6 Preroll function .....	46
6-7 Display hold .....	47
6-8 Offset memory .....	47
6-9 Auto function .....	49
6-10 Addition and subtraction of time data .....	51
7. Others .....	53
7-1 Lock mode .....	53
7-2 Tach pulse learning in the 460 mode .....	53
7-3 Notes on using the 1 master 3 (or 2) slave system .....	54
7-4 Time code at off line editing .....	55
7-5 Technical information .....	56

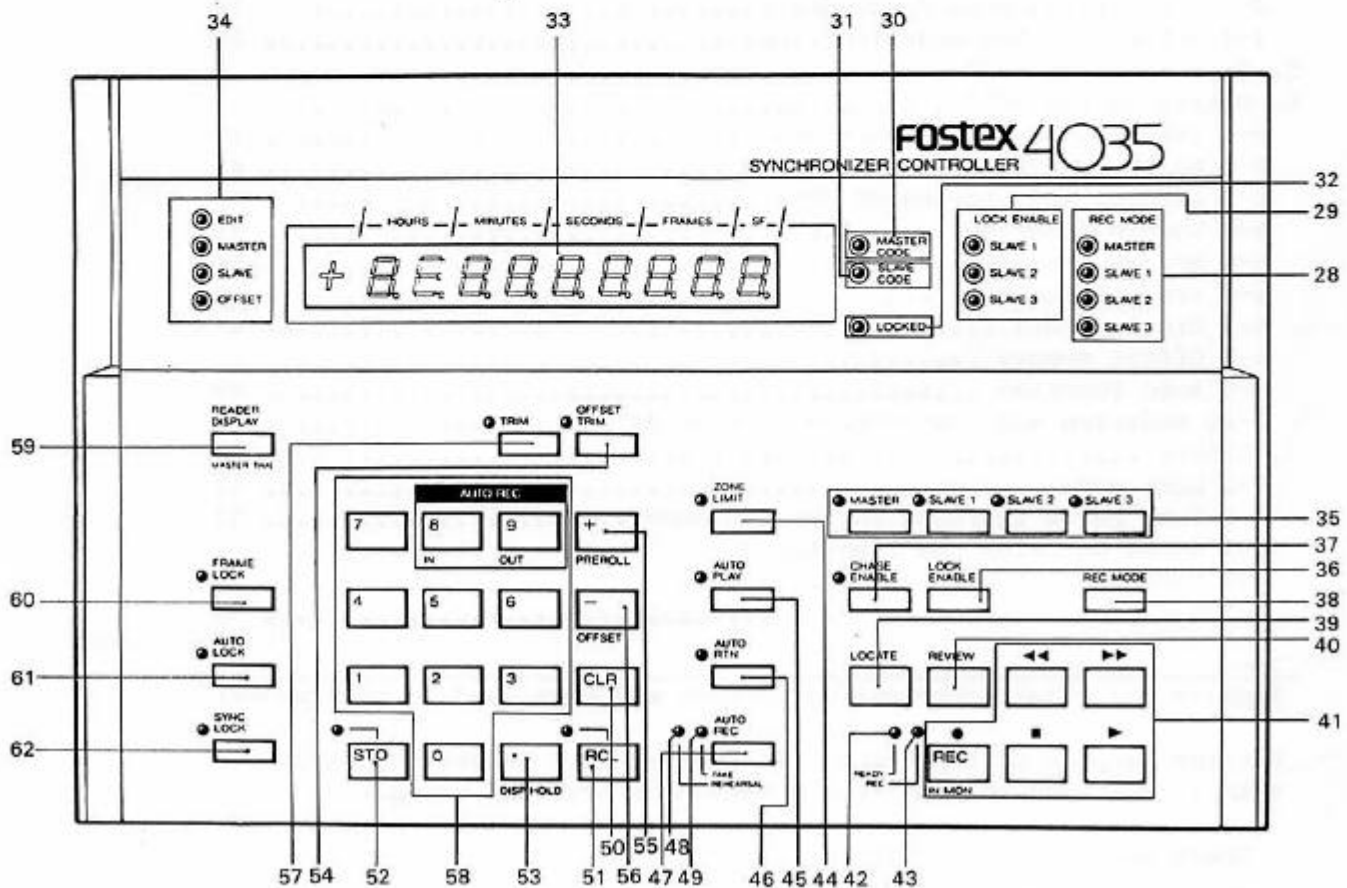
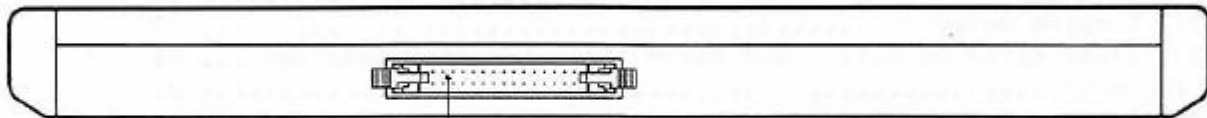
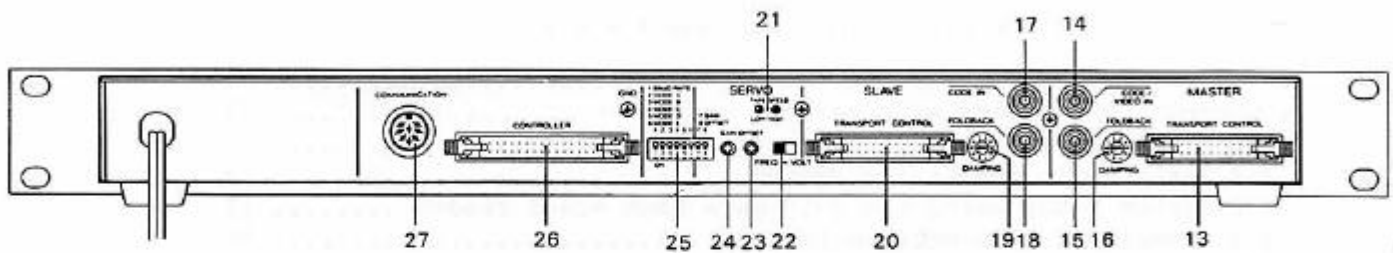
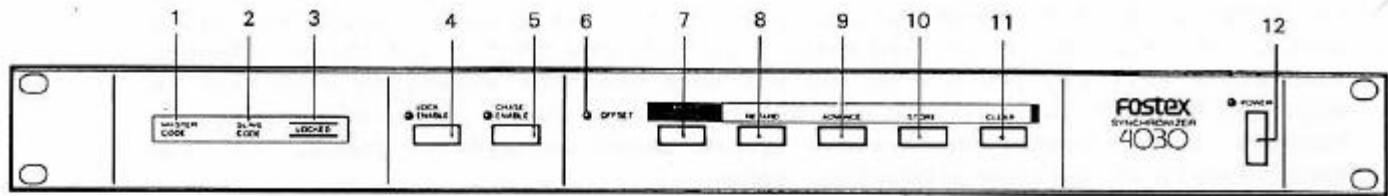
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Symbols and codes representing buttons and keys used in this manual

For the purpose of explanation in this manual, several types of symbols are used to represent a button or key. For example :

Store key, STO key, [STO] ..... These all mean the same.

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# 1. THE CONTROLS AND THEIR FUNCTIONS [Panel lettering in ( )]

## MODEL 4030 SYNCHRONIZER

### FRONT PANEL

#### (1) Master time code indicator (MASTER CODE)

This is lit when the master time code is correctly read by the 4030. Also, this will blink if it is 'learning' the tach (CTL) pulse rate (Refer to page 39 for details on 'learning').

#### (2) Slave time code indicator (SLAVE CODE)

This is lit when the slave time code is correctly read by the 4030. Also, this will blink when it is 'learning' the tach (CTL) pulse rate (Refer to page 39 for details on 'learning').

#### (3) Lock indicator (LOCKED)

This is lit if the master and slave are running in synchronization.

#### (4) Lock enable button/indicator (LOCK ENABLE)

This button determines whether or not speed of the slave is to be controlled by the 4030. If the slave is in play mode when this indicator is lit, the slave capstan servo will be controlled by the 4030 which will speed up or slow the capstan until standing offset display matches programmed offset value.

After adjusting the servo offset/gain, this indicator will blink when 'learning' the servo characteristics (Refer to page 21 for details on adjusting).

#### (5) Chase enable button (CHASE ENABLE)

The button for enabling the chase mode. During the lit state of the indicator, the 4030 will send FF, REW, PLAY and STOP commands to the slave so that it will always be within 3 seconds of the established offset memory thus automatically keeping it in synchronization (By the use of machine generated tach pulse). When this button is pressed ON, the lock enable indicator (4) will also be lit and remain lit even though the chase enable indicator is independently turned off.

#### (6) Offset indicator (OFFSET)

This is lit when the offset memory value is other than "0". (OFFSET: Difference in time code between master and slave)

#### (7) Offset modify button (OFFSET MODIFY)

This button is pressed to switch on (indicator is lit) the offset modify mode when the offset memory is to be changed using RETARD (8), ADVANCE (9), STORE (10) or CLEAR (11) buttons. This button need not be pressed if the 4035 controller is used for this operation.

(8) Offset retard button (RETARD)

With the lock indicator (3) lit and the transport running in synchronization, pressing this button while offset modify is ON, changes the offset memory in the minus direction (slave speed is reduced). Pressing it once retards speed by 1/100 frame, and will change continuously if held down. In doing so, the offset indicator (6) will blink momentarily at each step of speed reduction.

(9) Offset advance button (ADVANCE)

With the lock indicator (3) lit and the transport running in synchronization, pressing this button with the offset modify ON, changes the offset memory in the plus direction (slave speed is raised). Pressing it once raises speed by 1/100 frame, and will change continuously if held down. In doing so, the offset indicator (6) will blink momentarily at each step of speed reduction.

(10) Offset store button (STORE)

If this button is pressed with offset modify ON, the difference in time code between the master and slave at that moment will be stored in the offset memory.

(11) Offset clear button (CLEAR)

If this button is pressed with offset modify ON, any data other than "0" in the offset memory (offset indicator (6) is lit) will be cleared and the offset memory value will be "0" and the offset indicator (6) will be extinguished.

(12) Power switch (POWER)

REAR PANEL

MASTER SECTION

(13) Transport control connector (TRANSPORT CONTROL)

Accessory and remote connectors of the equipment to be the master are connected here via the 8540 synchronizer cable (and interface if other than a Fostex machine). If the 4030 is to be used in "read code only" master mode, and a 4010 high speed reader is not being used, no 8540 cable is necessary to the master control transport connector (Refer to section 4-4-10 for details.).

(14) Time code/composite video input jack (CODE/VIDEO IN)

The master time code output is plugged in here. Also, a 48Hz ~ 60Hz sync pulse and composite video signals can be input here to be used for a reference signal.

(15) Time code foldback jack (FOLDBACK)

Time code signals at input (14) is directly output here. It is convenient for branching the time code signals to other equipment.

(16) Damping selector (DAMPING)

The selector for adjusting the rate of deceleration in approaching the objective point when locating from the 4035. Set this to "0" when a VTR is used for a master. For an MTR, it must be adjusted for each equipment depending on the amount of tape, reel size, amount of tension, etc. (Refer to 3-2 for details.) Basically, the bigger machine, the higher damping number.

SLAVE SECTION

(17) Time code input jack (CODE IN)

The slave time code output is applied here.

(18) Time code foldback jack (FOLDBACK)

Time code signals at input (17) is directly output here. It is convenient for branching the time code signals to other equipment.

(19) Damping selector (DAMPING)

The selector for adjusting the rate of deceleration in approaching the objective point when locating or at FF/REW in the chase mode can be controlled from the 4035. It must be adjusted for each variety of machine depending on the amount of tape, reel size, amount of tension, etc. (Refer to 3-2 for details.)

(20) Transport control connector (TRANSPORT CONTROL)

The servo control connectors, accessory jacks, and remote jacks of the slave are connected here via an interface and/or through the Model 8540 synchronizer cable.

SERVO ADJUSTING SECTION

This section is for adjusting and switching the servo control to match the slave deck characteristics. Refer to "3. PREPARATION OF OPERATION" for details on adjusting method.

(21) Tape speed indicator (TAPE SPEED HIGH/LOW)

Tape speed of the slave is indicated by either of two indicators when adjusting the servo. Refer to page 24 for the various modes of indication. (For some models of decks, the indicators on the rear of the 4030 may be invalid.)

(22) Frequency-voltage control selector (FREQ-VOLT)

This is switched in accordance to type of servo control of the slave. This must be switched always with the power off.

(23)(24) Servo gain/offset trimmer (OFFSET/GAIN)

Gain and offset of the slave servo are adjusted by these trimmers. Refer to 3-3 for detailed adjusting method.

(25) DIP switches

Refer to 3-1 for procedures on setting these switches.

(26) Controller connector (CONTROLLER)

The Model 4035 Synchronizer Controller is connected here. If more than one synchronizer is used, an 8710 kit is necessary, and the controller connector from each synchronizer will be connected to the 8710. The cable for the 4035 is packaged with the 4035 unit.

(27) Communication connector (COMMUNICATION)

This is the RS232C interface connector used for communication with a microcomputer. The Model 8740 cable, for converting the normal 25 pin D sub-connector to this DIN plug, is available as an option. Refer to attachment 1, for the RS232C commands and method of communication.

#### 4035 SYNCHRONIZER CONTROLLER

The exclusive controller unit allows complete remote control of all functions of the synchronizers. One 4035 unit can control up to three 4030 synchronizer by using the 8710 interface.

Each button on the 4035 is labelled with a function, and a few of them become other functions when Recall (RCL) or stop (STO) is previously touched. In the normal display mode, holding down recall and store simultaneously will enter a second page mode. In 2nd mode, many of the buttons access additional sync functions. See Section 4 for detailed description.

(28) Record mode indicator (REC MODE, MASTER/SLAVE 1 ~ 3)

A recording command is permitted to be issued to the master and slaves whose indicator is lit here. ON/OFF is selected by the REC MODE selector button (36). To prevent accidental recording even though the REC button is pressed, a recording command will not be sent to the recorder whose indicator here is not lit.

(29) Lock enable indicator (LOCK ENABLE, SLAVE 1 ~ 3)

The 4030 will control the capstan speed for the purpose of synchronizing to the master the slave whose indicator is lit. ON/OFF of these indicators are controlled by the LOCK ENABLE button (36).

After adjusting gain/offset of the servo, the lock enable indicators will blink while the 4030 is learning the servo characteristic (Refer to 3-3 for procedures in adjusting). The operation of these indicators are identical with the lock enable indicators (4) on the 4030.

(30) Master time code indicator (MASTER CODE)

This is lit whenever the master time code is correctly input. Also, this will blink when it is learning (refer to page 40 for details on 'learning.') the tach (CTL) pulse rate when it is first put into play after power up. This indicator corresponds to the master time code indicator (1) on the 4030.



(31) Slave time code indicator (SLAVE CODE)

This is lit whenever the slave time code is correctly input. Also, this will blink when it is learning (refer to page 40 for details on 'learning') the tach (CTL) pulse rate when it is first put into play after power up. This indicator corresponds to the slave time code indicator (2) on the 4030.

(32) Lock indicator (LOCKED)

This is lit when the master and slave are running in perfect sync. This indicator corresponds to the lock indicator (3) on the 4030.

(33) Data display

Time code, offset, EDIT time data selected by the display indicator will be displayed. In the EDIT mode, at least one 'period' LED will always be blinking. The 2nd mode (page 25) which accesses a number of other useful functions and adjustment modes can also be displayed. The 2nd mode will only come on when the master or slave is displayed on the recorder.

(34) Display indicator (EDIT/MASTER/SLAVE/OFFSET)

These LED's are for indicating which data is presently shown on the numerical display. In the normal mode, the LED's will switch in rotational order of MASTER/SLAVE/OFFSET each time the READER DISPLAY select button (69) is pressed. For SLAVE/OFFSET, data of the slave indicated by the CONTROL SELECT button (35) will be displayed. When the data is to be edited, it will automatically enter the EDIT mode.

(35) Control select button/indicator (MASTER/SLAVE 1 ~ 3)

Equipments subject to various control and settings, and memory designations, are selected by pressing these buttons. There will be no response from SLAVE 2 and SLAVE 3 buttons if each 4035 is not connected through 8710 to a second and third 4030. Both MASTER and SLAVE 1 indicators will be lit when these buttons are pressed simultaneously.

(36) Lock enable button (LOCK ENABLE)

This is the button to select whether or not the slave chosen by the control select buttons (35) is to be speed controlled. The lock enable indicator (29) will alternately go on and off each time this button is pressed. When the slave enters the play mode while the indicator is lit, the slave servo capstan will be controlled in direction toward the setup offset memory. This button corresponds to the lock enable/indicator (4) of the 4030 which will also go on.

(37) Chase enable button/indicator (CHASE ENABLE)

When one slave is selected by the control select button (35), each time this button is pressed the indicator will go on and off, and the chase mode also will go ON and OFF. The lock enable indicator will also be lit automatically when the chase mode goes to ON. In the chase mode, the various changes (FF/REW/PLAY/STOP etc) in the master function will also be followed by the slave. This button corresponds to the 4030 chase enable button/indicator (5) which will also be on.

- (38) Record mode select button (REC MODE)  
The REC mode, which permits a recording command to be sent to the deck selected by the control select buttons (35), is setup by this button. Each time this button is pressed, the record mode indicator (28) will go ON/OFF.
- (39) Locate button (LOCATE)  
The button for manipulating the tape to any desired point for the machine selected by the control select button (35). Refer to page 45 for method in setting the locate point.
- (40) Review button (REVIEW)  
When this button is pressed for the transport selected by the control select button (35), the tape will be rewound for about 5 seconds (initial value), then enter the play mode. This review time can be reset to any length between 0 ~ 59 seconds (Refer to 6-5 for procedure). If the button is held down longer than the preset time, the tape will rewind during this time and immediately enter the play mode upon releasing the button.
- (41) Function buttons (◀◀/▶▶/●/■/▶)  
These buttons are for remote controlling the transport selected by the control select button (35).
- (42) Record ready indicator (READY)  
This indicator will light, in the rehearsal mode, to show the recording zone in the auto recording mode (Refer to 6-9-4 for details).
- (43) Record indicator (REC)  
This indicator shows the recording condition of the transport selected by the control select button (35). When the record mode is ON, the transport will enter the record mode when the PLAY and REC buttons are simultaneously pressed. It will flash when the REC button only is pressed to enter the input monitor state for the Fostex recorders (A, B, and E series and 460) and some other machines.
- (44) Zone limit button/indicator (ZONE LIMIT)  
This button sets the zone limit function between any two cue memory points for the transport selected by the control select button (35). When zone limit is ON and the tape is within this zone, this indicator will be lit, and when it is outside this zone, it will flash. (Refer to 6-9-1 for details).
- (45) Auto play button/indicator (AUTO PLAY)  
The auto play function is set by this button for the transport selected by the control select button (35). The indicator will be lit when auto play is ON, it will automatically enter the play mode upon arriving at the locate point (Refer to 6-9-2 for details).

(46) Auto return button/indicator (AUTO RETURN)

This button sets the auto return function between any two cue memory points for the transport selected by the control select button (35). The indicator will be lit when auto return is ON (Refer to 6-9-3 for details).

(47) Auto recording button (AUTO REC)

This button sets the auto recording (auto punch in/out) function between cue number 8 (in point) and cue number 9 (out point) for the transport selected by the control select button (35) (Refer to 6-9-4 for details). In the 2nd mode (refer to 4-4-13), it will initialize offset recording of the slave in relationship to the master.

(48) Rehearsal indicator (REHEARSAL)

This is lit when the auto recording function is in the rehearsal mode.

(49) Take indicator (TAKE)

This is lit when the auto recording function is in the take mode.

DATA ENTRY SECTION (Ten digit keypad)

Each key zero through nine and (50) ~ (58) are for recalling/changing/storing data in each memory for cue data and offset, auto mode cue numbers, and preroll time. The keys with panel lettering under them, have two meanings depending on how it is operated (For example, -/OFFSET key (56)). Refer to 6-3 for actual method of operation.

(50) Clear key (CLR)

The numerical display will be cleared to 00H 00M 00S 00F 00SP at the instant this key is pressed and then enter the desired data.

(51) Recall key/indicator (RCL)

After pressing this key, then any memory key will bring the stored data memory onto the display. At this point, it will be in the edit mode. The RCL indicator will be lit when the RCL key is pressed and extinguished when the memory key/button is pressed.

(52) Store key/indicator (STO)

After pressing this key, pressing the key or button for any memory will store in that memory the data presently on display. The STO indicator is lit when the STO key is pressed and extinguished when the memory key is pressed, at which time it will return to the normal mode from the edit mode.

(53) Period/display hold key ( . /DISP HOLD)

In the edit mode, when this key is pressed the period is moved to the right of the display segment which will be changed. This saves ambiguity. The display hold mode is entered when this key is pressed after pressing the RCL key, and the display at that moment is held and then enter the edit mode.

(54) Offset trim button/indicator (OFFSET TRIM)

When this button is pressed when the system is in sync, the indicator will be lit and enter the offset trim mode. The display, at the same time, will change to indicate frame and 1/100 frame. In this state, the indicator will blink once each time the + key is pressed and offset will change by 1/100 frame. It can be changed continuously if this button is held down (Refer to 6-8-3 for details).

This button corresponds to the 4030 offset modify button (7).

(55) Plus/preroll key (+ /PREROLL)

This button has three functions. It corresponds to the + (plus) key in the edit mode, the 4030 offset advance button in the offset trim mode, and changes the offset memory value in the increase direction.

Recall and store of the preroll time memory (one minute or less) can be done by pressing this key after pressing the RCL (51)/STO (52) keys (Refer to 6-6 for details).

(56) Minus/offset key (- /OFFSET)

This button also has four functions. It corresponds to the - (minus) key in the edit mode, the 4030 offset retard button in the offset trim mode, and changes the offset memory value in the decrease direction.

Recall or store of the offset time memory can be done by pressing this key after pressing RCL (51)/STO (52) (Refer to 6-8 for details).

(57) Trim button (TRIM)

This button is the setup for one step modifying mode of the digit whose period is blinking (when in the edit mode). The numbers will change in each direction when the +/- keys are pressed while the indicator is lit. The blinking period can be changed by pressing the period key (display hold) (Refer to 6-3 for details).

(58) Keypad (0 ~ 9)

The keypad is used to enter data in the edit mode.

Also, when these keys are pressed after pressing RCL (51)/STO (52) keys, the corresponding cue number time data can be recalled or stored (Refer to 6-3-2 for details).

(59) Reader display select button/master code (READER DISPLAY/MASTER CODE)

The button for switching the time data on the display. Each time this button is pressed, the display indicator will change in order of MASTER → SLAVE → OFFSET. This button is also pressed to return to the normal mode from the EDIT mode.

When the master sync signal is operating from a composite video signal or pulse, the start time code data is entered in the edit mode. Pressing STO, then the recorder display button fixes the count to begin with the first pulse or a composite video signal or reference pulse to the master time code/video input connector (14).

#### LOCK MODE SELECT BUTTONS

Buttons (60) ~ (62) are lock mode select buttons for setting the sync run condition. Refer to 7-1 for the meaning of each and how to use them.

(60) Frame lock button/indicator (FRAME LOCK)

This button sets the lock to the frame lock mode. The indicator will be lit in doing so. When it is set to the auto lock mode of (61), this will be lit in the frame lock mode while in play and preparing to achieve lock.

(61) Auto lock button/indicator (AUTO LOCK)

This button sets the lock mode to the auto lock mode. When this mode is setup, the function is initially in a frame lock sync mode, then automatically switches to sync lock mode after the "lock" becomes stable. The auto lock indicator is lit permanently in auto lock mode together with one or other of Frame lock and Sync lock indicators as appropriate.

(62) Sync lock button/indicator (SYNC LOCK)

Sets the sync lock mode (indicator will be lit). This will also light when in the sync lock mode when auto lock mode (61) is setup.

(63) Synchronizer connector

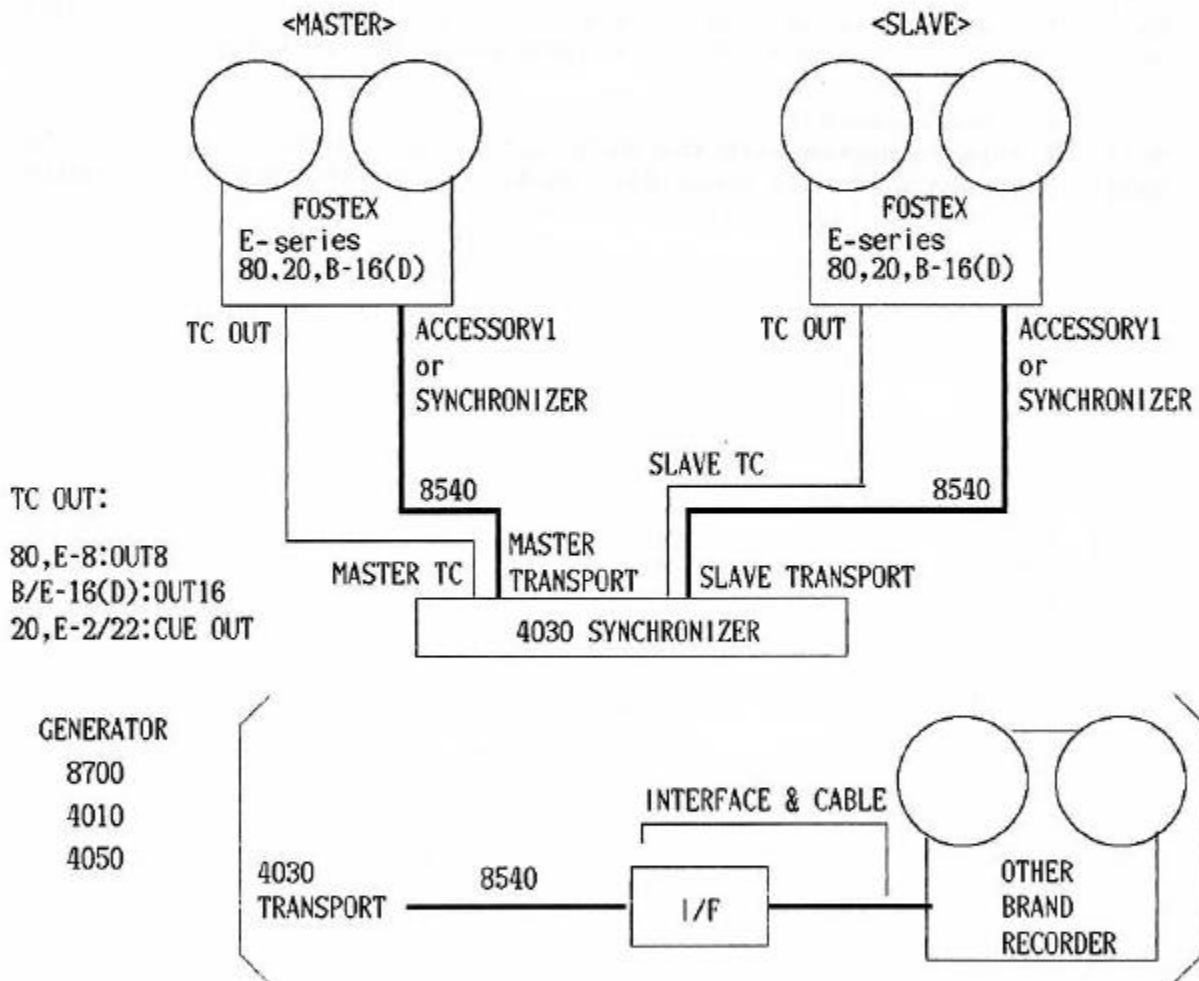
This is interconnected with the 4030 controller receptacle (26) by the cable packaged with this controller unit. Be sure the cable connector without the ground lug is plugged in here.

## 2. CONNECTING EXAMPLES WITH VARIOUS EQUIPMENTS

Several representative setting examples will be shown here. Try connecting your system from these illustrations.

NOTE: When connecting the remote receptacle of the VTR and ATR recorders of other brands, you will require, in addition to the Model 8540 synchronizer cable, an exclusive interface for each type of equipment (Refer to the Interface List, Attachment 3).

2-1 Sync system of two audio decks (Example of chase synchronizer)

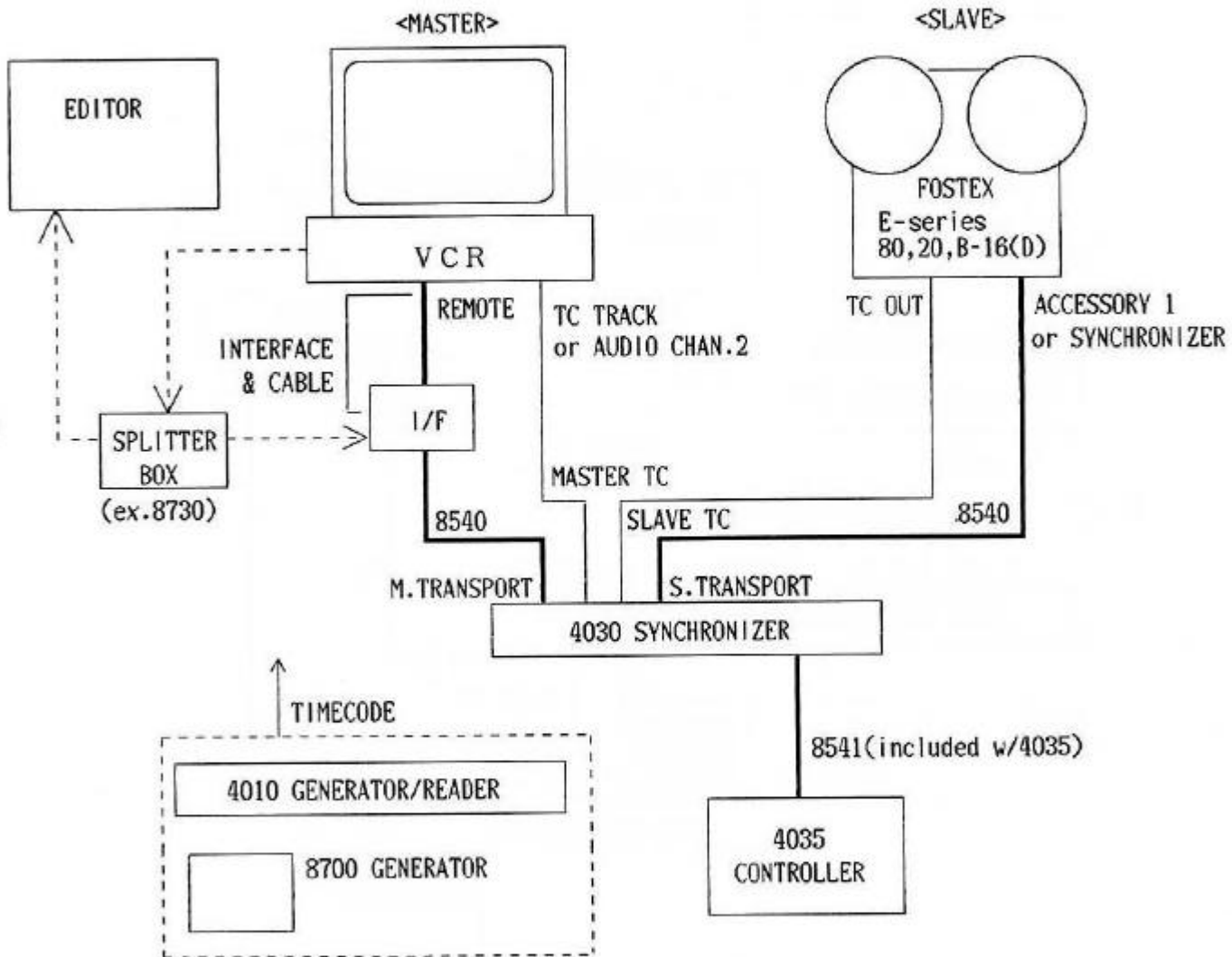


This is a system of synchronizing two multitrack recorders to increase (two tracks less double) the number of tracks. The same time code is recorded on a track or both the master and slave tapes. If the master deck or locator control buttons are operated, the slave deck will always follow the master, and thus it will seem as if a single deck is being controlled. Such a method of operation is called Chase Synchronizing. In this method, the 4035 is not always required.

2-2 Basic audio sweetening system

After completing picture editing, editing of effects sound and music tracks is called audio sweetening. The 4030/4035 system is most suitable for this operation of synchronizing the multi-track recorder (MTR) with the VTR.

For a machine provided with a VTR interface, the VTR can be controlled from the 4035 by connecting them as shown below.



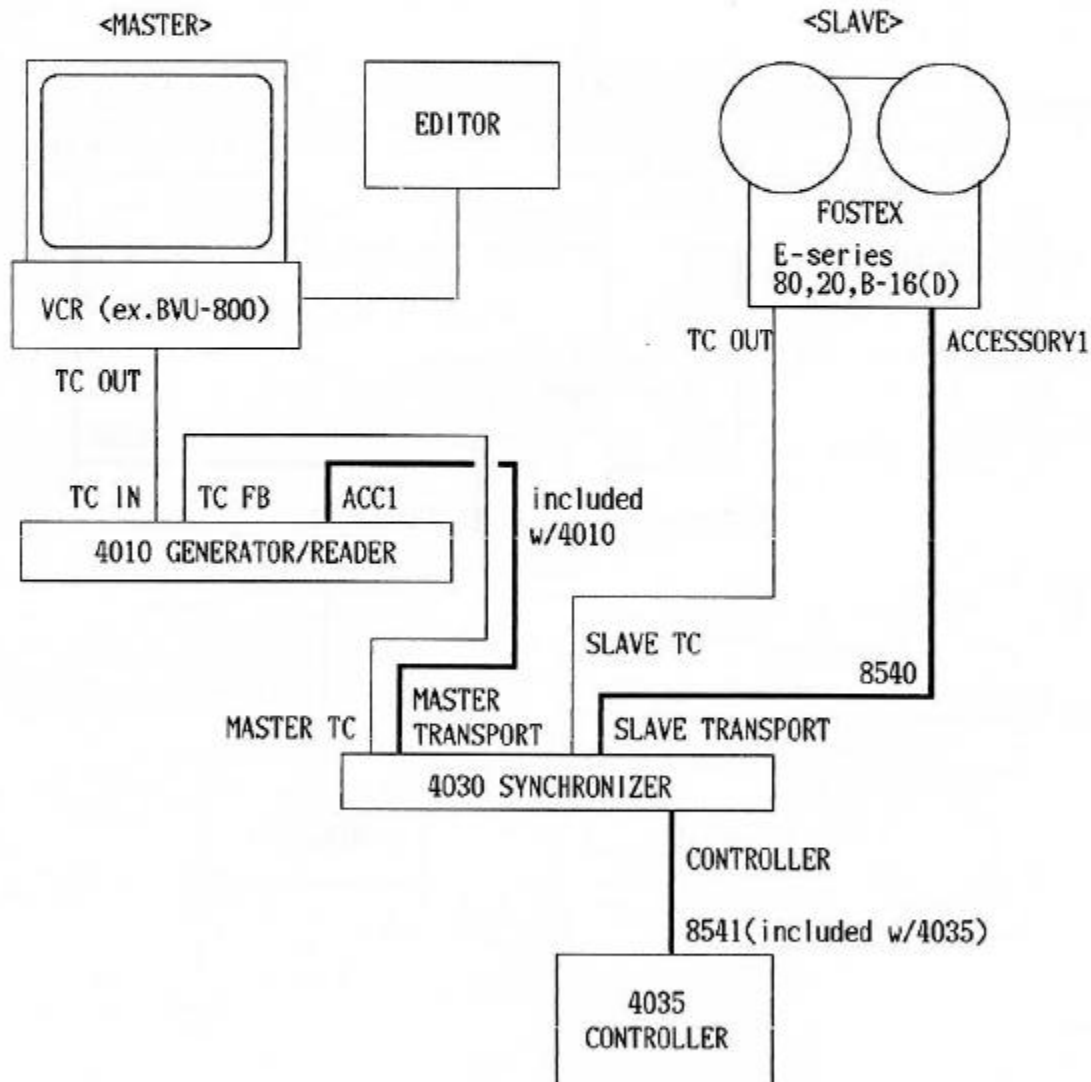
2-3 System setup when using the 4010 Time code generator/recorder as a high speed reader

If the VTR is the type which uses deep layer recording (SONY BVU 800) of the time code, the 4010 high speed reader can be used, instead of using an interface. In such a case, a direction signal and tach pulse are sent to the 4030 master transport connector from the 4010 accessory connector.

In this setup, the slave will perfectly follow even when the jog dial is manipulated from the VTR editing controller.

NOTE: In this system, set to the code-only-master mode by the 2nd mode (Refer to 4-4-10).

In addition, a short RCA to RCA cable will have to go between code out 4010 and code in 4030.

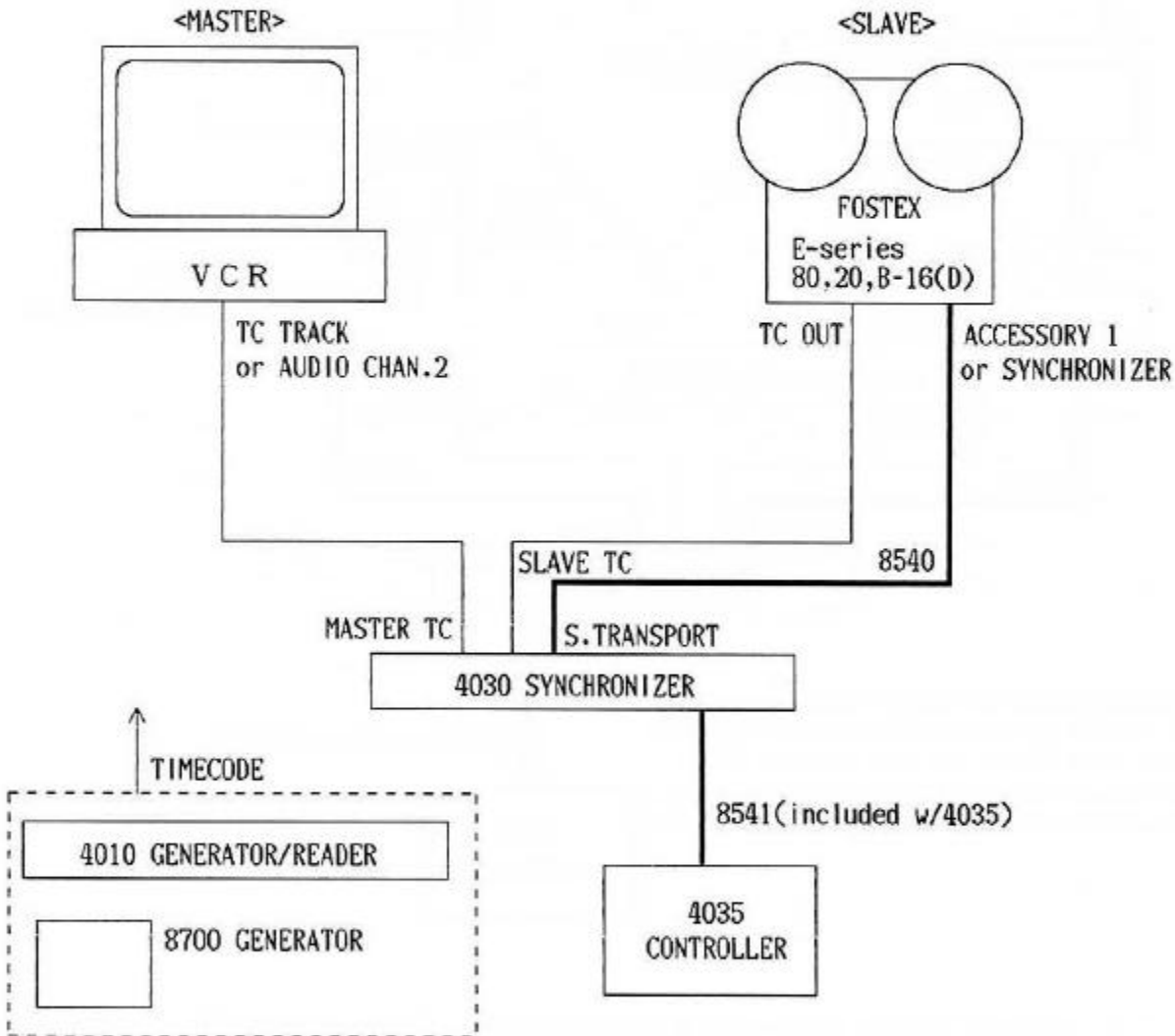




2-4 Example of code only master

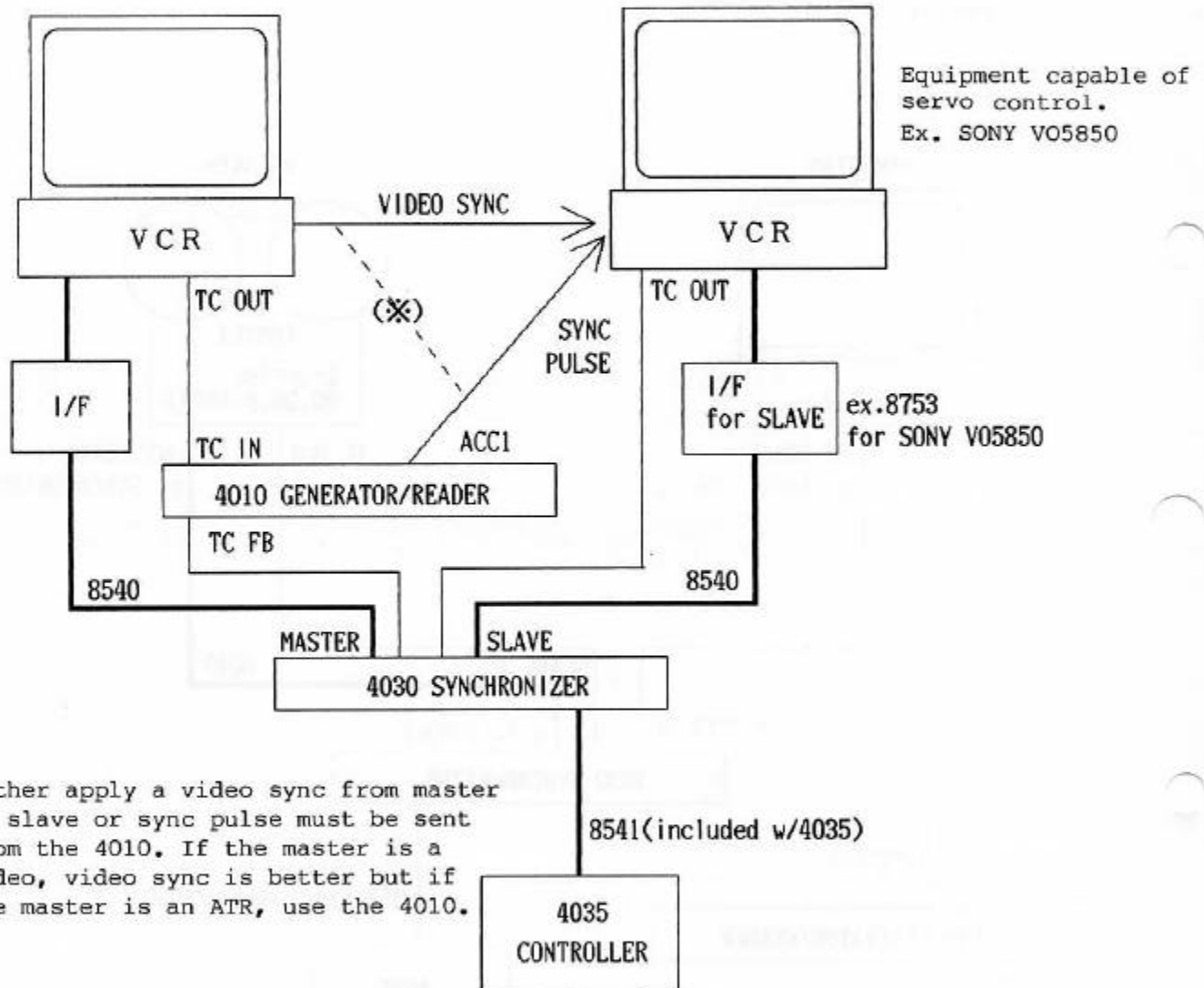
In using a VTR and ATR without an interface, the 4010 can be used by simply providing time code only from the master. In this case, the slave will follow only when the correct time code is supplied from the master in the play mode, and the slave will stop in other modes (FF, REW, etc.).

NOTE: In this system, set to the code-only-master mode by the 2nd mode (Refer to 4-4-10).



2-5 Example of using a VTR for the slave

Generally, the VTR is used as the master at MA work but two VTR's can be synchronized using one VTR as the slave. In this case, the 4010 time code generator/reader and a VTR slave interface must be used as shown below.

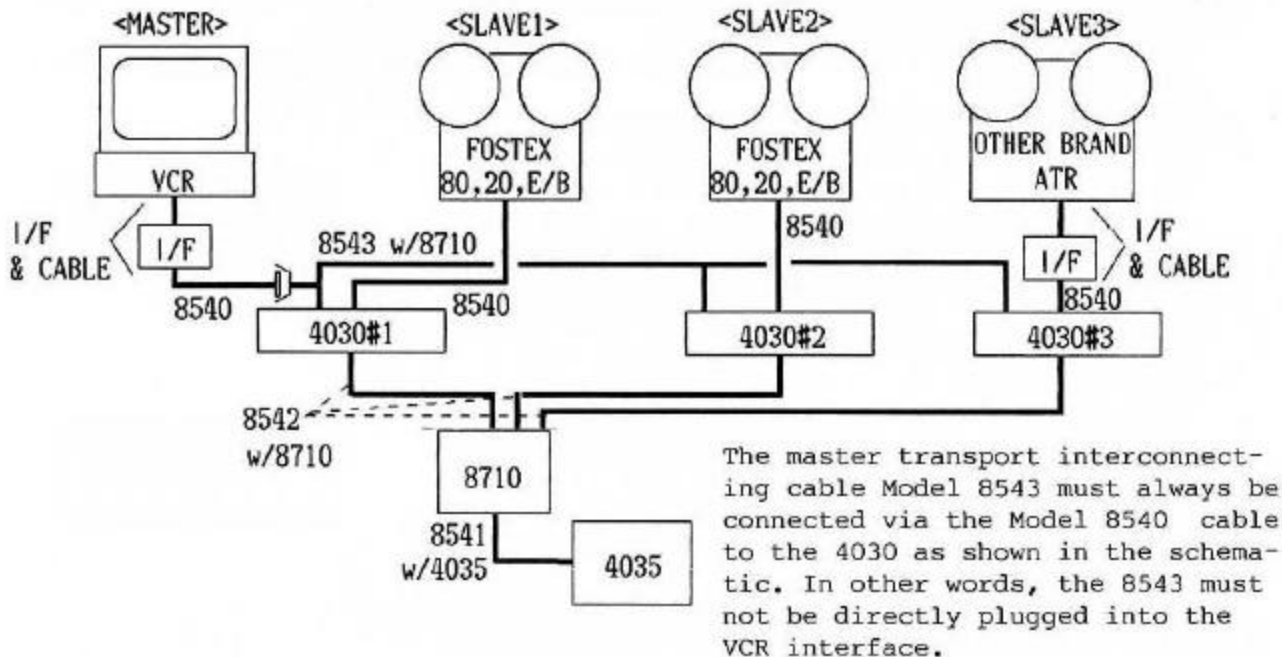


\* Either apply a video sync from master to slave or sync pulse must be sent from the 4010. If the master is a video, video sync is better but if the master is an ATR, use the 4010.

- \* It is a necessary condition that the time code is generated in sync with the video signal in both master and slave. Generate the V-sync from the 4010 generator and record the time code.
- \* Only certain video decks can be operated as a slave. Depending on the type of VCR, in some cases, it must be modified when it is to be used as the slave. Please consult our service department for detailed information.

2-6 One master three slave system

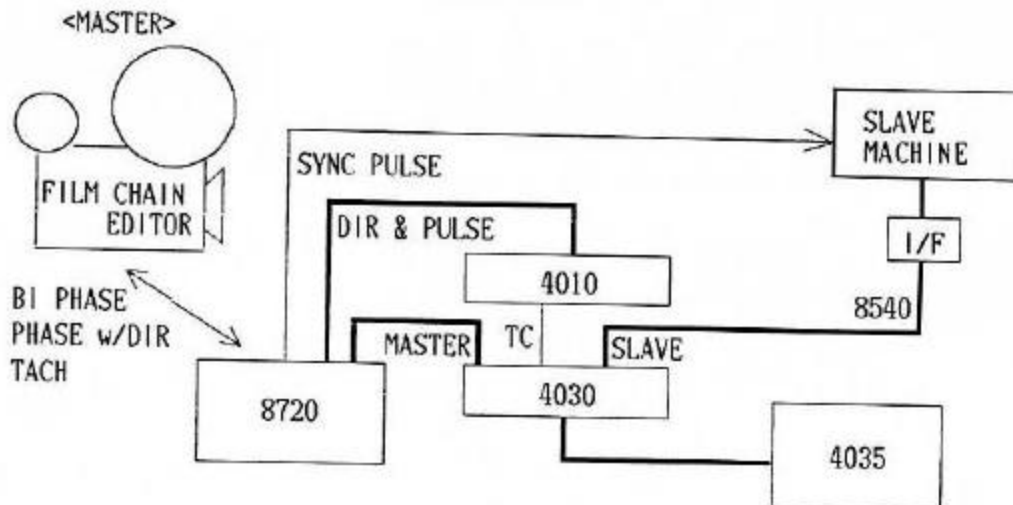
The 4030 is a one master one slave synchronizer unit but one 4035 unit can control up to three 4030 units, or in other words, control three slaves from one 4035 unit. In this case, the 8710 expansion interface must be used as shown below.



2-7 Sync with a film transport using the bi-phase interface

A film transport and/or magnetic film transport with a bi-phase output can be synchronized with a time code based ATR by controlling the 4030 through an 8720 interface and the 4010 generator reader, as shown below (Refer to the 8720 manual for details on connecting).

NOTE: If the film transport does not have a bi-phase jack but references to power line sync pulse, directly apply this power line pulse to the 4030 master IN jack.



### 3. PREPARATION BEFORE OPERATING

Following are explanations on various settings and adjusting which must be carried out before proceeding to actual operating.

#### 3-1 Setting the rear panel DIP switches

The rear panel DIP switches must be preset to match the operating environment of the 4030 Synchronizer such as type of master and slave, and whether the 4035 will be used or not.

DIP switches 1 ~ 3 must be switched always with the power switched OFF.

#### 1. Selecting the RS232C baud rate (BAUD RATE)

Baud rate of the RS232C communication buss must be selected. It will be 9600 baud in the up (OFF) position and 4800 baud at the down (ON) position. The baud rate should be chosen by considering the communication condition of the microcomputer. This switch can be set either way if the RS232C is not used.



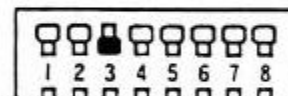
#### 2. Mode A (MODE A)

This switch is set to down (ON) position for the auto lock mode when the 4030 is used without the 4035 controller. If the 4035 is connected, this switch will be ignored and the auto lock button (61) of the 4035 will be effective.



#### 3. Mode B (MODE B)

This switch determines whether the lock mode will be frame lock or sync lock when using the 4030 without the 4035 Controller. The up (OFF) position will be frame lock and down (ON) position, sync lock. If the setting of this switch is to be effective, the MODE DIP switch #2 must be up (OFF). On the other hand, if the 4035 is connected, this switch will be ignored and the 4035 lock mode select buttons (60) and (62) will be effective.



#### 4. Mode C (MODE C)

This switch is set down (ON) when the master transport is the Postex B-16 and B-16 (D). This must be set to up (OFF) for other transports.



#### 5. Mode D (MODE D)

This switch is set down (ON) when the slave transport is the Postex B-16 or B-16 (D). This must be set to up (OFF) for other transports.



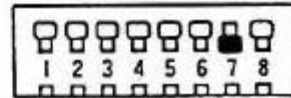
#### 6. Mode E (MODE E)

This switch can be set either way as it is not used.

NOTE: Offset is always adjusted before GAIN.

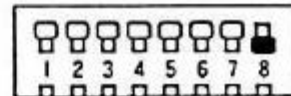
7. Servo gain (GAIN)

When the slave servo gain is to be set at initial setup, this switch is set down (ON) and the gain trimmer (24) adjusted. Anytime this switch (AND/OR OFFSET) is set to ON, then OFF, a servo characteristic learning period will be required. Refer to 3-3 for details on adjusting method.



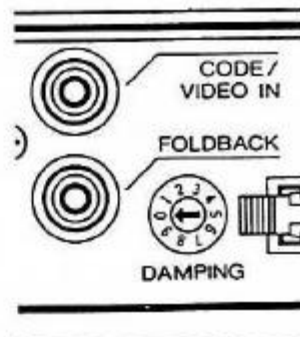
8. Servo offset (OFFSET)

When the slave servo offset is to be set at initial setup, this switch is set down (ON) and the offset trimmer (24) adjusted. When doing this adjustment, first set the offset value by switch #8, then set the DIP switch #7 gain. It will require the servo characteristic learning period after this switch is set to ON, then OFF. Refer to 3-3 for details on adjusting method.



3-2 Damping selector

This makes allowance for the ballistics and mechanical mass of the tape deck when the machine is arriving at the locate point (the braking characteristic) when auto locating master and slave. When damping is zero, the 4035 will only issue a stop command at the locate point. When reel inertia is large, it will overshoot the desired stop point. Therefore, if the damping selector figure is increased step by step, the 4030 will send short bursts of FF/REW commands beforehand of the locate point to cut down the locate speed (if it should overshoot, it will reverse to the locate point).



For optimum setting of the damping figure, the tape should be actually located several times while gradually raising the damping selector figure until it stops smoothly without overshooting.

If a cassette type recorder (VTR) is used, nearly always set this selector to zero. Very occasionally a damping of 1 will be necessary.

CAUTION: Even when the 4030 is used without the 4035 controller locator, damping must be adjusted so that it does not overshoot (or undershoot) the slave locate function in chase.

REF 1: Use the following figures as a rule of thumb for Postex recorders. (There will be slight differences depending on reel size, type and amount of tape used.)

B-16 (D), E series (E-2/22/8/16) .....	4 ~ 6
A series (Model 80, 20) .....	1 ~ 3
4 track cassette (460) .....	0

REF 2: This value can be set from the 4035 in the initial setup mode (2nd mode). Refer to 4-4-2 for details.

REF 3: Should the selected damping range be insufficient for other recorders, readjust it by changing the damping range by entering the 2nd mode function and selecting a different range. Refer to 4-4-15 for detailed setup method.

Basically, if the tape overshoots or keeps on going past the locate point, damping is too low, if it crawls into the locate point, it needs a lower number.

### 3-3 Slave servo adjusting and servo characteristic learning

The 4030 must be set to the correct slave capstan servo type setting, and then learn the results of speed control range (offset/gain) adjustments, in order to correctly sync. Refer to the following for correct adjustment. (Refer to Chapter 4 for details on 'Initial setting mode (2nd mode)' mentioned in above explanations.)

#### Before switch on of power:

Check each piece of equipment for correct interconnections, complete the DIP switch (1 ~ 5) setting, and set selector (22) to FREQ (frequency control) or VOLT (voltage control) to match the slave capstan servo system.

REF: For Fostex recorders, set to -

A series (Models 80, 20), B-16, 460 ..... VOLT

E series (E-2/22/8/16), B-16D ..... FREQ

For other brand recorders (VTR), refer to Users Manual of each recorder or read our interface manual.

#### Preparation:

To set up slave, record a tape with correct speed time code (about 10 minutes).

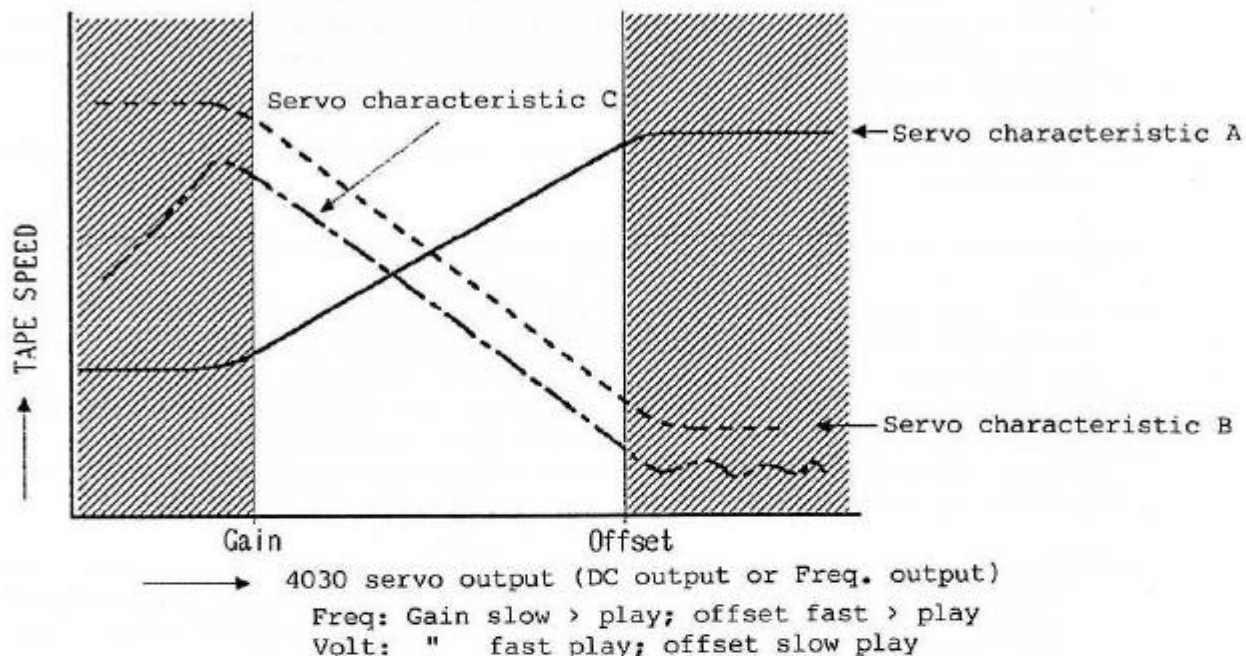
Immediately after switching power to the 4030, play the slave for a few seconds to read in the time code and allow it to learn the tach pulse rate (let it run 3 ~ 5 seconds until the time code indicator (2)(31) changes from blink to a constant light).

CAUTION: If the Fostex 460 (4 track cassette) is to be the slave, set to the 460 mode in the initial setup mode (2nd mode) before making the servo adjustment. (Refer to 4-4-8 for procedure.)

#### Method of adjusting:

The characteristics of the slave will be as shown in graph 1 below depending on type of servo. Adjust the servo offset and gain so that tape speed range is between 1/2 times and 2 times normal play speed. And, at the same time, not enter the unstable area indicated by the slanted lines (The suitable "Fast play"/slow play percentage area will differ according to the specific equipment).

Graph 1: 4030 servo output and tape speed



- As the relationship between the servo DC output and tape speed for the Fostex Models 20, 80 and B-16 will be servo characteristic C, set offset to 0.5 times ~ 0.7 times normal speed, and gain on B-16 to about 1.4 ~ 2.0 times in the range where it stabilizes. Model 20 and Model 80 will adjust offset to about 1.4 ~ 1.55 times.
- As the relationship between servo FM output and tape speed will be servo characteristic A for the Fostex B-16D and E series (E-16/8/2/22), set offset at about 1.6 ~ 2.0 times normal tape speed and gain about 0.5 ~ 0.7 times in the range where it stabilizes.
- In the case of other brand recorders, the approximate characteristic will be A for FM servo and characteristic B or C for DC servo. In some cases, the maximum control range is very narrow. For details, refer to the manual for each interface.

1. Put the slave in the play mode and set OFFSET (#8) of DIP switch (25) to the down (ON) position.
2. Slowly rotate the offset trimmer (23), find the point where tape speed changes, and adjust so that it stabilizes at the proper speed (refer to graph 1) by referring to the speed indicator (21) (or the 2nd mode speed indicator) and the sound on a separate track.

REF: In the initial setting mode (2nd mode), offset and gain can be adjusted while actually watching the tape speed change in numerical figures. Refer to P. 26 and 4-4-1.

3. Return #8 of DIP switch (25) to its original up position (OFF), and GAIN (#7) to the down position (on).
4. Slowly rotate gain trimmer (24) to change tape speed and find the point where it reaches the offset speed. Then, from that point, find the point where it reaches the proper speed (refer to graph 1) by referring to the speed indicator (21) (or 2nd mode speed indication) or sound on a separate track.

REF: Adjust carefully as gain adjusting is more critical compared to offset adjusting.

5. Return #7 to original up position (OFF) of DIP switch (25).
6. Press the front panel or 4035 lock enable buttons (4) or (36)(If it is in the 2nd mode on 4035, return it to the normal mode first by pressing the clear key (50)). As the indicator will blink to indicate that it is learning the servo characteristic, let the slave run (its speed will change automatically) until the indicator changes to continuous light (after about one minute). The 4035 will become confused if you run out of code in the learn period.

NOTE: As the 4035 display will indicate calibration error, as shown below, when learning is not correct, recheck the servo type, and readjust by narrowing offset/gain of the servo. If you run out of code, flip on the off 7 or 8, go to the top of code and relearn.











CAL Error



\* Meaning of the speed indicator and speed indication in the 2nd mode

Tape speed at offset/gain adjusting can be observed on the 4030 speed indicator or speed indication in the 2nd mode of the 4035.

NOTE: Refer to 4-4-1 for details on the 2nd mode.

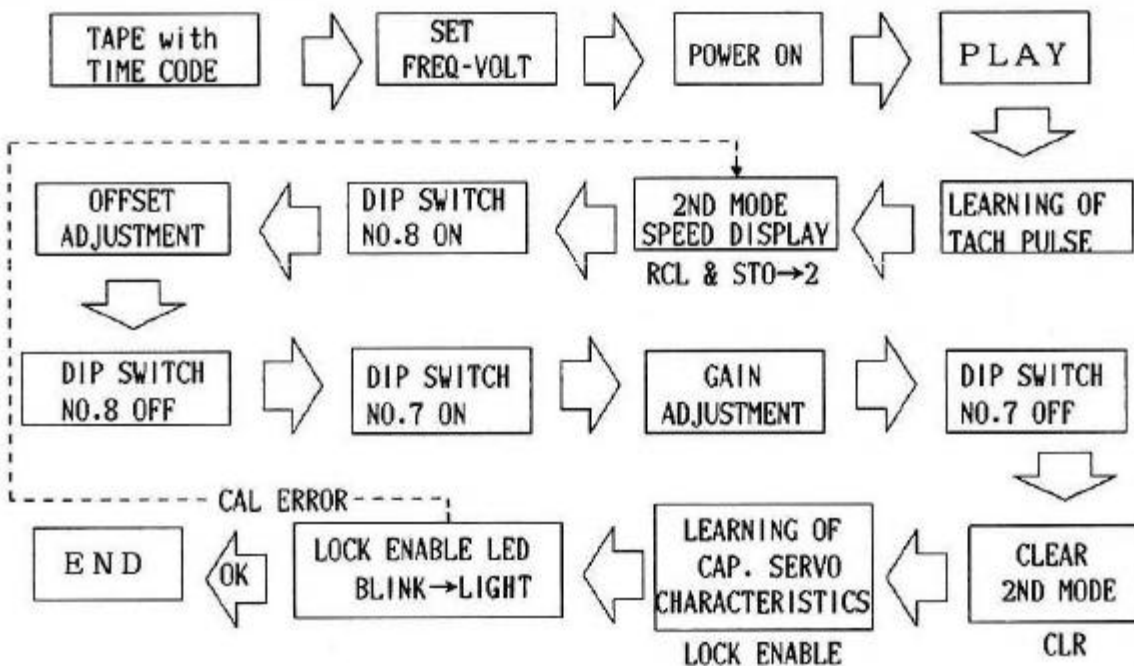
TAPE SPEED	TAPE SPEED INDICATOR		2nd MODE * DISPLAY
	HIGH	LOW	
↑	BLINK 		↑
× 2			2.00
NORMAL SPEED (× 1)	LIGHT 	LIGHT 	1.00
× 0.5			0.50
↓		BLINK 	↓

\* 2nd MODE TAPE SPEED DISPLAY

KEY **RCL** & **STO** → **2** → **READER DISPLAY** ● SLAVE1~3

DISPLAY 2nd → 1.00 → 1.50 (EXAMPLE)

※FLOW CHART OF CAPSTAN SERVO ADJUSTMENT



#### 4. 2nd MODE

##### 4-1 What is 2nd mode?

2nd mode is 2nd function mode to be used at initial setup and will be used to access certain functions depending on the application condition. When using the 4035, changes in various parameters can be confirmed on the display (the same settings can also be done with only the 4030).

The 2nd mode is entered from the normal mode by pressing STO while holding down the 4035 RCL button. When the 2nd mode is entered, the display will change as follows:

**2 n d**

From this condition, the various parameters will be shown on the display as the keys and buttons are pressed. For explanations on each function, refer to each subject in the following.

To return to the normal mode from the 2nd mode, press the CLR key.

A second 2nd mode function cannot be entered directly. Go to CIR, then RCL/STORE. In other words, one 2nd mode function at a time.

NOTE 1: The 2nd mode cannot be entered from other than the normal mode (not edit mode or remote mode).

NOTE 2: In the 2nd mode, operations other than specific operations and CLR, will not be accepted by the tape transport.

\* The various functions in the 2nd mode can be seen at a glance when the overlay sheet, included with the 4035 unit, is placed over the 4035 control buttons.

##### 4-2 Memory initialized condition

The various parameters of the 4030 2nd mode are set to the initial values at shipping out from the assembly plant. This will be called the memory initialized condition in this manual.

When you begin to setup the 4030, it's a good idea to re-initialize the various parameters by returning the memory to an initialized condition. This can be done by switching on the power while pressing the 4030 CLR button (all the settings will be initialized).

#### 4-3 List of 2nd mode functions

Upon entering the 2nd mode by the method in 4-1 (RCL & STO), you can enter the various functions by pressing the keys and buttons listed below and the display will be as shown in the following.

##### 4-3-1 When using the 4035

		(.) --- light, (*) --- blink		
4035 key	Meaning	Reader	Display	Setting method
[2]	Tape speed display	M/S	2. 1.00	-
[3]	Locate damping	M/S	LdP 4. r *	[0 ~ 9] + [STO]
[4]	Tach pulse relearning	M/S	TRC LEARN *	[STO]
[5]	Direction mode	M/S	dir 0. *	[0],[1] + [STO]
[6]	Midnight mode		mid 0. *	[0],[1] + [STO]
[7] + [0]	Slave weight mode		Wgt 0. *	[0],[1] + [STO]
[7] + [1]	Servo relearning		SRP LEARN *	[STO]
[TRIM]	Machine mode	M/S	MCn nor nAL	[+] + [STO]
[FRAME LOCK]	Frame display/set	M/S	FRn 30nd *	[+] + ([STO])
[AUTO LOCK]	Code only master		Co n 0. *	[0],[1] + [STO]
[SYNC LOCK]	Code mode		Co d 0. *	[0],[1] + [STO]
[AUTO PLAY]	Play to park	M/S	PPr 05EC. *	[0 ~ 9] + [STO]
[AUTO REC]	Offset recording		oFr 0. *	[0],[1] + [STO]
[CHASE ENABLE]	Slave park point		+CPP 0. *	±[0 ~ 9][STO]
[LOCK ENABLE]	Lock damping		LdP 0. *	[0 ~ 9] + [STO]
[LOCATE]	Damping range	M/S	d n P 2. *	[1 ~ 3] + [STO]
[CLR]	Return to normal mode			

##### 4-3-2 Setup by 4030 only

4030 button to be pressed for setting	Setting method	Function to be set	DAMPING SWITCH	MASTER SLAVE
[RETARD]	[STORE]	Tach pulse relearning		M & S
[CHASE ENABLE]	Power ON	Direction mode	0, 1	M & S
[STORE][CLEAR]	"	Midnight mode	2, 3	M
[ADVANCE]	[CHASE EN]	Set of slave weight mode		
[RETARD]	"	Clear		
[RETARD]	[LOCK EN]	Servo relearning		
[STORE][OFFSET MOD]	Power ON	Machine mode	0, 1	M & S
[LOCK EN][CHASE EN]	"	Set of frame mode	0,1,2,3	M
[OFFSET MOD][ADVANCE]	"	Set of code only master		
[ " ] [RETARD]	"	Clear		
[OFFSET MODIFY]	"	Code mode	0, 1	M
[RETARD]	"	Play to park	0 ~ 9	M & S
[CHASE EN][ADVANCE]	"	Slave park point(+)	0 ~ 9	S
[ " ] [RETARD]	"	" (-)	0 ~ 9	"
[LOCK ENABLE]	"	Lock damping	0 ~ 9	"
[STORE]	"	Damping range	1,2,3	M & S
[CLEAR]	Power ON	Memory initialize		
[ADVANCE]	"	Software ver. display (4035 display)		

#### 4-4 Details on the 2nd mode function

Meaning and application of each 2nd mode function listed in 4-3 are explained in the following.

2nd mode functions can be set with only the 4030 by powering up the 4030 while holding down certain combinations of front panel buttons and setting rear panel damping control arrangements to a corresponding range setting. A 4035 makes all of the 2nd mode functions considerably easier.

##### 4-4-1 Tape speed indication

In the 2nd mode, multiplication factor of the input time code speed against standard speed can be displayed. Using this, tape speed can be calculated in actual figures. This function is used mainly at adjusting offset and gain of the slave servo.

##### Method of display

First, be sure the reader display is reading slave and the appropriate slave transport has been selected.

- 1) Enter the 2nd mode.
- 2) Press 2 of the ten digit keypad.

The present tape speed (how many times against standard speed is the input time code speed) will be shown on the display as shown below.

Example:            2.        1. 00 (Changes according to tape speed)

The display will flicker or not be shown at all if there is an error in reading the time code.

##### 4-4-2 Setting of locate damping

Locate damping can be set by the 4035. This operation will have priority over 4030 rear panel damping switch. In the memory initialized condition, the rear panel switch setting will be effective.

##### Method of setting

- 1) Enter the 2nd mode.
- 2) Press 3 of the ten digit keypad as shown below.

LdP 4. r        #

The r after the number indicates that the rear panel switch is effective. The number directly indicates the switch position. When this r is not shown, the number displayed is the damping factor.

- 3) When any number (0 ~ 9) on the ten digit keypad is pressed, that number will be shown on the right end of the display. Then, if STO is pressed, that number will be the new damping factor and will be displayed as shown below:

                  LdP 4. r        #  
[STO]            LdP 1.

- \* Pressing [.] (period), then [STO] and it will return to the switch effective state.
- \* Above setting will be held even though power is switched off.

#### 4-4-3 Relearning of relationship between tach pulse and time code

After switch on of power, initial learning of the tach pulse and time code rate can be controlled from the 4035/4030.

##### A. Method in using the 4035

- 1) Enter the 2nd mode.
- 2) Press 4 of the ten digit keypad. Display will then be as follows:

TAC LEARN.

- 3) The master or slave whichever is to be relearned is selected and shown on the reader display.
- 4) When STO is pressed, whichever is selected at above 3) will enter the relearning mode, and as the time code indicator will blink, put the corresponding equipment in the play mode. The indicator will change to steady light on finishing "learn" (normally requires 3 ~ 5 seconds).

##### B. Method using 4030 only

As the master and slave will both be in the unlearned state in regards to the tach pulse when STORE is pressed while pressing RETARD. Then play-back the time code tape and let them relearn the tach pulse (the time code LED will blink during "learn" and change to steady light on finishing "learn").

#### 4-4-4 Setting of the "direction signal disregarding" mode

If this direction signal disregarding mode is set when controlling the SONY VO series, BVU series and BVW series by the 4030/4035 system, there will be no error between the 4035 display and the actual tape position.

In the "direction signal disregarding" mode, detection of the tape travel direction will be not by the tach pulse direction signal but by the present or immediately before tally (PLAY, F.F, or REW, etc.) signal.

##### A. Setting method using the 4035

- 1) Enter the 2nd mode.
- 2) Press 5 on the keypad. The display will change to the following.

d r 0.            \*

- 3) 0 represents the normal mode using the direction signal and 1 the direction signal disregarding mode. When 0 or 1 on the keypad is pressed while in the above state, this number will be shown on the right end of the display.

d r 0.            1.

- 4) Press STO and it will be set in the mode corresponding to the number selected in above 3).

d r 1.

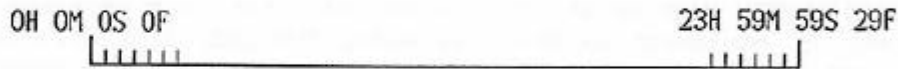
B. Setting by the 4030 only

- 1) With power switched off, set the 4030 rear panel master and slave damping switch to 0 for the normal mode and 1 for the direction signal disregarding mode.
- 2) Switch on power while pressing CHASE ENABLE. This sets the direction mode of both the master and slave.
- 3) Return the master and slave damping switches to their correct positions.

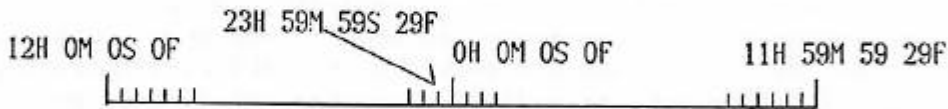
- \* These settings will be held even if the power is switched off.
- \* It will be set at the normal mode (0) in the memory initialized state.
- \* If the 460 mode is selected by the machine mode (refer to 4-4-8), it will be set automatically to the direction signal disregarding mode.

4-4-5 Midnight mode

In the memory initialized state, the time code normally must be processed within the same date as shown below.



Consequently, a continuous time code crossing over zero hour (23H58M, 59M, 00H00M, 01M ..... ) cannot be handled. Therefore, a mode which allows processing a recorded time code that counts across the date line is available as shown below. This is called the "midnight mode."



In this mode, if the time code that is read is between 12H00M00F and 23H59M29F, it is determined to be before zero hour (yesterday). In addition, if the memory content or the edit mode display content is used for "time", if it is after 12H, it will be handled as "yesterday." This setting will be related to all operations of zone limit, auto return, auto rec, locate, chase locate, etc.

For example, in normal mode, if a tape stopped at 1H is made to locate toward 23H, it will enter fast forward toward 23H of "today" but in the midnight mode, it will rewind toward 23H of "yesterday."

A. Setting using the 4035

- 1) Enter the 2nd mode.
- 2) Press 6 on the keypad. The display will change to the following.

0070. \*

- 3) 0 represents the normal mode and 1 the midnight mode. When 0 or 1 on the keypad is pressed while in the above state, this number will be shown on the right end of the display.

0070. 1\*

- 4) Press the STO key and it will be set to the mode corresponding to the number selected in above 3).

0071.

B. Setting by the 4030 only

- 1) With power to the 4030 switched off, set the master damping switch as follows.

Normal mode	2
Midnight mode	3

- 2) Switch on power to the 4030 while simultaneously pressing STORE and CLEAR. This completes the setting procedure.
- 3) Return the master and slave damping switches to their correct positions.

\* These settings will be held even if the power is switched off.

4-4-6 Slave wait mode

In this mode, if the slave is at a position ahead of the master, the slave will remain stopped to wait for the master to catch up when the chase mode is entered. In other words, this is a mode which "does not chase in the rewind direction." It will be in the normal mode when the memory is initialized.

A. Setting method using the 4035

- 1) Enter the 2nd mode.
- 2) Press the keypad 7, then 0, in this order. The display will show the following:

07L0. \*

3) "0" represents the normal mode and 1 the slave wait mode. When 0 or 1 is pressed, this number will be shown at the right end of the display. When STO is pressed while in this condition, it will enter the mode corresponding to this number.

```

      87L 0.      1.
S T O 87L 1.

```

B. Setting by the 4030 only

With power switched on to the 4030, press CHASE ENABLE, while pressing ADVANCE to set to the slave wait mode, or while pressing RETARD to cancel the slave wait mode.

\* These settings will be held even if power is switched off.

4-4-7 Relearning the capstan servo characteristics

Learning of the capstan servo characteristics conducted after adjusting the servo offset gain can be conducted from the 4035/4030.

A. Method using the 4035

- 1) Enter the 2nd mode.
- 2) Press keypad 7, then 1, in this order. The display will be as follows.

```

CAP LEARN *

```

3) Press STO and the slave will be in the unlearned state of the capstan servo control, and in the lock enable state, the lock enable indicator will blink.

B. Method using the 4030 only

With power switched on to the 4030, pressing LOCK ENABLE while pressing RETARD will put it in the capstan servo control unlearned state.

4-4-8 Setting the machine mode (For Fostex Model 460)

The cassette type multitracker Model 460 generates tach pulses by the reel rotation. There is a 460 mode to comply with this tach pulse. As it will be in the normal mode at the memory initialized state, always set to this mode when the 460 is used for the master or slave (For details at using the 460, refer to 7-2).

In this mode, damping will be automatically set to 0.

A. Method using the 4035

- 1) Enter the 2nd mode.
- 2) Press TRIM. Of the master or slave, the machine mode (NORMAL or 460) presently selected by the READER DISPLAY will be shown on the display.

```

  ã[ã norãRL
or, ã[ã      460

```



- 3) "NORMAL" and "460" will be alternately shown on the display each time "+" is pressed and the dot at the right end of the display will blink.
- 4) When STO is pressed, the machine mode on display at that moment will be set for the master or display whichever is selected on the READER DISPLAY and the blinking dot at the right end of the display will be extinguished.

B. Method of setting by 4030 only

- 1) With power switched off, set the 4030 rear panel master and slave damping switches, respectively, to 0 for the normal mode, and 1 for the 460 mode.
- 2) Switch on power while simultaneously pressing STORE and OFFSET MODIFY of the 4030. This sets the machine mode of the master and slave.
- 3) Return the master and slave damping switches to their correct state.

4-4-9 Display/setting of the frame number

The number of frames of the input time code can be shown on the 4035 display. It can be set to a particular number of frames, and conveniently entered.

A. Display/setting by the 4035

- 1) Enter the 2nd mode.
- 2) When FRAME LOCK is pressed, the present frame number of the master or slave, whichever is selected on the READER DISPLAY, will be put on the display.

```

Frñ   24   . ↓
       25   . ↓
       drop. ↓
       30nd. ↓

```

The dot on the right end of the display will start blinking when the (+) key is pressed and the display will change in the above top to bottom order each time the (+) key is pressed. When STO is pressed in this condition, frame number of the master or slave (whichever is presently selected) will be set. However, if a time code of different frame number is input, the display will change to input signal frame count. If the reference input to the master is other than time codes, the display will be for the set frame mode.

B. Setting by the 4030 only

- 1) With power switched off, set the master damping switch to the number (0 for 30, 1 for DROP, 2 for 24, 3 for 25) corresponding to the frame number to be set.

- 2) Switch on power to the 4030 while pressing LOCK ENABLE and CHASE ENABLE. This sets the master frame number.
- 3) Return the damping switch to its original position.

\* The frame number thus set will be held even if the power is switched off.

4-4-10 Code only master

In the memory initialized state, the 4030 will read the time code only when the transport play tally signal goes to TRUE. Therefore, if time code only is to be input without making any connections to the master transport, it must be set to the code only master mode by the following procedures.

A. Method using the 4035

- 1) Enter the 2nd mode.
- 2) Press AUTO LOCK. The display will change to the following.

[ 0 0 . \* ]

- 3) 0 represents normal mode, and 1, the code only master mode. When 0 or 1 on the keypad is pressed while in the above state, this number will be shown on the right end of the display.

[ 0 0 . 1 ]

- 4) The mode corresponding to the number selected in above 3) will be set by pressing STO.

[ 0 0 . 1 ]

B. Setting by 4030 only

The normal mode will be set by simultaneously pressing OFFSET MODIFY and RETARD, then switching on power; or the code only master mode by simultaneously pressing OFFSET MODIFY and ADVANCE, then switching on power.

- \* This setting will be held even if power is switched off.
- \* If the SMPTE/EBU codes only are to be used for the master input in the code only master mode, set CODE MODE = 1 (Refer to 4-4-11).

4-4-11 Code mode

Setting as to whether time code only is to be used for the master input signal, or that the reference signal should be automatically switched when a video/pulse signal is input, must be made.

In the memory initialized state, the code mode will be "0".

If the input signal is to be time code only as setup in 4-4-10 to the code only mode, the code mode must always be set to "1".

Code mode = 0 : Automatic switching to SMPTE/EBU code or video/pulse.  
Code mode = 1 : SMPTE/EBU code only.

A. Method using 4035

- 1) Enter the 2nd mode.
- 2) Press sync lock. The display will change to the following.

Code 0. \*

- 3) When 0 or 1 on the keypad is pressed while in the above state, that number will be shown at right end of the display.

Code 0. 1\*

- 4) The mode corresponding to the number selected in above 3) will be set by pressing STO.

Code 1.

B. Setting using 4030 only

- 1) With power to the 4030 switch off, set the master damping switch to the desired code mode (0 or 1).
- 2) Switch on power to the 4030 while pressing the 4030 OFFSET MODIFY. This completes the setting procedure.
- 3) Return the master and slave damping switches to their original positions.

\* These settings will be held even if power is switched off.

4-4-12 Play to park function

Play to park is the function of first, locating to a point in front of the locate PARK point, then, reading the time code in the play mode and accurately stopping at the locate PARK point. How many seconds prior to the objective point should it locate can be set by the following procedure.

The play to park number of seconds will be zero in the memory initialized state.

Typically, this is useful for VTR transports where there is a lace up error from REWIND to PLAY.

A. Method using the 4035

- 1) Enter the 2nd mode.
- 2) Press AUTO PLAY. The display will change to the following. The display will indicate the master or slave condition whichever is selected on the READER DISPLAY.

PP, 0SEC. \*

- 3) When 0 ~ 9 on the keypad is pressed while in the above condition, that number will be shown at right end of the display.

PP, 0SEC. 3\*

- 4) It will be set to the play to park number of seconds entered in above 3) for the master or slave, whichever is on the display, by pressing STO.

PP, 35EC.

B. Method using 4030 only

- 1) With power to the 4030 switch off, set the master or slave damping switch to the desired number of seconds.
- 2) Switch power to the 4030 while pressing RETARD on the 4030. This completes the setting procedure.
- 3) Return the master and slave damping switches to their original positions.

\* This setting will be held even if power is switched off.

4-4-13 Auto REC with offset

Auto REC is possible with offset applied to the slave. The in-point and out-point for auto REC are respectively set in cue memories 8 and 9 but in the auto REC mode with offset, the actual in/out points will be as follows:

Master : 8 and 9

Slave : 8 + offset memory and 9 + offset memory

Auto REC in the locked state of the master and slave is possible by this mode even though offset is set.

Method of setting

- 1) Enter the 2nd mode.
- 2) Press AUTO REC. The display will change to the following.

aFr 0.

- 3) "0" represents the normal mode, and 1, the mode with offset. When the keypad 0 or 1 is pressed in the above state, that number will be shown at right end of the display.

aFr 0. 1

- 4) The mode corresponding to the number selected in above 3) will be set by pressing STO.

aFr 1.

#### 4-4-14 Setting the slave park point

When the master is stopped, the position where the slave is to stop in the chase mode is called the slave park point which is "0" (slave park point = master park point) in the memory initialized state. In the 2nd mode, this value can be set within a range of  $\pm 3$  seconds.

Setting of slave park point in other than zero is important when play and stop of the slave are automatically controlled according to the condition of the master. For instance, the 4030 issues a play command to the slave after it begins to read the master code. When the master is put in play, it will be slightly later before the slave starts reading the time code. At that moment, the master will have already traveled some ways in front of the slave and as a result lock up time will be extended. Having the slave wait in front of the master solves this problem.

At start up, the difference (if offset memory = 0, the value indicated by OFFSET on the 4035 reader display) at the servo control starting point (when both master and slave code LED's are lit) can be made as small as possible by using the slave park offset. For example, if the difference is -1 second, the slave park point should be at the +1 second position.

The slave park point is expressed by the (+) (-) symbols and numbers 0 ~ 9. As one step is about 1/3 second, the number corresponding to +1 second is +3. +0 and -0 have the same meaning.

##### A. Setting using the 4035

- 1) Enter the 2nd mode.
- 2) Press CHASE ENABLE. The display will change to the following.

+ [ P P 0 .      \*

- 3) When (+) or (-) is pressed in this state, this symbol will be shown at the right end of the display, and when 0 ~ 9 on the keypad is pressed, that number will be shown at the right end of the display.

- [ P P 0 .      3\*

- 4) It will be set to the slave park point number of seconds corresponding to the number selected in above 3) when STO is pressed.

- [ P P 3 .

##### B. Setting using the 4030 only

- 1) With power to the 4030 switched off, set the master and slave damping switch to the number to which it is to be set.
- 2) Switch on power to the 4030 while pressing CHASE ENABLE and ADVANCE when the symbol is (+), or CHASE ENABLE and RETARD when the symbol is (-). This completes the setting.
- 3) Return the master and slave damping switches to their correct setting.

\* These settings will be held even if power is switched off.

#### 4-4-15 Setting the damping factor for the lock mode

Among recorders of other brands, there are some which are slow in responding to the 4030 servo output. For this reason, a provision is made to allow setting the damping factor for the capstan lock mode. Damping is expressed in numbers 0 ~ 9. A small number for faster responding capstans, a higher number for slower responding capstans. Lock damping will be 0 in the memory initialized state (it need not be changed for Fostex recorders). In the same way as for locate, the smallest possible value at which it will not overshoot at lock mode is the optimum damping value for that recorder.

##### A. Method of setting using the 4035

- 1) Enter the 2nd mode.
- 2) Press LOCK ENABLE. The display will change to the following.

LOCK 0.

- 3) The number on display is the present lock damping value. If it must be changed, press 0 ~ 9 on the keypad and that number will be shown at right end of the display.

LOCK 5.

- 4) The value selected at 3), above, will be the new lock damping value when STO is pressed.

LOCK 5.

##### B. Method of setting using the 4030 only

- 1) With power to the 4030 switched off, set the slave damping switch to the desired lock damping value.
- 2) Switch on power to the 4030 while pressing LOCK ENABLE. This completes the setting procedure.
- 3) Return the slave damping switch to its correct position.

\* This setting will be held even if power is switched off.

#### 4-4-16 Damping range

Chase locate may not be smooth for recorders of other manufacturers by using only the 0 ~ 9 range of the 4030 rear panel damping switch. In such a case, change the damping range by referring to the table below. In the memory intialized state, the damping range will be 2 (it need not be changed with a Fostex recorder).

Range 1	Range 2	Range 3
0	0	0
1	1	1
5	5	5
9	9	9

When the damping switch is at 0, pre-braking during locate will not be done in any range. When the damping switch is set 1 ~ 9, range 3 will present the highest damping. However, there is a slight overlapping between damping ranges as shown in the above table.

#### A. Method of setting using the 4035

- 1) Enter the 2nd mode.
- 2) Press LOCATE. The display will change to the following.

dāP 2. \*

- 3) The value displayed shows the damping range for the master or slave whichever is presently selected by the reader display. If it must be changed, press 1 ~ 3 on the keypad and that value will be shown on the right end of the display.

dāP 2. 3\*

- 4) The value selected at 3), above, will be the new damping range when STO is pressed.

dāP 3.

#### B. Method of setting using 4030 only

- 1) With power to the 4030 switched off, set the master and slave damping switches to the desired damping range (1 ~ 3).
- 2) Switch on power to the 4030 while pressing STORE. This completes the setting procedure.
- 3) Return the slave damping switch to its correct setting.

\* This setting will be held even if power is switched off.

## 5. OPERATING THE 4030

Normal operation becomes possible when various connections, setting and servo adjustments up to the previous section, are completed. In this section, fundamental operation on using the 4030 only as a chase synchronizer, will be explained.

### 1. (Tach pulse learning)

After switch on of power, first, run the master and slave for several seconds in the play mode. Use a program that has been stripped with time code and input the time code. Through this operation, the 4030 learns the tach (CTL) pulse and time code rate and thus has accurate knowledge of tape position at all times. (Time code indicator will change from blinking to a constant light when tach has been learned).

NOTE: When setting to code only master, the master time code indicator will not blink but go directly to constant lighting.

### 2. (Lock enable)

The speed of the slave capstan servo will be controlled when the lock enable button (4) is pressed and the slave is in the play mode. If the slave is ahead of the master position, it will run slower than normal speed and if behind, go faster. When the master and slave simultaneously enter play and the master and slave positions are close to each other, sync will be achieved in a few seconds and the lock indicator (3) will be lit.

### 3. (Chase enable)

When the master and slave are far apart, it will take too much time to catch up by only the play mode. So, if the chase enable button (5) is pressed, the slave will immediately FF or REW toward the master position, then automatically enter the sync play mode and runs to fast or to slow until it achieves sync and locks to the master.

In chase lock, the slave will follow changes in the master function. For example, if the master is put in FF, the slave will also enter FF. This mode is most frequently used in normal chase synchronizer application.

To cancel the chase mode, the chase enable button (5) or lock enable button (4) is pressed. When chase mode is cancelled by pressing the lock enable button, the lock enable mode will also be cancelled.

NOTE: If it takes too long to lock, or lock is easily disengaged, or drifts across the lock point such as in older or unstable recorders, change the lock damping (refer to 4-4-14) in the 2nd mode.

### 4. (Offset modify)

Follow the procedures below if offset must be applied to the slave.

A: When the master and slave are running in sync, the offset memory value can be changed by pressing RETARD (9) or ADVANCE (8) after pressing the OFFSET MODIFY button. When RETARD/ADVANCE is pressed once, it will change by  $\pm 1/100$  frames, and the offset indicator (6) will flash. It



will change continuously if it is held down and the offset indicator will flash quickly. If an offset value other than 0 is stored, the offset indicator will remain lit.

B: While in the above A state, the offset memory value can be changed in one frame increments if the RETARD (9) or ADVANCE (8) button is pressed when the OFFSET MODIFY button is ON.

C: While the master and slave are stopped or running independently, pressing the OFFSET MODIFY button (7), then the STO button, the displayed offset will be registered in the offset memory and offset indicator (6) will be lit.

If the offset memory is to be returned to 0, press OFFSET MODIFY, then the CLR button. Slave will immediately correct its offset to 0.

## 6. OPERATING THE 4035

In this section, the locate function, memory function, calculating function and auto function using the 4035 will be explained (Please complete all connections and servo adjusting by referring to sections 2 and 3 before proceeding further.).

The numerous functions of the 4030 can be shown by connecting the Model 4035 Synchronizer Controller to the Model 4030 Synchronizer.

\* Immediately after switch on power, always play the master and slave for several seconds to read the time code from the program tapes while learning the tach pulse rate (until time code indicators (30) and (31) change from blinking to a constant light.

### 6-1 Transport control functions

The transport selected (indicator will light) by the deck control selector (35), can be remote controlled from the 4035. Select indicators SLAVE 2 or 3 will not light unless the 8710 expansion interface and additional 4030's for each slave are connected.

Both master and slave 1 transports can be controlled and both indicators will be lit when the MASTER and SLAVE 1 are simultaneously pressed.

If the CHASE ENABLE button is on, it will take priority and the slave cannot be controlled independently.

In addition to transport control, these selectors choose which transport will be effected for setting the various modes and auto function memories.

(Example 1) To play the master

[MASTER] → [PLAY (▶)]

(Example 2) To simultaneously FF the master and slave 1

[MASTER] & [SLAVE 1] → [FF (▶▶)]

(Example 3) To set slave 1 in REC mode

[SLAVE 1] → [REC MODE]

\* If that transport is already selected, you need not press it again.

6-2 Basic operation to lockup machines (Assuming all first time adjustments have previously been made)

Basic operation from power switch on up to locking using the 4035 will be explained. It is assumed you have already completed setting of the 4030 DIP switches.

Also, it is assumed time code and sound is already recorded on the master and slave, time code offset is at 0, the interface is connected to the master, and the system is controllable from the 4035.

1. Switch on power, simultaneously press MASTER and SLAVE 1 on the transport selector (35) to light both indicators.
2. The master and slave will start at the same time when PLAY is pressed. Let it play for several seconds until the time code indicator changes from blinking to a constant light indicating the tach (CTL) pulse has been learned. Also, use the READER DISPLAY to check if the time code numbers are correctly read, respectively, from the master and slave.
3. Press LOCK ENABLE after making sure the SLAVE 1 indicator is lit. Then, SLAVE 1 in the lock enable indicator (29) will be lit. In this state, when the master and slave are entered in play, the slave speed will change in the direction required to approach the master offset to 0. Press READER DISPLAY, to put OFFSET on the display, and check that the numbers are moving toward 0.
4. Press CHASE ENABLE. Indicator will be lit, it will immediately enter FF/REW if offset is more than offset window, then locate to within offs window, and automatically enter the play mode to achieve locking. When it enters lock, the offset will be 00.00.00.00.0 and the "locked" indicator(32) will be lit. When auto lock mode is chosen (61), the 4030 will be in frame lock until it locks, then change to sync lock several seconds after entering lock, and the respective indicators, (60 and 62) will be lit.
5. The SLAVE 1 and CHASE ENABLE indicators will go off on the 4035 when MASTER transport control is selected but the slave will remain in the lock enable mode. The slave will always follow the master when the master transport is controlled in any mode.

NOTE: If the slave will not lock, it overshoots, takes too long to lock, or drifts in and out of lock (Also, check frame type of both master and slave.), reset the lock damping in the 2nd mode, refer to 4-4-14.

After confirming the above basic operations, proceed to explanations of the following items.

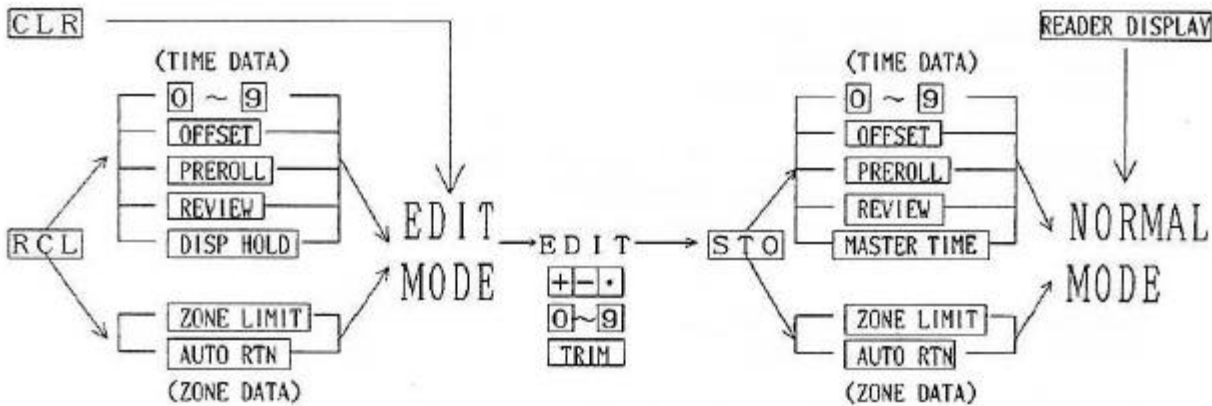
## 6-3 Editing and storing of data

### 6-3-1 Edit mode

Various data such as cue data and offset memory can be stored in the 4030 by using the 4035's EDIT MODE.

The edit mode is entered, by pressing the 4035 CLR button. Stored data can be recalled by pressing RCL, then the desired memory key (0 ~ 9). Or when [RCL][DISP HOLD] buttons are pressed, the reader display indicator will change to EDIT. At the same time, the period will blink behind any one of the digit segments in the display. Touching the period will shift the blinking display, and the segment that can be modified.

This state will be cancelled when the edited data is stored in any memory by pressing STO, and then the desired memory location. The display will then return to the normal mode. It can also be forced to return to the normal mode by pressing READER DISPLAY. The EDIT display will be lost if you go directly to normal reader display. It will automatically return to normal mode if data is not stored within about 15 seconds.



### 6-3-2 Editing/storing of time data

The data can be edited using [+], [-], [0 ~ 9], [.] and [TRIM] by entering the edit mode. Also, the edited data can be stored by pressing STO, then the desired memory key number.

(Editing the time data)

1. Press CLR (clear). The display will be cleared to 00.00.00.00.0, enter the edit mode, and ± and period of the hour digit will blink.

[CLR] 00.00.00.00.0  
↓

2. Data can be entered in the digit segment with the blinking period behind it. Pressing the [.] will shift the period. Time data is thus entered, as shown at right, by using the keypad [0 ~ 9] and the [.] key.  
For a minus data, the ± digit is made to blink and [-] is input.  
When editing, not in the cleared state but a recalled time data, the period behind of the digit segment to be edited will blink and changes can be made from the keypad.

(Storing the time data)

3. Press STO, then the corresponding memory key to store the edited data. The corresponding memories are as follows:

Cue memory ... [0] ~ [9]  
Offset ..... [OFFSET]  
Master time .. [MASTER TIME]

The following two memories will accept 0s ~ 0s59f only due to its nature and will display an "Error" against other data.

Preroll time ... [PREROLL]  
Review time .... [REVIEW]

In addition to the above, if a time value which does not exist in reality is attempted to be stored, "Error" will be displayed in the same way. As much as you try, you cannot put 25 hours in a day or 61 seconds in a minute.

(Confirming the input time data)

4. To confirm the input data, press RCL, then the memory key to be recalled. As this state is the edit mode, data can also be edited by the above procedures from 2) and after.

Example) Input of 01.20.34.00.5

```
[1][.]  0 1. 00. 00. 00. 0
          ↓
[2][0][.] 0 1. 20. 00. 00. 0
          ↓
[3][4][.] 0 1. 20. 34. 00. 0
          ↓
[.]      0 1. 20. 34. 00. 0.
          ↓
[5]      0 1. 20. 34. 00. 5.
```

Example) Storing in cue memory 1

```
[STO]    0 1. 20. 34. 00. 5.
          ↓
[1]      Returns to normal mode
```

Example) Error display

```
00. 0 1. 30. 00. 0
          ↓
[STO] [PREROLL]
          Error

25. 00. 00. 00. 0
          ↓
[STO]
          Error
```

Example) Calling out cue memory 1

```
[RCL] [1]
      0 1. 20. 34. 00. 5
          (Edit mode)
```

(Trimming data by the TRIM button (57))

5. Instead of entering changes or slight modifications from the keypad, TRIM can be used (in the edit mode). Press TRIM, and with the indicator lit, move the period to the digit to be edited. The number in that digit segment can be increased or decreased a digit at a time by the [+] or [-] key. The numbers will change continuously when the [+]/[-] key is held down and the count will be automatically carried over/under to the next segment.

### 6-3-3 Editing/storing of zone or auto return data

In the auto functions section, zone limit and auto return are set by selecting two points at random. This allows the pair of points to remain constant and only the cue points need be changed. Also, the boundary points can be separately selected respectively for the master and slave. The method in editing the boundary data is explained next.

NOTE: Before this setting, store the desired time data into the desired cue memory by the method in 6-3-2.

(Editing the boundary data)

1. Press the CLR (clear) key. The display will be cleared to 00.00.00.00.0, enter the edit mode, and the period for the  $\pm$  and hour digit will blink.

[CLR] 00.00.00.00.0

↓

Example) Input of zone 1-2

2. The desired boundary is entered as shown at right. Press the [-] key and the display will change for zone limit or auto return entry. To later change one of the boundary points, RCL auto return or zone limit, move the blinking [.] to the cue memory to be changed and enter the new point.

[1] 00.00.00.00.0

↓

[-] 1 - 0

↓

[2] 1 - 2

↓

(Storing the boundary data)

3. Once you have the boundaries selected, press STO, then press either ZONE LIMIT or AUTO RETURN. Press STO and cue number with the earlier time which is stored will be automatically displayed. Regardless of the order of the entry for zone or auto return, the lower number of the two cue points will automatically precede the higher numbered cue point.

Example) Storing into zone limit

[STO] 1 - 2 or,

2 - 1

↓

[ZONE LIMIT]

Returns to normal mode.

(Confirming the zone data)

4. If the input data is to be confirmed, press [RCL], then [ZONE LIMIT] or [AUTO], whichever you wish to call out. As this is the edit mode, the data can be edited by the procedures from above 2) and after.

Example) Calling out zone limit section.

[RCL] [ZONE LIMIT]

1<sub>m</sub> - 2      or,  
2<sub>m</sub> - 1

(Edit mode)

#### 6-4 Locate function (Locate button (39))

Locate is the function whereby the transport automatically entering FF/REW and going to a selected cue point and stopping at that specified point. During FF/REW, the tach (CTL) is converted to time code and displayed (providing the initial tach learn on power up has been completed). To instruct the locate point, there is the direct input method and the method of recalling a cue memory.

NOTE: Set damping to the optimum value according to reel size and amount of tape (refer to 3-2).

(Locate method 1)

1. Press MASTER or SLAVE 1 (2, 3) to select the transport to be located.
2. Press the CLR (clear) key. The display will be cleared to 00.00.00.00.0, enter the edit mode and the period to shift the blinking dot past the  $\pm$  and hour digits, to the minute segment.
3. The value for locating is entered using the keypad and [.] (period) key (refer to 6-2-2 for details on input method).
4. Locate operation will start when the LOCATE key is pressed.

(Locate method 2)

1. Press MASTER or SLAVE 1 (2, 3) to select the transport to be located.
2. Press RCL and call out a cue memory.
3. Locate operation will start when the LOCATE key is pressed.

Example) Locate master to  
00.01.30.00.0

[MASTER]  
↓  
[CLR] 00.00.00.00.0  
↓  
[.] [.] 00.00.00.00.0  
↓  
[1] [.] [3] [0] 00.01.30.00.0  
↓  
[LOCATE]

Example) Locate master in cue  
memory 1 (ex: 00.01.30.00.0)

[MASTER]  
↓  
[RCL] [1]  
00.01.30.00.0  
↓  
[LOCATE]

\* As LOCATE is another memory, it is sufficient to press LOCATE only when it is to be located again to the same locate point. If it is to be located to a new locate point, it must be rewritten to this new value.

\* Locate address memory point is confirmed when LOCATE is pressed.

NOTE: The slave cannot be separately located while set in the chase mode.

#### 6-5 Review function (Review button (40))

When review is pressed, the tape will rewind for a short distance and automatically enter into play. The rewinding time can be set between 0 ~ 59s29f by the following method (it is set to 5 seconds in the memory initialized state). If review is held down, it will rewind as long as it is held down but enter play at the instant it is released.

(Change of review time)

1. Enter data 0 ~ 59s29f in the edit mode.
2. Press STO, then REVIEW and the time entered in above 1) will be set.

(Confirming the review time)

3. Press RCL, then REVIEW to confirm the review time.

Example) Change review time to 7 seconds

[CLR] 00 00.00.00.0

↓

[.] [.] [.] [7]

00.00.07.00.0

↓

[STO] [REVIEW]

Returns to normal mode.  
Or touch recorder display  
to MASTER/SLAVE/or OFFSET.

#### 6-6 Preroll function (Preroll key (55))

Preroll is the function of setting the locate point and auto return point to park in front of the actually located cue number. For example, if the preroll time is set to 5 seconds and the tape is located at one minute, it will actually locate at 55 seconds. Normally, this function is used to input the time until lockup for auto punch in/out operations.

Preroll time can be freely set within the range of 0 ~ 59s29f (it is set to 0 in the memory initialized state).

(Changing the preroll time)

1. Enter data 0 ~ 59s29f in the edit mode.
2. Press STO, then PREROLL and that time will be set.

(Confirming the preroll time)

3. To confirm the preroll time, press RCL, then PREROLL.

Example) Set preroll time to 10 seconds.

[CLR] 00.00.00.00.0



[.] [.] [.] [1] [0]

00.00.10.00.0



[STO] [PREROLL]

Returns to normal mode.  
Or touch reader display to MASTER/SLAVE/or OFFSET.

6-7 Display hold (Display hold key (53))

Data on the display can be held, edited and stored from the normal mode. For example, this is convenient at registering the cue point while monitoring the picture and sound.

1. Press READER DISPLAY and put the data to be held on the display.
2. Press RCL, then DISP HOLD (53) and data at that moment is held and the display enters the edit mode.

3. When data must be edited, store it in any one of the cue memory after editing, or if not, directly as it is.

NOTE: You can also hold the display by pressing STO (not [RCL][DISP HOLD]) but you cannot edit it. You can store it in a cue memory.

Example) Hold the master time code and register in cue memory 1.

[READER DISPLAY]

Reader (MASTER) display (running)



[RCL] [DISP HOLD]

01.20.34.23.5



[.] [.] [.] [.] [0] [0]

01.20.34.00.5



[STO] [1]

Returns to normal mode.

6-8 Offset memory

When the master and slave must be locked with a certain difference between their time codes, this difference is stored in the offset memory. Offset can be set in the following three methods using the 4035.

- (1) The reader display offset value can be directly stored.
- (2) Offset value can be input and stored using the edit mode.
- (3) Offset can be trimmed using the OFFSET TRIM button (54) and the [+]/[-] keys.

Following are the procedures for each method.

NOTE: In the drop frame mode, the offset display will be different when it locks since it will take into account the appropriate dropped frames.



6-8-1 Storing the prevailing reader display offset value into the offset memory

1. Press READER DISPLAY and put the offset value on the display.
2. Press RCL, then DISP HOLD. The display will be held and enter the edit mode.
3. Press STO, if the value need not be changed, or after editing if it must be changed, then press OFFSET and that value will be registered in the offset memory.

NOTE: You can also hold the display by pressing STO (not [RCL][DISP HOLD]) but you cannot edit the held display. Store it directly in OFFSET.

Example) Register the display offset value in the offset memory.

```
[READER DISPLAY]
(OFFSET) display
↓
[RCL] [DISP HOLD]
 00 00.40.23.0
↓
[.] [.] [.] [.] [0] [0]
 00 00.40.00.0
↓
[STO] [OFFSET]
Returns to normal mode.
```

6-8-2 Enter the offset value and store using the edit mode

1. Press CLR or [RCL][OFFSET] and enter the edit mode.
2. The desired offset value is input by the [.] and keypad.
3. Press STO, then OFFSET and that value will be registered as the new offset value.

Example) Register 1h in the offset value.

```
[CLR] 00 00.00.00.0
↓
[1] 0 1 00.00.00.0
↓
[STO] [OFFSET]
Returns to normal mode.
```

6-8-3 Trim offset using the OFFSET TRIM button (54) and the [+]/[-] keys

This method is to trim offset in 1/100 of a frame with the master and slave in the locked mode. It is convenient for lip syncing (for matching the voice with lip movement).

This is equivalent to offset modify and using ADVANCE and RETARD on the 4030.

1. Check that it is in sync travel. If quick offset change is required, set lock mode to FRAME LOCK. For on-line, undetectable change in offset, i.e. for post sync or live work, the lock mode should be left in SYNC LOCK.
2. When OFFSET TRIM is pressed, the display will change as shown at right, and the reader display OFFSET will blink. The display will be indicating, from the left, minus 1 second 23 frames, 45/100 of a frame.

Example) Offset trim

```
[OFFSET TRIM]
↓
- 0 1.23.F.45
↓
[+] or [-]
- 0 1.23.F.45
↓
↓ Increase or decrease
```

3. The OFFSET TRIM indicator will blink each time [+] or [-] is pressed and offset will increase or decrease by 1/100 frame (it will change continuously if held down).
4. While in OFFSET TRIM, if [+] or [-] is pressed while holding down one key among [1] ~ [9], the offset frame digit will increase or decrease by proportion to that number.
5. It will return to the normal mode upon pressing OFFSET TRIM.

[3] & [+] - 01.20.F.45

NOTE: Offset is entered when offset trim is turned off. It is not necessary to touch store, offset.

6-9 Auto function

The various auto functions of zone limit, auto play, auto return and auto record can be set by using the 4035.

Each function can be set for either the master or the slave, or both, and separate cue points can be used in auto return and zone limit.

Each function is explained below.

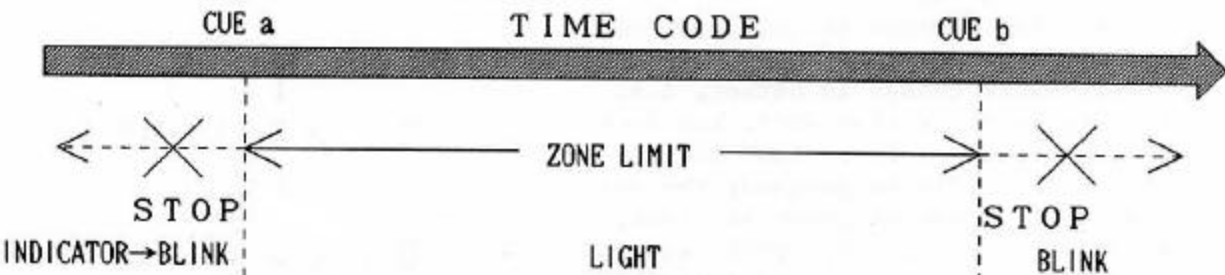
NOTE: When set to the midnight mode while in the 2nd mode, these auto mode will operate differently. Refer to 4-4-5 for details.

6-9-1 Zone limit (Zone limit button (44))

Zone limit is the function of limiting the work section between two cue points and automatically stopping the transport(s) when an attempt is made to exceed this boundary range. It is very effective, especially in open reel tapes, to prevent tape from winding off the reel.

Zone limit is set by first selecting the transport to be zoned, by the transport selector (35), and turning on the ZONE LIMIT.

When zone limit is on, the indicator will be lit while in the zone, and will blink when outside this zone. Also, if the transport tries to leave this zone, it will automatically enter the stop mode and the light will blink. You can move into the zone but not out of it.



\* Refer to 6-3-3 on method of setting the cue memory to be used for zone limit.

#### 6-9-2 Auto play (Auto play button (45))

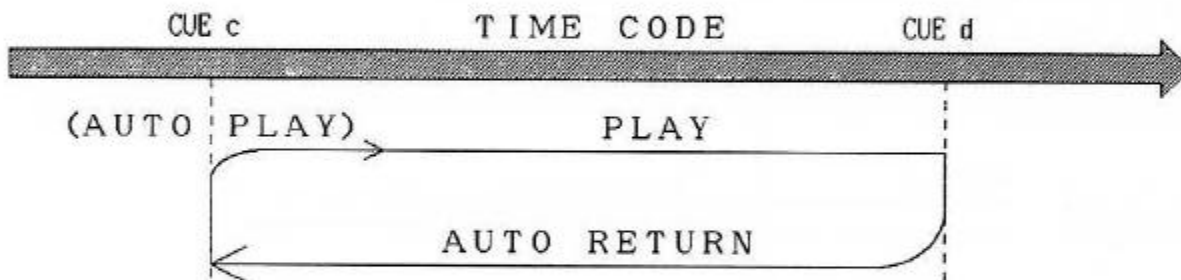
Auto play is the function of automatically entering the play mode upon arriving at the specified point by the locate or auto return functions. Shuttle repeat can be setup by combining this with auto return, explained later.

Auto play is setup by selecting the transport with the transport selector (35), then pressing AUTO PLAY. When auto play is ON, the indicator will be lit.

#### 6-9-3 Auto return (Auto return button (46))

Auto return is the function of presetting two points on the tape, playing the tape up to the end point, then automatically rewinding to the starting point as shown below. Shuttle repeat is possible by combining this with the previously mentioned auto play.

This is turned on by selecting the transport with the transport selector (35) and pressing AUTO RTN. When auto return is ON, the indicator will be lit.



\* Refer to 6-3-3 for method of setting the cue memory used for auto return.

#### 6-9-4 Auto recording (Auto REC button (47), indicators (42)(43)(48)(49))

When this function is on, the tape while in the play mode will automatically enter record (punch in) at a selected cue point, then at the end of the section to be recorded the transport will come out of record (punch out) at a second selected cue point. The rehearsal mode is to confirm the selected section before actual recording.

In auto recording, cue memory 8 (in point) and 9 (out point) are used. In other words, time data of the section to be recorded must be respectively stored before setting the auto recording function.

Also, the transport for auto recording must be selected by the transport selector (35), and the record mode enabled for that transport, then set by pressing AUTO REC.

NOTE 1: Occasionally, an ERROR will be displayed when AUTO REC is pressed. This occurs when cue memory 9 is equal or earlier in time than cue memory 8. Always store the time code so that 8 is less than 9.

NOTE 2: A record mode selector switch is provided on the Fostex interfaces for other manufacturers' recorders. When you wish to record on these transports, this switch should be set to other than the OFF

(position mode A/B). Experiment with blank tape to determine A and B differencing.

NOTE 3: The slave can be set to record with an offset. Refer to 4-4-13 for details.

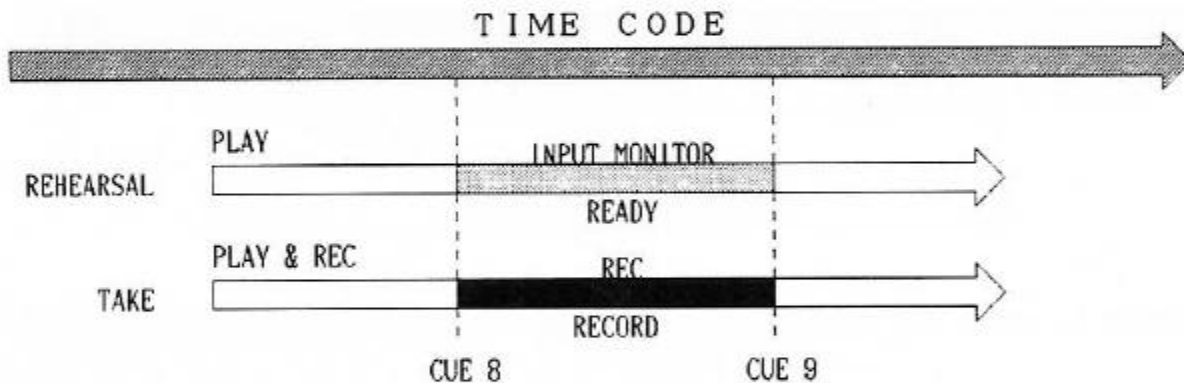
(Rehearsal mode)

The green rehearsal indicator (48) will be lit and enter the rehearsal mode when AUTO REC is pressed. Now, if the recorder is put into play prior to the punch in point, the ready indicator (42) will light at the in point and extinguished at the out point (it will not be recording).

When the Postex recorder is used, this section will change to the input monitor mode and, therefore, you can rehearse the punch-in. Prior to the in point, the transport has been in the tape monitor mode.

(Take mode)

With the rehearsal indicator (48) lit, simultaneously pressing REC and PLAY prior to the in point. This will put the recorder in the take mode and the indicator light will change from rehearsal to the red take indicator (49). It will actually enter record when cue 8 is reached and come out of record at cue 9. Be sure record mode indicator (28) is lit. The REC indicator will be red throughout the recording section.



#### 6-10 Addition and subtraction of time data

Time data can be added or subtracted using the 4035. The calculated results can be stored as the offset value or used for locate data.

(Input method)

1. The calculating mode is entered by pressing [+] or [-] when the right end (SF) digit dot is blinking in the edit mode. The display will be cleared and the data stored internally.
2. When STO is pressed after entering the next data, this data and the previously entered data will be calculated according to the [+] or [-] input at above 1), and the result displayed.
3. As the condition in above 2) is the same as pressing STO in the normal edit mode, the calculated result will be stored in that memory by pressing the desired memory key.

NOTE: When it is set to the midnight mode (Refer to 4-4-5), it will be calculated according to this example, the result of 0 hour minus 23 hour will be, -23 hour in the normal mode, and +1 hour in the midnight mode.

(Input example)

Example 1: When the master is 1H 23M 45S 12F, calculate offset so that the slave is 0H 50M 10S 20F, and store it in the offset memory.

1. Press CLR and enter the edit mode.
 

.00.00.00.00.0
2. Input the slave time data.
 

[.] [.] [5] [0] [.] [1] [0] [.] [2] [0] [.] 00.50.10.20.0
3. Confirm that the SF digit period is blinking and press [-]. The display will be cleared.
 

.00.00.00.00.0
4. Input the master time data.
 

[1] [.] [2] [3] [.] [4] [5] [.] [1] [2] 01.23.45.12.0
5. Press STO (any dot blinking will make no difference). The calculated result will be displayed.
 

-00.33.35.22.0
6. Press OFFSET. The calculated result will be stored in the offset memory and then return to the normal mode.  
A recalled data can also be calculated.

Example 2: Locating ahead of the present tape location (0H30M20S15F1SF) by the amount in cue memory 1 (0H1M30S).

1. Press [RCL] [DISP HOLD] to hold the display and enter the edit mode.
 

.00.30.20.15.1
2. Press [.] four times to shift the period blinking to the SF digit.
 

00.30.20.15.1
3. Press [+]. The display will be cleared.
 

.00.00.00.00.0
4. Press [RCL] [1] to call out cue memory 1.
 

.00.01.30.00.0
5. Press STO and the calculated result will be displayed.
 

.00.31.50.15.1
6. Press LOCATE and it will be stored as the locate data. To actually locate, press LOCATE once more.

## 7. OTHERS

### 7-1 Lock mode

The 4030/4035 has two modes of sync travel - the frame lock and sync lock. It also has an auto lock mode which can automatically switch to either lock mode depending on the tape travel condition.

This switching is accomplished by lock mode buttons (60, 61 and 62) in the 4035 and by DIP switch settings (refer to 3-1) on the 4030. Each mode is explained in the following.

#### • Frame lock

The bits expressing the time code data is read, and slave lock is applied to match this value. Until lock is achieved, synchronizer is in this mode. If there is excess wow and flutter in the time code from a VTR master, the slave will follow it.

To offset modify or offset trim, always disengage auto lock and set to frame lock mode.

#### • Sync lock

In auto lock, after synchronizer attains frame lock, it enters this mode. In this mode, it will be matching the phase of the time code sync word, the slave will be less affected by wow in the master.

When auto lock is disengaged and sync lock mode only is on, the slave will be in the so-called slow lock state and may become somewhat unstable by a drop out of the master time code but will run without being abruptly affected by this.

For sequences with Discontinuous code or offset, Switch Auto Lock off once sync lock is established.

#### • Auto lock

This mode automatically switches between the above two modes. The 4030 will be in the frame lock mode until lock is attained, but once it is locked and becomes stable, it automatically goes to sync lock. It will return to frame lock if sync is disengaged for some reason. For most work, set to this mode except during offset modify and offset trim.

### 7-2 Tach pulse learning in the 460 mode

If the Fostex Model 460 multitracker (4 track cassette MTR) is to be used, the 4030 must be set to the 460 mode at the 2nd mode (Refer to 4-4-8).

This is because the Model 460 does not generate a constant cycle (Equivalent) tach pulse (such as those operated by "real time" tach counters) but a pulse which is generated by rotation of the reel. In the case of the 460, learning of the time code and pulse rate is done in two steps as explained below.

- A. Learning of parameters determined by tape thickness (C-60 or C-90) and tape speed (9.5cm/s or 4.8cm/s) at time code recorded.
- B. Learning the relationship between cassette tape position and time code.

Immediately after switching the machine mode, a re-learning is commanded by the procedure in 4-4-3, learning will be done in order of A then B. Both stages will end after the 460 takeup side reel rotates about nine times but if there is time code error or drop out during this process, it will require further time. As usual, during learning, the time code indicator will blink.

\* The result of learning in stage A will be held in memory even though power is switched off, if learning in stage A has been completed when the power is switched on, learning will start from stage B.

If there is any status change in the time code or tape, the operation will be as follows:

- (1) If time code is not continuous  
It will become a new time code and adapt in about 2 revolutions. After this, the tape position indicated by the pulse count will be an extension of the new time code.
- (2) When the tape is replaced with the same thickness and recorded with a time code of the same speed.  
If it is allowed to rotate about 8 times in the time code playback mode, it will adapt to the new condition. However, if it is put in FF during this process, there will be a difference between the display and the actual position. If relearning must be done, either switch power off and on again or re-learn by the procedure in 4-4-3.
- (3) When present tape speed is different from the recorded time code or tape was replaced with a different thickness.  
Re-learn by the procedures in 4-4-3 as learning from stage A will be necessary.

#### 7-3 Notes on using the 1 master 3 (or 2) slave system

When controlling more than one slave using the 8710 expansion interface, consider the following points.

- (1) Press the clear key for all transports at switch on of power as shown below:

[MASTER] → [CLR], [SLAVE 1] → [CLR], [SLAVE 2] → [CLR]  
[SLAVE 3] → [CLR]

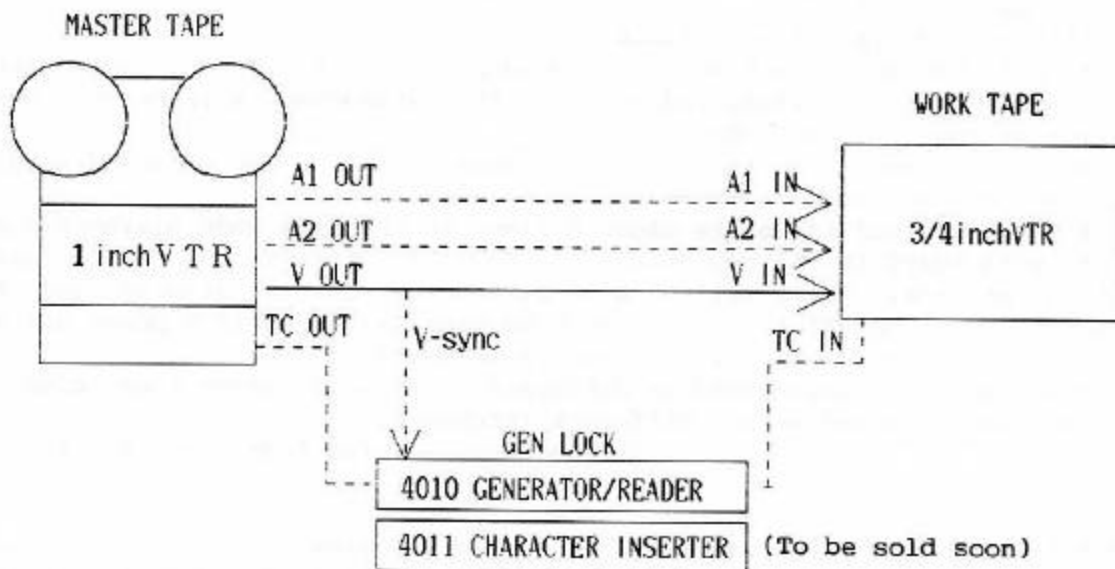
- (2) As the 4035 is simply switching the controls against the 4030 for their respective slaves, cue memories which can be used are as follows:

Master and slave 1 ..... The same cue memory  
Slave 2, slave 3 ..... The 4030 cue memory of each

#### 7-4 Time code at off line editing

Normally, the time code value of a one inch video tape which has finished on-line editing, is not necessarily sequentially continuous. Therefore, when making an off line 3/4 inch work tape for post production work, a time code for a work tape must be generated using a time code generator such as the 4010 which can apply GEN LOCK (Refer to schematic below).

To raise work efficiency, the time code value is often inserted in the picture using a character inserter. This is called a window dub.





## 7-5 TECHNICAL INFORMATION Model 4030 Transport Interface

### 7-5-1 Interconnections

Connectors provided on the 4030 are, a reference signal (time code, video and pilot signals in case of a master, and time code signal for a slave) RCA pin jack pair (One jack of the pair is 'foldback') for each master and slave, and a 20 pin flat cable connector for the control signal. Following are explanations on how these connectors are utilized.

#### 7-5-1-1 Equipments which can be connected

Fostex tape recorders provided with the synchronizer connector, listed below, can be directly connected to the 4030 using the Model 8540 cable set. The Fostex model numbers provided with this connector are:

A-20, A-80, B-16, B-16D, B-16M, E-2, E-22, E-8, E-16, E-16M

These models can be connected either way as a master or a slave, and all functions of the 4030/4035 can be utilized. The content of the Model 8540 cable set is, a cable with RCA pin plugs for the reference signal and a 20 conductor flat cable with MIL spec 20-pin flat cable connectors on both ends. The length of both are 5 meters and the same pin numbers are connected with each other between the 20-pin connectors on both ends.

Tape recorders other than listed above can be used as a master if it can, at least, output a reference signal. The minimum requirement of a tape recorder to be used as a slave is the ability to be externally speed controlled electrically in the play mode, in addition to be able to output a reference signal. These minimum requirements are related to locking two transports in the play mode. If the control signal is not perfectly connected, functions other than this could be subjected to limitations. Connecting the reference signal only to use it as a master is called 'code only master'.

When it is necessary to make a connection other than the 'code only master' method with a transport not in the above listed "Fostex synchronizer models", a direct connection cannot be made with the 8540 cable and consequently, some form of interface adaptor is required.

Interface adaptors presently available or in the stage of development is listed in the "Interface List" (Please ask your Fostex dealer for this list). It must be noted that the functions of the 4030/4035 could be limited depending on the functional characteristics of some tape recorders.

#### 7-5-1-2 Reference signal

As the reference signal is necessary to know tape positions in the play mode and for reference in measuring the tach pulse cycle, it must always be connected. Any one of the following for the master, and only (1) for the slave, must be applied.

(1) SMPTE/EBU specification time code

Nondrop frame

Drop frame

25 frame/sec

24 " "

100mVpp ~ 10Vpp

(2) Video signal

Composite video signal 0.5 ~ 2Vp-p

Composite sync signal 0.2 ~ 8Vp-p

(3) Pilot signal, 48 ~ 60Hz, sine or square wave, 0.2 ~ 8Vp-p

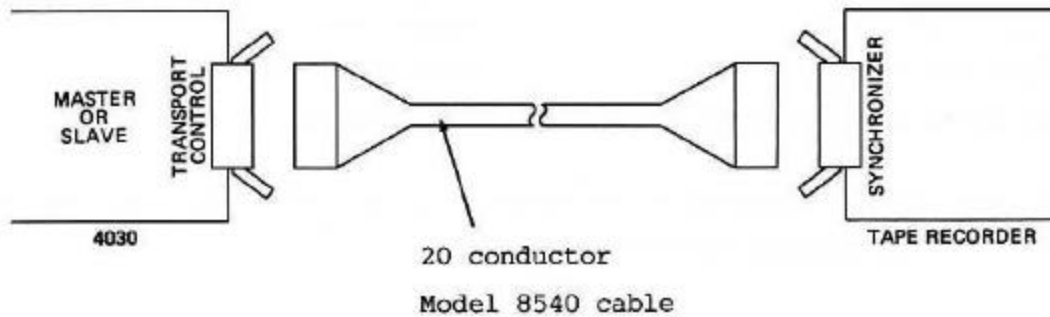
The reference signal must be the type which can display the playback speed of the recorder, etc. In short, the playback signal, of the above listed signal recorded on the tape, is normally input as the reference signal.

The foldback connector is directly wired to the code in connector and allows parallel access to the signal input at code in.

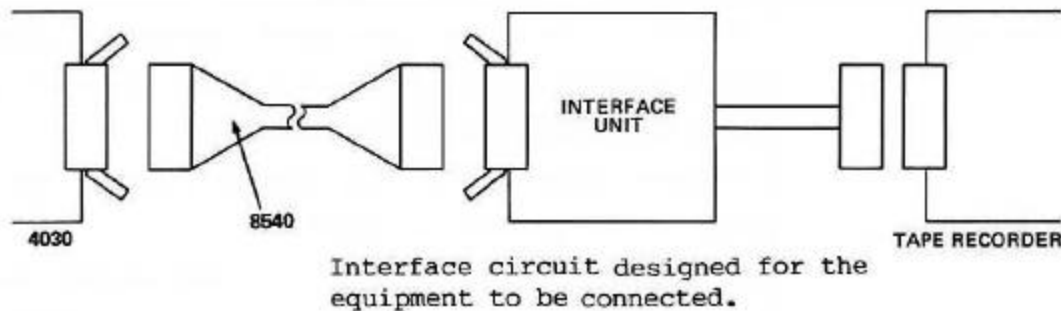
### 7-5-1-3 Control signal

**CAUTION:** Always switch off power to the 4030 and tape recorder when the connectors are plugged or unplugged. Also, do not switch on power before the SERVO TYPE switch is set according to type of slave to be used.

The 'Postex Synchronizer Tape Recorders' listed in item 1.1 are connected as shown below.



The connection will be as shown below for those not in the above mentioned list.



**CAUTION:** Always set the SERVO TYPE switch (FREQ-VOLT) when the slave is connected. It must be set to VOLT when the slave playback speed control is by analog voltage, and FREQ when controlled by frequency. Postex products must be set as listed below:

VOLT	FREQ
A-20	E-2, E-22,
A-80	B-16D, B-16M
B-16	E-8, E-16, E-16M

### 7-5-2 Control signal specifications

Control signal specifications and the in/out circuit schematic for the 4030 are detailed below for reference in assembling an interface.

The following signals are carried by the 4030 rear panel MIL spec 20 pin flat cable connector (male).

#### 7-5-2-1 Logic input/output

- 1) Logic input terminal, Pin 1 ~ 3, 7 ~ 10, 18, 20
  - Input voltage range : 0 ~ 15V
  - Logic high level : Higher than 3.5V
  - Logic low level : Less than 0.8V
  - Low level input current (flow out) : About 0.5mA

Each pin of the terminal is connected to point (P), in the circuit schematic, through a 10K $\Omega$ , 1/8W resistor.

#### Status of the logic input signals

Pin No.	Name of signal	
1	Tach pulse	Signal for detecting tape speed. Whether at playback or fast winding modes, the pulse created at each given tape length is input here. Minimum pulse width (The shorter time of the high or low period) is 10 $\mu$ S. NOTE: Signals not created at a given length such as the reel rotation detecting pulse, cannot be used. Permissible frequency is, higher than 4Hz at playback and less than 5KHz at fast winding. Should this signal not be input, tape location display at fast winding, tape position display, locate, review and chase locate will not function.
3	Direction	Tape travel direction indicating signal. If tach pulse is to be input, this signal must also be input. The logic level at the normal tape direction, can be either high or low.

Status of the logic input signals

Pin No.	Name of signal	
7	<u>Play tally</u>	<p>These are low true signals to inform 4030 of the various modes the transport is in (Record Tally 1 only is high true). No definite interference in fundamental functions such as synchronize and locate will be encountered even though tape deck modes other than Play Tally is not input.</p>
8	<u>Stop tally</u>	
9	<u>Rewind tally</u>	
10	<u>Fast forward tally</u>	
2	<u>Record tally 2</u>	
20	<u>Record tally 1</u>	<p>The 4030 will not read the reference signal unless the play tally signal is true. Therefore, pin #7 must be fixed at zero volt (this potential need not be changed in accordance to the transport status) when the play tally signal from the transport is not connected.</p> <p>In a transport that can select the track to be put in the record mode, there are two conditions in the record mode - (A) any one track is selected and is in the record mode, or (B) no track has been selected. Record tally 1 represent the (A) condition. Record tally 2 is a signal which will be true when in the record mode, regardless to conditions (A) or (B).</p> <p>If a signal corresponding to record tally 2 only can be obtained from the tape transport, this should be applied to the record tally 1 pin.</p> <p>Pins not in use, must be fixed to false condition. False condition means, high level or open for low true signals and low level for high true signals.</p>

2) Logic output terminal, Pins 6, 13 ~ 16

Output circuit: Collector output, NPN transistor. This output is pulled up through a 10K $\Omega$ , 1/8W resistor connected to point (P) in the circuit schematic.

External pullup maximum voltage: +30V, recommended voltage, +5V.

Logic level output voltage: Less than 0.2V (At less than 10mA sink current).

Maximum sink current: 100mA

Pin No.	Name of signal	Low true command signals for various modes sent to the transport.
6	$\overline{\text{Record}}$	
13	$\overline{\text{Rewind}}$	
14	$\overline{\text{Stop}}$	
15	$\overline{\text{Fast forward}}$	
16	$\overline{\text{Play}}$	

3) Pullup supply terminal

Input voltage range: 0V ~ 15V or open

Recommended voltage: 5V

Current : Maximum 6mA (At 5 volts)

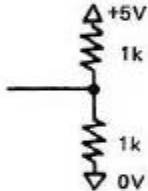
All logic input and logic output terminals are pulled up by 10K $\Omega$  resistors.

If a voltage lower than the voltage deemed logic high is applied to the transport side input circuit or it is set open, switching on the transport power and switching off power to the 4030 may result in unusual behavior of the transport.

7-5-2-2 Slave speed control, Pins 5, 11, 12

These are connected to the slave transport control connector only. These pins at the master are not connected.

Care must be taken in setting the servo type switch (FREQ-VOLT) as the tape recorder operation will differ between the two positions.

Pin No.	Name of Signal	Servo Type	
12	Servo out	VOLT	<p>Analog voltage output for speed control</p> <p>Load resistance : More than 10K<math>\Omega</math></p> <p>Output voltage range: -14V ~ +14V (No external pullup)</p> <p>~ +18V (External pullup=24V, 1.5K<math>\Omega</math>)</p>
		FREQ	<p>Frequency output for speed control</p> <p>Output voltage high: Higher than 4V (These low : Lower than 0.2V voltages against the load shown in circuit below):</p> <p>Output freq. range: 2KHz ~ 30KHz</p> <div style="text-align: right;">  </div>
			<p>NOTE: At either VOLT or FREQ, it will be zero volt when servo is off (when 4030 is not controlling the speed)</p>
5	Servo X	VOLT	Connected to the analog voltage input circuit GND of the transport.
		FREQ	No connection.
11	Servo Y	VOLT	<p>External pullup terminal of analog output voltage</p> <p>If the servo out positive output voltage (Max. about 14V) is insufficient, it can be pulled up externally. The external voltage must be less than 24V. Be sure it is applied to the 4030 through a series resistor to limit the sink current to less than 5mA.</p> <p>Leave this open if external pullup is not used.</p>
		FREQ	This is connected to 0V through a 3.3K $\Omega$ resistor at assembly. This has no meaning as a signal.





MODEL 4030 SOFTWARE VERSION 3.10 MANUAL

A supplement to the Model 4030/4035  
Synchronizer/Controller Owner's Manual

**CAUTION:** When the ROM (Read Only Memory integrated circuit) is replaced from version 3.0 or older version to version 3.10, data, parameter, mode, etc. in memory will all be erased and be in the default state only at the first switch on of power after replacing.

This manual on software version 3.10, explains its difference from version 3.0. Mainly, the following points have been changed in version 3.10 from version 3.0.

Improvement of operation and method of display

- Improvement of display method for speed indicating mode
- Improvement of trim mode
- Improvement in method of entering the calculating mode

Ability to meet requirements of the Model D-20 recorder

Model D-20 can -

Output time codes readable by the Model 4030 instead of a tach pulse even during the fast wind mode.

Fast wind in two different speeds.

The 4030 can now control this type of recorder.

Communication conditions can now be altered

Parity, number of transmitting bits, number of stop bit.

Other features for more flexible control -

- Chase window width can be varied
- Punch out method can be altered
- Slave weight point can be established
- Control pulse width can be varied

Details on the changes

General methods in the 2nd mode operation are not referred to in the following explanation. If necessary, please refer to the Model 4030 manual. Modes and parameters set by the 2nd mode will be held even when power is switched off.

1. Improvements over existing function

1.1 Improvement of trim mode

The frame digit can now be trimmed when the trim mode is entered immediately after recall [RCL] or clear [CLR]. In previous versions, this was possible only from the "hour" digit.

1.2 Improvement in method of entering the calculating mode

Entering this mode in previous versions was limited to when the sub frame dot was blinking but from version 3.10, the calculating mode can now be entered by pressing +/- while the dots other than the +/- digits is blinking. However, it will not enter the calculating mode in the following case but enter the range setting mode by the memory number.

[CLR] [n] [-] (n = 0 ... 9)

### 1.3 2nd 2 : Speed indicating mode

Time code condition will now be indicated too. If there is no error, "0" will be displayed.

2 0 1.00

When there is an error, the number representing the speed will be extinguished and "E" will be displayed.

2 E

Display of this "E" will respond quicker than the MASTER CODE/SLAVE CODE LED to the actual occurrence of an error. When there is absolutely no input of time code or if the "E" condition continues for more than one second, "noCd" (no code) will be displayed.

2 noCd

### 1.4 2nd [TRIM] : machine select

Previously, it was only "normal" and "460" but the "D-20" mode has been added.

Several "2nd modes" necessary for D-20 have been newly added. Although these can be individually setup, it can all be done in one operation by using "machine select." Individual parameter changes can be done after setting to "machine select=D-20."

The 2nd modes equal to the D-20 mode are as follows:

For the master

2nd [AUTO LOCK] code only master	= 1
2nd [SYNC LOCK] code mode	= 1
2nd [7][5] low speed area	= 1
2nd [7][7] no tach pulse mode	= 1

For the slave

2nd [ LOCK ENABLE] lock damping	= 9
2nd [7][2] chase window	= 2
2nd [7][6] slave code enable	= 1
2nd [7][5] low speed area	= 1
2nd [7][7] no tach pulse mode	= 1

## 2. Newly added functions

### 2.1 2nd [+] : version display

It will be the same display as when power is switched on while pressing [ADVANCE] of the Model 4030.

89.0 : 03.10

### 2.2 2nd [7][2] : chase window

CRD 4

In the chase mode, should difference in position between the master and slave exceed a certain figure, the slave will enter the locate mode and chase the master in the fast wind mode. Previously, this figure was 4 seconds but this can now be changed. The display mode (MASTER/SLAVE/OFF-SET) has no affect on 2nd 72. Figures 1 through 9 can be set. The unit is "second." Default figure is 4 (seconds).

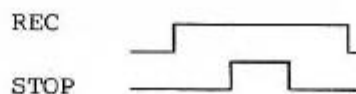
### 2.3 2nd [7][3] : punch out mode

Model 4030 will output a "punch out" command at the AUTO REC out point. Previously, the command actually output was selected by the rear panel switch to -

PLAY for other than B-16, or  
Simultaneous PLAY and STOP for B-16

but more kinds of "punch out" commands have been added. The default condition is either one of those indicated above. Method of operation is the same as with 2nd [TRIM] : machine select. The master and slave must be set separately. The display and the commands actually output are as follows:

P 0 7	P	PLAY
	P 5	Simultaneous PLAY and STOP
	r P	Simultaneous PLAY and REC
	r 5	Simultaneous REC and STOP
	r 5 r	REC and STOP as shown below



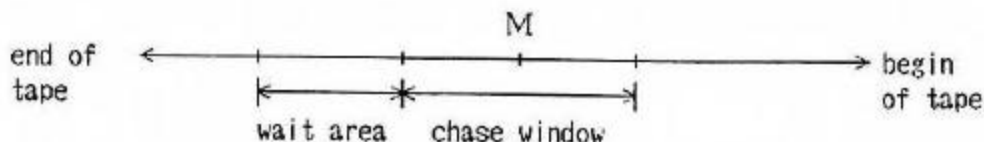
#### 2.4 2nd [7][4] : slave wait point

### SEP □

The slave will enter the locate mode when it is outside the chase window. However, as some slave equipment cannot locate accurately, it will sometimes be difficult to enter the slave in PLAY or STOP inside the chase window when the master is in PLAY or stopped. In addition, when the master is in PLAY, the slave occasionally slips outside the chase window again as it requires some length of time for it to switch from the fast wind mode to the PLAY mode.

When an equipment of such nature is ahead of the master and outside the chase window, a more satisfactory result can be obtained if it is entered in the stop mode to wait for the master rather than being entered in the locate mode. This will be called the "slave wait" function.

The slave wait point can be set to a figure from 1 through 9. The unit is "second." To initiate the slave wait function, the slave wait point must be set to a figure larger than for chase window. For example, if chase window is 4 seconds and slave wait point is 9 seconds, then its relationship will be as shown in the schematic. When the slave tape is inside the wait area, it will stop without entering the locate mode. The master tape will approach in the play mode and the slave start in the play mode upon entering the chase window. If an attempt is made to set a figure smaller than the chase window, it will be set automatically to the same figure with the chase window. If it has been set to a figure identical or smaller than the chase window, this function will not operate.



#### 2.5 2nd [7][5] low speed area

### LAR □

The Model 4030 will control the tape speed during the locate mode to allow the tape to be accurately stopped at the objective point. As this control is by quick switching in the Fast Forward and Rewind modes, it could not be used for controlling cassette type transports. However, the Model D-20 recorder has two levels in fast wind speed. There are some types of VCR which can be handled as if the fast wind speed is possible in two levels such as in search mode and in normal FF/RWD modes. If the low speed area is set to a figure other than "0", the Model 4030 will control speed in the locate mode by means of controlling these two speeds.

The figure for the low speed area should be 0 ~ 9, individually for the master and slave.

The unit for the low speed area figure is "minute." For example, if the figure is set to 2, it will go to the slower speed if distance from the locate objective point is less than 2 minutes, or go to the faster speed if

the distance is 2 minutes or more. The distance of 2 minutes means the length of tape for 2 minutes of PLAY time. Speed select command to the tape transport is applied by toggling the FF/RWD command. In the case of FF, for example, the tape transport will reciprocate between fast and slow each time an FF command is applied. The 4030 must know at which speed the transport is presently running. To achieve this, the tally signal output from the transport or interface circuit must be -

Fast FF : FF tally only is active  
Slow FF : Both FF tally and PLAY tally are active

This tally signal must be returned within 200ms after receiving a command from the 4030.

#### 2.6 2nd [7][6] : slave code enable

SCD 0

Setup 0 or 1. This is not related to the display select (MASTER/SLAVE/OFFSET) state. Default figure is "0." Setup the condition to read (try to read) the slave time code.

When "0", it will read only when the slave PLAY tally is active.  
When "1", it will read regardless to condition of PLAY tally.

Mode "0" is for preventing malfunction when in other than the PLAY mode.

Mode "1" allows compliance with equipments (Models D-20 and 4011) which outputs time codes readable by the 4030 although when in other than the PLAY mode.

#### 2.7 2nd [7][7] : no tach pulse mode

NTF 0

Setup "0" or "1" individually for the master and slave.

- 0 : This is the normal mode. The 4030 will be able to keep track of the tape position by the tach pulse during the fast wind mode.
- 1 : Allows compliance with equipments (Models D-20 and 4011) which outputs the tape position, not by tach pulses but by time codes during fast winding. The 4030 can read the following time codes.

Rate (Not the code content but a physical frame repeat frequency) is  $1/2 \sim 2$  times.  
The frame address advances one at a time for each frame.

Therefore, throughout the duration sufficient for the 4030 to recognize, 5 frames for example, it will operate by a time code whose frame address increases one at a time regardless to tape speed and tape travel direction.

#### 2.7 2nd [7][8] : control pulse width

CPW 2

Setup figures 1 ~ 9 individually for the master and slave. The unit is 100mS. Default is 2 (200mS).

Setup the transport control command pulse width which is automatically output from the 4030.

#### 2.7 2nd [8][0] : parity bit

Setup the functions related to parity, from among communicating conditions by RS-232.

The present condition is displayed first. Each time the [+] key is pressed, modes which can be set will be successively displayed and the mode on display setup by pressing [STO]. Default condition is odd.

P 7 P     o d d    Odd parity generate/check  
          E ũ E n    Even parity generate/check  
          n o n E    No parity generate/check

#### 2.8 2nd [8][1] : number of data bit

Setup the number of data bits, among communicating conditions by RS-232. Method of setup is same for 2nd 80. Default is 8 bits.

d b 7     8 b , 7    8 bit  
          7 b , 7    7 bit

#### 2.9 2nd [8][2] : number of stop bit

Setup the number of stop bits to be added to transmit data, among communicating conditions by RS-232. Method of setup is same for 2nd 80. Default is 1 bit.

s b 7     1 b , 7    1 bit  
          1.5 b , 7    1.5 bit  
          2 b , 7     2 bit

# **Model 4030/4035 SYNCHRONIZER/CONTROLLER**

## **Owner's Manual Supplement for Software Version 3.20**

### **CAUTION:**

When the 3.20 ROM integrated circuits are installed in the 4030, all previously stored data and mode settings will be erased and set to default condition. This occurs only at initial power on after replacement. This occurs only when replacing 3.10 or older version.

### **Printing History**

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## CONTENTS

1	About this manual.....	2
2	About version 3.20.....	2
2.1	improvement on controlling model D-20 "DAT" recorder .....	2
2.2	improvement of operation .....	2
2.3	communication .....	2
2.4	others.....	2
3	Details on changes.....	3
3.1	improvement of trim mode .....	3
3.2	improvement in method of entering the calculation mode .....	3
3.3	[LOCKED] LED.....	3
3.4	automatic speed display.....	3
3.5	improvements on communication response time .....	3
3.6	second mode scroll.....	3
3.7	machine select .....	4
3.8	slave start point and park area.....	4
3.9	software version display.....	8
3.10	speed display mode.....	8
3.11	chase window width.....	8
3.12	punch out mode .....	8
3.13	low speed area.....	9
3.14	slave code enable .....	9
3.15	no tach pulse mode.....	10
3.16	control pulse width.....	10
3.17	external sync mode.....	10
3.18	parity bit.....	11
3.19	number of communication data bit .....	11
3.20	number of stop bit .....	11
3.21	locked window.....	11
3.22	stop tally ignore .....	12
4	Set up conditions of machine select .....	12
5	Second mode summary.....	13

## 1 About this manual

This manual is provided as a supplement to model 4030 / 4035 synchronizer / controller owner's manual, Fostex part number: 8288186100 which describes the software version 3.0

This 3.20 manual describes the differences between version 3.0 and 3.20. Since version 3.20 includes improvements of version 3.10, this manual supersedes the manual supplement for version 3.10.

## 2 About version 3.20 software

The 3.20 software differs from the 3.0 in the following ways.

### 2.1 improvements on controlling model D-20 "DAT" recorder

Functions necessary for controlling the D-20 have been added from version 3.10. From 3.20, algorithm for chase and lock have been improved, so that faster lock up time can be achieved.

New functions (second mode) for D-20 are as follows :

- slave start point and park area
- low speed area
- slave code enable
- no tach pulse mode
- external sync mode

These are also useful for other types of transports.

A parameter "D-20" appears in machine select mode. Selecting it will set all functions for D-20 except "external sync mode". Since how to set the "external sync mode" depends on D-20 system configuration, it is not set automatically. It should be set individually by [2nd 79].

### 2.2 improvement of operation

Tape speed indicating mode also displays time code status.

While servo adjusting (dipswitch on), the 4035 automatically enters speed indicating mode.

Improvement of trim mode.

Improvement in method of entering the calculating mode.

The [LOCKED] LED on 4035 blinks when about to lock.

Second mode functions can be scrolled.

### 2.3 communication

Communication conditions such as parity, number of data bits and number of stop bits can now be altered.

Improved communication response time.

### 2.4 others

Locked window width can be varied.  
Chase window width can be varied.  
Punch out method can be altered.  
Transport control pulse width can be varied.  
Software version display by 4030 operation.  
A mode in which stop tally signal from transport is ignored has been added.

### **3 Details on the changes**

In the following description, general method in the 2nd mode are not referred to. If necessary, please refer to the model 4030 manual. Second modes explained in this document cannot be set by the 4030 key operation at power on. Those modes should be set by using the 4035. Modes and parameters set by second mode will be retained even when power is switched off.

#### **3.1 improvements of trim mode**

When the trim mode is entered immediately after "recall" [RCL] or "clear" [CLR], the "frame" digit can be trimmed first. In previous versions, it was from "hour" digit.

#### **3.2 improvements in method of entering the calculation mode**

Entering this mode in previous versions was limited to when the "sub frame" dot was blinking. From version 3.10, the calculating mode can be entered by pressing the [+]/[-] key while one of the dots other than the +/- digit is blinking. However it will not enter the calculating mode in the following case, but enter the range setting mode by the memory number.

[CLR] [n] [-] (n+0...9)

#### **3.3 [LOCKED] LED**

When the lock deviation becomes less than 1 frame, the LOCKED LED on 4035 begins to blink. It stays on when the locked state is achieved.

#### **3.4 automatic speed display**

While the servo adjusting state (dipswitch 7 or 8 ; on), the 4035 enters the speed indicating mode automatically. the display mode returns to the previous state when the dipswitches are turned off.

#### **3.5 improvements on communication response time**

The 4030 can now communicate up to 5 times (depending on the 4030 status) faster than before.

#### **3.6 second mode scroll**

When in any second mode, pressing the [+]/[-] key while holding down the [OFFSET TRIM] key brings 2nd mode status one after the other.

### 3.7 machine select : 2nd [TRIM]

A new parameter "D-20" has been added to machine select function. The parameters are now "normal", "460" and "D-20". Selecting a machine parameter causes several "2nd modes" necessary for the machine to be set at one time. After a machine parameter is selected, any one of the second mode parameters can be altered by individual 2nd mode. To retrieve the initial state for that parameter, select the same machine parameter again with the "machine select" function. If a machine identical to current selected machine is selected, all altered parameters are initialized to default state of that machine. The list of default state for each machine is shown in section 4.

### 3.8 slave start point and park area : 2nd [CHASE ENABLE]

#### outline of the function

The "slave park point" function in version 3.1 and before has been changed to this function.

The D-20 can vary its playing speed only within a +/- 10% range, therefore lock up time depends very much on the distance at the moment that the 4030 just begins to control the slave D-20 playing speed to lock up with the master transport. This park & start function is provided to minimize the distance at then beginning of control. When this function is set to "on", the chase slave transport operation is as follows:

- a) When the master is playing or stopped, the slave transport goes into the "park area" and stops to wait for the master to arrive.
- b) When the master reaches a point called "start point" in play mode, the slave starts.

When this function is turned "off", the slave actions are:

- a) When the master is stopped, slave also stops at the master position.
- b) When the master is playing within the chase window, the slave also plays unconditionally.

#### Important :

When this function is on and the master is controlled from 4035 keyboard, only the master should be control enabled (state that the SLAVE I LED on the 4035 is off). If both master and slave I are enabled, this function does not work correctly.

"Slave start point" is defined as : when slave is waiting for the master and the master reaches the point where :

$$\text{deviation} - \text{slave start point value} \\ (\text{deviation} - \text{slave position} - \text{master position} - \text{requested offset})$$

, the slave starts.

"Slave park area" is an area in which the slave will stop and wait for the master to ensure that the start point function works correctly. The actual area the slave stops is after a point set as "slave park area lower limit" and before the chase window upper limit.

With this park & start function, lock up time of machines other than D-20 can be improved. It is especially improved in the following cases :

- a) the slave machine's speed control range in play mode is narrow
- or

b) master configuration is "code only master"

When "D-20" is selected in the machine select function, parameters for this function are set as :

start point            - + 1 frame  
park area lower limit - 50 frame  
function on / off      - on

### setting values

The display for this second mode is :

+SP0 (PPSQ )

+.                    : sign of the start point ( + indicates the slave being at advanced point from the master is)  
SP0                 : start point value (-99~+99 frames)  
PPSQ                : park area lower limit point value (0~99 frames)  
{                     : on / off of this function    on:1    off:0

Initially, the dots of start point sign and value are blinking. Sign can be entered by the [ + ] / [ - ] key. Value is entered by number key [ 0 ] ~ [ 9 ]. Range is from -99 to +99 frames.

When the dot key is pressed, blinking moves to the digit of park area lower limit value. Value range which can be set by the number keys is from 0 to 99 frames.

When the dot key is pressed again, blinking moves to the on/off digit. A "0" or a "1" can be entered here.

The blinking returns to the first position when the dot key is pressed again.

At any state of blinking, if the [STO] key is pressed, entire parameters displayed at this moment are memorized into backup memory.

If

start point > park area lower limit

at the moment that the [STO] is pressed, the park area lower limit value is forced to be equal to the start point value.

And if

park area lower limit + 1 second > chase window

, the chase window width is adjusted not to be above condition.

### how to find the optimum value

Without understanding the following explanation, proper setting for this function can not be achieved. Please read carefully in order to get good lock up time.

- 1) i) Turn the park & start function on.  
ii) Put the 4030 into CHASE MODE.  
iii) If the master is controlled from the 4035, only the master should be control enabled (state that the SLAVE 1 LED on the 4035 is off).  
iv) Put the 4035 into the offset display mode.

The following is explained as if the requested offset (content of offset memory) is 0.

- 2) i) Make the master and the slave lock together in play mode.  
ii) Stop the master.

The slave will play until it reaches the park area. The slave stops when this is reached.

- 3) i) Put the master into play mode.

After the [MASTER CODE] LED turns on, a play command is given to the slave. When the 4030 can begin to read the slave TC, the [SLAVE CODE] LED turns on.

- ii) Read the offset value at this moment.

If it is less than +/- 0.5 frame, it shows that this park & start function was performed successfully.

- 4) i) Repeat items 2 and 3 several times.  
ii) If each time is OK, go to item 7.

If not, the parameter should be changed. At this stage, it is yet uncertain that which parameter is unsuitable.

At first, in order to eliminate the effect of the park area;

- iii) set the park area lower limit value to 99 frames.

- 5) i) Perform items 2 and 3.  
ii) Observe the offset value at the moment that the [SLAVE CODE] LED turns on.  
iii) If the offset value is less than 0.5 frame, the start point setting is correct. Then go to item 6.  
iv) If the offset value is greater, the start point value should be changed to cancel the offset. If the offset value is about -9 frame, add "9" to the current start point value.

This check must be done in the condition that the park area lower limit is sufficiently far from the master position.

A certain amount of time will pass from the moment that the slave machine receives a play command to the moment that the 4030 can read the slave TC. Within this time interval, the master moves. Also the slave moves but the amount of tape movement is less than that of the master. This difference will depend on the start up characteristic of the slave machine. The start point value should be adjusted depending on the slave transport. This value is not affected by what type of unit you use for the master machine.

- 6) A certain amount of time will pass from the moment that the master machine begins playing to the moment that the 4030 can read the master TC. Judgment of whether the master is crossing over the start point is made only under a condition that the 4030 can read the master TC. If the slave is started while the master position is uncertain, a short lockup time can not be achieved. Since the master moves before the slave starts, if the park position of the slave is too near the master, it may happen that the master crosses over the start point before the 4030 can read the master TC. If this happens, the 4030 will give a play command to the slave the moment that the master TC comes, but it is too late so that short lock up time will not be achieved.

The slave park area should be set to eliminate this master start up time problem. To choose an optimum value;

- i) repeat items **2** and **3** lowering the slave park area lower limit value.
- ii) The minimum value with which the item **3** works well is optimum, but to be safe, it is recommended to add a few frames to the parameter.

7) Below are methods for checking park area when the master is playing and the slave is in chase locate mode.

In order to do this, the 4030 settings for "locate damping" and "low speed area" must be correct. Otherwise accurate park area setting cannot be achieved.

a) The locate damping value must be 0 for cassette type transports (D-20, 460, video cassette... )

b) If the slave machine is so equipped, the "low speed area" function should be set appropriately according to item **3.13** of this manual.

c) With other machines than mentioned above, the locate damping value should be minimum value with which the locate operation finishes without overshooting.

8) This item is for a case when the slave comes to the park area in forward direction winding.

- i) Be sure that settings described in item **7** are correct.
- ii) Disable the chase mode.
- iii) Place the master about 1 minute ahead of the slave.
- iv) Put the master into the play mode.
- v) Enable the chase mode.

Then the slave goes beyond the master and stops.

vi) If the slave stopped without overshooting, it is OK.

vii) If the slave overshoot and returned to stop, try to enlarge the chase window width by 2nd [7][2].

9) In consequent with item **8**, a play command is given to the slave when the master reaches the start point.

- i) Observe the offset display as item **3**. If it is less than 0.5 frame, checking of item **8** and **9** are OK.

If it is not so, the reason for it is that the time interval between the time of play command to the slave and the time at the 4030 can read the slave TC is different from that of item **3**. It means that the master came before the slave stops and waits. In this case;

- ii) The park area lower limit value should be made greater.

10) This item is for a case that the slave comes to the park area in reverse direction winding.

- i) Disable the chase mode.
- ii) Place the slave about 1 minute ahead of the master.

- iii) Put the master into the play mode.
- iii) Enable the chase mode.

Then, when the slave reaches the upper limit of the chase window, a stop command is given to the slave. A play command is given to the slave when the master reaches the start point.

- iv) Observe the offset display as item 3. If it is less than 0.5 frame, checking of item 10 is OK.

If it is not so, the reason for it is either :

- a) The slave overran the upper limit of the chase window and passed through the park area lower limit.
- b) The master reached the start point before the slave has stopped completely.

The way to correct this is to enlarge the chase window width.

### 3.9 software version display : 2nd [+]

Software version is displayed by the 4035 operation. 2nd [+] displays as:

**9004 3320            90.04 V3.20**

### 3.10 speed display mode : 2nd [2]

The time code reading status is thus displayed.

2 o 100	When there is no error, "o" is displayed.
2 E	If a reading error occurs, "E" is displayed. Display of this "E" will be quicker than the [MASTER CODE] / [SLAVE CODE] LED's to the actual occurrence of an error.
2 noCd	When there is no input of timecode or when the "E" condition continues for more than 1 second, "noCD" (no code) is displayed.

### 3.11 chase window width : 2nd [7][2]

In the chase mode, if the difference in position between the master and the slave exceeds a certain figure, the slave will enter the locate mode and chase the master in the fast winding mode. This figure is called the chase window. The default value of the chase window is 4 (seconds). It can be changed by 2nd [7][2]. Figures 1 through 9 can be set. Each unit represents one second of time. This parameter can be set at any state of the display select (MASTER / SLAVE / OFFSET).

### 3.12 punch out mode : 2nd [7][3]



The 4030 will output a "punch out" command at the auto record out point. Previously the command actually output was selected by the dipswitch to :

- play command for other than the B-16
- simultaneous play and stop commands for the B-16

More kinds of "punch out" commands have been added after version 3.0. The default condition is either one of those indicated above. Method of operation for the 2nd[7][3] is same as 2nd[TRIM] machine select. The master and the slave must be set separately. The



display and the commands actually output are :

P 0 7			
	P	P	play
	r	P	simultaneous play and stop
	r	U	simultaneous play and rec
	r	U	simultaneous rec and stop
	r	3 r	rec and stop as shown below
			rec 
			stop 

### 3.13 low speed area : 2nd [7][5]

LA r 0

The 4030 will control the tape speed during the locate mode to allow the tape to be accurately stopped at the objective point. As this control is by quick switching in the fast forward and rewind modes, it could not be used for controlling cassette type transports. However, the D-20 has two levels in fast winding speed. And there are some types of VCR which can be handled as if the fast wind speed is possible in two levels such as in search mode and in full wind modes. If the "low speed area" is set other than "0", the 4030 will control speed in the locate mode by means of controlling these two speeds.

The figure for the low speed area should be 0~9, individually for the master and the slave.

Each unit represents ten seconds of time. For example, if the figure is set to 4, when the distance from locate objective point is less than 40 seconds, lower wind speed is commanded from the 4030. If the distance is greater than 50 seconds, the higher speed wind command is issued. In the area greater than 40 seconds and less than 50 seconds, the state (higher or lower speed) does not change. The distance of 40 seconds means the tape length for 40 seconds of play time.

Speed select command to the tape transport is applied by toggling the F.FWD/RWD command. In the case of F.FWD, for example, the tape transport will reciprocate between fast and slow each time a F.FWD command is applied. The 4030 must know at which speed the transport is presently running. To achieve this, the tally signal output from the transport or the interface circuit must be :

fast F.FWD : F.FWD tally only is active  
 slow F.fwd : F.FWD tally and PLAY tally are active

These tally signals must be returned within 200 mS after receiving a command from the 4030.

### 3.14 slave code enable : 2nd [7][6]

SC d 0

Setup "0" or "1". It can be entered at any state of display select. Default figure is "0". This 2nd mode determines the condition to read (try to read) the slave timecode.

0 : 4030 reads the slave timecode only when the slave play tally is active.  
 1 : 4030 reads the slave timecode regardless of the condition of play tally

"0" is for preventing malfunction when in other than the play mode.

"1" is for equipments (D-20,4011) which output timecode readable by 4030 even in other than the play mode.

### 3.15 no tach pulse mode : 2nd [7][7]

7P Q

Setup "0" or "1" individually for the master and the slave.

**0**: This is the normal mode. The 4030 will be able to keep track of the tape position by the tach pulse during the fast wind modes.

**1**: This allows compliance with equipments such as D-20 or model 4011 which outputs the tape position not by tach pulses but by timecode during fast winding.

The 4030 can read timecode with the following characteristics :

Rate (not the code content but a physical frame rate) is  $1/2 \sim 2$  times

The frame address advances one at a time for each frame.

therefore these equipments output timecode in a manner that:

Rate is always about normal play speed.

The frame address increases one at a time and it continues at least 5 frames in a row regardless to the tape speed and direction.

### 3.16 control pulse width : 2nd [7][8]

CPW 2

Setup figures 1 ~ 9 individually for the master and the slave. The unit is 100 mS. Default is 2 (200 mS).

This 2nd mode determines the pulse width of transport control commands which is automatically output by the 4030.

### 3.17 external sync mode : 2nd [7][9]

E.S 0

Setup figures 0, 1 or 2. It can be entered in any state of the display select.

If the playing speed of the slave is controlled only from the 4030, a "0" should be set. "1" or "2" should be set if the slave machine has an external sync signal input and when lock up condition is achieved, the speed reference of the slave is switched over to the external sync signal.

The "locked" signal is output from the 4030. It is activated at the same time with the [LOCKED] LED on the 4030 (not 4035) turns on. When the slave receives this signal, it switches to external sync mode. After switched, actual tape speed does not follow the control output of 4030. Figure "1" or "2" for this 2nd mode notifies this fact to the 4030.

At mode "0", the 4030 becomes "locked" state when the lock deviation is less than 0.1 frame.

At mode "1", the "locked" state condition is identical to the mode "0". This mode should be used in the case of either of the following a) or b).

a) The slave is a VTR and it can be synchronized to external video frame information, or the slave is the D-20 and it is configured as a slave of "DAT frame sync mode". In these cases, as final lock up action is done by the slave machine itself, precise control by 4030 is not needed.

b) The slave D-20 is configured as an external sync mode and the sync signal input to the D-20 is not DAT frame, but video frame or pulses. In such configuration, when switched over to the external sync, the lock deviation at

this moment is maintained hereafter. If the maximum lock deviation of 0.1 frame is permitted, a "locked" state can be achieved faster than the mode "2". At mode "2", the 4030 enters the "locked" state when the lock deviation is less than 50 micro second. This mode should be used in a system of above item b) and lock accuracy is important.

### 3.18 parity bit : 2nd [8][0]

This 2nd mode sets up the functions for handling the parity bit, from among RS - 232 communication conditions.

The present condition is displayed first. Each time the [↵] key is pressed, modes which can be set will be successively displayed. The mode on the display is stored by pressing the [STO] key. The default condition is "odd".

odd	odd parity generate / check
even	even parity generate / check
none	no parity generate / check

### 3.19 number of communication data bit : 2nd [8][1]

This 2nd mode sets up the number of communication data bit, from among RS - 232 communication conditions. The method of set up is the same as for the 2nd 80. The default condition is "8 bit".

8b	8 bit
7b	7 bit

### 3.20 number of stop bit : 2nd [8][2]

This 2nd mode sets up the number of stop bit, from among RS - 232 communication conditions. The method of set up is the same as for the 2nd 80. The default condition is "1 bit".

1b	1 bit
1.5b	1.5 bit
2b	2 bit

### 3.21 locked window : 2nd [8][3]

This second mode determines the condition at which the 4030 turns off the "locked" signal and the [LOCKED] LED.

In an external sync system described in the explanation of 2nd [7][9], after switching over to the external sync mode, if the entire system configuration is not perfect, a case of lock deviation growth may occur. The cause for it may be a problem of synchronizing ability of slave system or may be incomplete sync relation between slave sync source and the master. In normal way, the 4030 turns off the [LOCKED] LED and inactivates the "locked" signal when the lock deviation becomes greater than 0.1 frame. Then the slave begins to be controlled by 4030 again. In this state, the sound or the picture of the slave is disturbed.

With such a system, there may be a case where the deviation is permissible but the disturbance should be avoided. For this situation, the 2nd [8][3] loosens the condition at which the 4030 turns off the "locked" state.

Method of set up is the same as for the 2nd 80. Settable parameters are 0.1, 0.7, 1.2, 1.7

and 2.3 frames. The default state is 0.1 frame.

**L P D 0. IF**

### 3.22 stop tally ignore : 2nd [8][4]

When the 4030 with the default condition is going to output a stop command by request from its internal functions, if the stop tally signal from the transport has been active already, the 4030 does not output a stop command. The reason why the 4030 does not output a stop command in such case is that a kind of transport enters an undesirable altered state from its normal stopped state if it has received a stop command while it is already in stopped state. We call this characteristic as (a) in this paragraph.

Another machine (b) outputs the stop tally signal when it is in the transition state from one mode to another in spite of the fact it never received a stop command. At the moment that this type of "stop tally" is active, incidentally if the 4030 wants to output a stop command, the command will not be output.

For machine like (a), a figure of "0" should be set; while for (b) type machine, a "1" should be set. If the machine is neither (a) nor (b), either figure is OK. This parameter should be set individually for the master and the slave.

**3 P 0**

## 4 set up conditions of machine select

m/s	function	normal	460	D-20
	locate damping range	2		
	locate damping	switch	0	0
	direction mode	0	1	0
	low speed area	0	0	40 sec
	no tach pulse mode	0	0	1
	punch out mode	play	play	play
m	code only master	0	0	1
m	code mode	1	1	1
s	slave start point & park area	0,0,off	0,0,off	+1,50,on
s	chase window	4 sec	4 sec	3 sec
s	slave code enable	0	0	1
s	lock damping	0	0	3

Items indicated "m" or "s" are set only if the machine is the master or the slave.

In addition to the items summarized in the table above, the following special functions are set in the 4030.

#### 460:

algorithm which handles tach pulse signal becomes 460 exclusive mode.

#### D-20:

algorithm of lock up becomes D-20 exclusive mode.

## 5 second mode summary

m/s	key	function		
	+	software version display	9004 0320	
m/s	trim	machine select	MC 0 0 0 0 0 0 0 0	S[+]
m/s	frame lock	frame mode	FC 0 0 0 0 0 0 0 0	S[+]
	auto lock	code only master	CO 0 0 0 0 0 0 0 0	0:off 1:on
	sync lock	code mode	CO 0 0 0 0 0 0 0 0	0:pulse/TC 1:TC
m/s	auto play	play to park	PP 0 0 0 0 0 0 0 0	0:9 second
	auto rec	auto rec with offset	AR 0 0 0 0 0 0 0 0	0:off 1:on
	chase enable	slave start point & park area	+SP 0 0 0 0 0 0 0 0	+/-0~99 frame, 0~99 frame, 0:off/1:on
	lock enable	lock damping	LC 0 0 0 0 0 0 0 0	0:9
m/s	locate	locate damping range	LD 0 0 0 0 0 0 0 0	1~3
m/s	2	TC speed & status display	TC 0 0 0 0 0 0 0 0	
m/s	3	locate damping	LD 0 0 0 0 0 0 0 0	0:9
m/s	4	tach pulse re-learn	TR 0 0 0 0 0 0 0 0	[STO]
m/s	5	direction mode	DR 0 0 0 0 0 0 0 0	0:direction signal 1:motion tally
	6	midnight mode	MC 0 0 0 0 0 0 0 0	0:off 1:on
	70	slave wait mode	SW 0 0 0 0 0 0 0 0	0:off 1:on
	71	capstan re-learn	CR 0 0 0 0 0 0 0 0	[STO]
	72	chase window width	CW 0 0 0 0 0 0 0 0	1~9 second
m/s	73	punch out mode	PO 0 0 0 0 0 0 0 0	S[+]
m/s	75	low speed area	LS 0 0 0 0 0 0 0 0	0, 10~90 second
	76	slave code enable	SC 0 0 0 0 0 0 0 0	0:off 1:on
m/s	77	no tach pulse mode	NT 0 0 0 0 0 0 0 0	0:off 1:on
m/s	78	control pulse width	CP 0 0 0 0 0 0 0 0	1~9 (100 mS)
	79	external sync mode	ES 0 0 0 0 0 0 0 0	0:normal 1:ext., 0.1F window 2:ext., 50 micro sec wdw
	80	parity bit	PR 0 0 0 0 0 0 0 0	S[+]
	81	number of data bit	DB 0 0 0 0 0 0 0 0	S[+]
	82	number of stop bit	SB 0 0 0 0 0 0 0 0	S[+]
	83	locked window	LW 0 0 0 0 0 0 0 0	S[+]
	84	stop tally ignore	ST 0 0 0 0 0 0 0 0	0:off 1:on

m/s : should be set for the master and the slave individually

S[+] : parameters can be scrolled by [+] key