FOSTEX®

Model **8335**

(Model D-15 exclusive TC/SYNC card)

Owner's Manual

FOSTEX®

Table of Contents

Introduction

We wish to thank you for purchasing the Fostex Model 8335.
The Model 8335 is an optional TC/SYNC card designed exclusively for the Model D-15 Digital Master Recorder.
By installing this TC/SYNC card in the D-15, external time codes (LTC) can be converted to the IEC time code (set of PRO R-TIME and PRO binary) and recorded. Furthermore, A-TIME or IEC time codes recorded on the tape can be converted to time codes (LTC) and played back.
Also, new functions such as the CHASE function (playback only) by external time code, phase modifying operation using WORD, VIDEO, and AES/EBU signals will be added to further complement the D-15 function.

In addition to functions added to the D-15 by installing the Model 8335, functions before installation and partial changes after installation are also explained in this manual.
Before operation, we suggest that you read the D-15 manual together with this explanation.

1. Contents of Package

Accessory items packaged with the 8335 are as listed below.
Please check contents with this list for any missing items.
If anything is missing, please contact the Fostex Dealer or Distributor.

Accessory	Amount
TC/SYNC card	1
Screws	7
Connecting cable (with 5 pin connector)	1
Connecting cable (without 30 pin connector)	1
Owner's Manual	1

2. Installing the card in the D-15

Normally, Fostex Dealer or Distributor will install this card in the D-15.
Therefore, please request the dealer or distributor of purchase to do the installation.

Major Functions

Recording external time code (LTC)

External time code (LTC) applied to the TIME CODE connector can be converted to the IEC time code (consisting of PRO R-TIME time code and PRO binary), which is the standard format for professional DAT time code recording, and then recorded.

> **<NOTE 1>**
> *In a D-15 installed with this card, 24 and 25 fps time codes can be automatically discriminated and recorded but 29.97 and 30 fps cannot be discriminated. Consequently, if recording 29.97 or 30 fps time codes are to be recorded, the D-15 must be setup matched with the time code which is recorded by the Model 8335 SETUP menu "411 -***."*
>
> **<NOTE 2>**
> *Time code (LTC) can be recorded only during recording of audio signals (or no sound recording) and time code cannot be recorded individually. Also, if audio insert is carried out, time code of that section will be erased.*

> *Refer to page [16] for time code recording and page [13] for SETUP menu "411 -***."*

Conversion and output of A-TIME/IEC time code to LTC

When A-TIME or IEC time code is recorded on tape, it can be converted to LTC and output from the TIME CODE OUT connector.
The frame rate and format of the time code (LTC) to be output can be randomly set by the SETUP mode.

> *Refer to page [18] for time code playback and page [11] ~ [12] for the SETUP mode.*

Chase by external time code (LTC) is possible (At PLAYBACK only)

Time code chase against externally input time code is possible.
In this case, the chase mode selecting and external sync signal selecting is set by the SETUP mode.

> *Refer to page [19] for chase synchronizing and page [15] for the SETUP mode.*

Phase modifying operation by WORD IN, VIDEO IN, AES/EBU IN is also possible

Phase modifying operation by the external sync signal (WORD, VIDEO, AES/EBU) is possible with the 8335 installed.
External sync signal selecting can be set by the SETUP mode.

> *Refer to page [21] for details on phase modifying operation by an external sync signal and page [15] for the SETUP mode.*

Time locate/memory edit by TC is possible

In addition to time locate/memory edit by A-TIME, time locate/memory edit by TC time will be possible.

Event start by REF TC is possible

Simultaneous with the external time code (REFERENCE TC) time coinciding with the memory [00] time, the D-15 will execute event start (playback mode). If the D-15 GPI switch is ON during this operation, then EVENT 0 will be output from GPI OUT.

Names and Functions
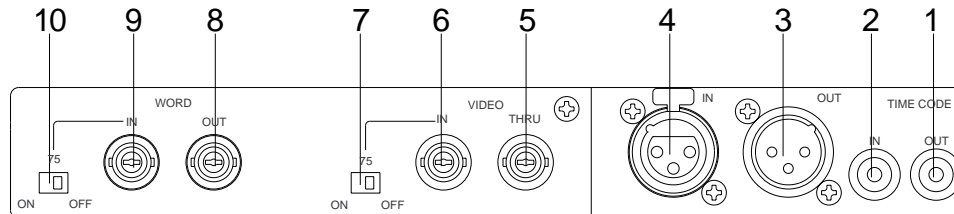
1. TIME CODE OUT connector (Connector: RCA pin jack - unbalanced)
Time code (LTC) converted from A-TIME on the tape or IEC time code is output here.

2. TIME CODE IN connector (Connector: RCA pin jack - unbalanced)
External time code (LTC) is input here.
Because this connector is the switching type, if it is used in parallel with the balanced connector (XLR), priority is given to the unbalanced (RCA) connector.

3. TIME CODE OUT connector (Connector: XLR-3-32 type - balanced)
Time code (LTC) converted from A-TIME on the tape or IEC time code is output here.

4. TIME CODE IN connector (Connector: XLR-3-31 type - balanced)
External time code (LTC) is input here.
If this is used in parallel with the unbalanced (RCA) connector, the RCA type will be given priority and thus this connector will not function.

5. VIDEO THRU connector (Connector: BNC type)
The external video sync signal is input here when synchronizing with the video sync signal.

6. VIDEO IN connector (Connector: BNC type)
The external video sync signal is input here when synchronizing with the video sync signal.

7. VIDEO IN terminating switch (75 ON/OFF)
Termination of the VIDEO IN signal is switched ON or OFF but is normally switched ON.
If a multiple connection is made via VIDEO THRU, then the last equipment only is switched ON and others switched OFF.

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8. WORD OUT connector (Connector: BNC type)

Word sync signals are output here.

When synchronizing with an external signal, word sync signals in sync with the external sync signal is output here.

9. WORD IN connector (Connector: BNC type)

The external word sync signal is input here when synchronizing with the word sync signal.

10. WORD IN terminating switch (75　ON/OFF)

Termination of the WORD IN signal is switched ON or OFF but is normally switched ON.

Changes in D-15 functions and new SETUP menu items

There will be some changes in the displays and key functions by installing the 8335 in the D-15 Furthermore, SETUP mode menu items heretofore not effective will now be effective.

The content of these changes and now effective functions only will be explained here. Therefore, in regards to other functions, please refer to the D-15 Owners Manual.

Content of changes

1. TC on tape will be shown in the FL display!

2. External time code (LTC) input will be displayed as the Reference (REF TC)!

Due to these changes in above 1. and 2., the display content will be different as a result of the D-15 DISP TIME key operation.

[Display switching by the DISP TIME key without 8335]
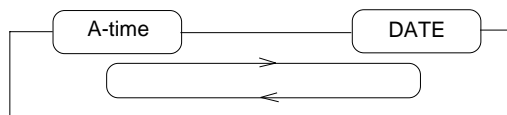
[Display switching by the DISP TIME key with 8335]
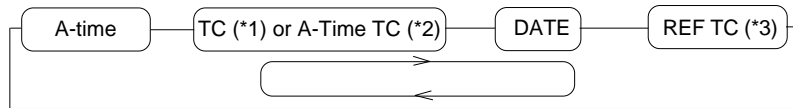
(*1) TC	Displays IEC time code figures recorded on tape.
(*2) A-time TC	Displays the resulting time code figures when A-time recorded on the tape is converted to time codes.
(*3) REF TC	Taking the externally input time code as a Reference, it is displayed as follows:

<**Example**>: When indicating 1h:34m:28s:15f, frame rate = 24
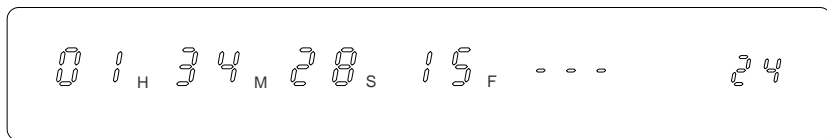
Other frame rate figures will be displayed as shown below:

Type of TC	Display
24 (FILM)	24
25 (EBU)	25
30 or 29.97 drop frame (SMPTE)	30D or 29D
30 or 29.97 nondrop frame (SMPTE)	30N or 29N

3. Input monitor of audio/time code is possible!

Input monitoring of audio and time code is possible by pressing the D-15 [**INPUT MONITOR**] key.

However, if audio data is being read into the RAM under the INSTANT START mode, input monitoring will be switched OFF automatically.

Refer to page [14] of the D-15 Owner's Manual on judging input monitor conditions by the INPUT MONITOR LED.

> *<NOTE>*
> *If it is desired to confirm the time code time which is being input, change to the "REF TC" display by pressing the [DISP TIME] key so that the time code figure being input can be confirmed.*

Changes and the new effective SETUP menu

Together with changes in the SETUP menu "Version display function" by installation of 8335, the following 9 item menu can be setup.

> **[Menu changed of display function]**
> * Version display function (vErSion 001-chk)

> **[New menu possible of setup]**
> * Setup of the playback time code format (rEProtc 401 -***)
> * Frame rate setup of playback time code (FrAME 402 -***)
> * Time code output ON/OFF setup at pause (PAUStc 403 -***)
> * Setup of time code output at fast winding (Windtc 404 -***)
> * Setup of the event start mode by REF TC (rEFPLY 405 -***)
> * Setup of the time code to be recorded (rECFrAM 411 -***)
> * Setup of the CHASE operation mode (CASEMod 501 -***)
> * Setup of the lock window (LockWind 502 -***)
> * Setup of the external clock (ExtCLK 503 -***)

1. Version display function [vE r Si on 001 -chk]

In addition to the D-15 version/date, the version/date of 8335 that is installed can be confirmed.

After simultaneously pressing [**0**] and [**1**] of the [**numerical keypad**] to enter the SETUP mode, select the [**vErSion 001 -chk**] menu by rotating the [**JOG**] dial and press the [**EXECUTE/YES**] key (It will change to the [D-15 version] display). Successively, if the [**JOG**] dial is rotated clockwise, it will alternately be displayed as follows in this order, and the order will be reversed when rotated counter clockwise.

d - 15 001 -00	D-15 version
83 35 001 -00	8335 version
d - 15 96 -08 -21	D-15 date
83 35 96 -08 -21	8335 date

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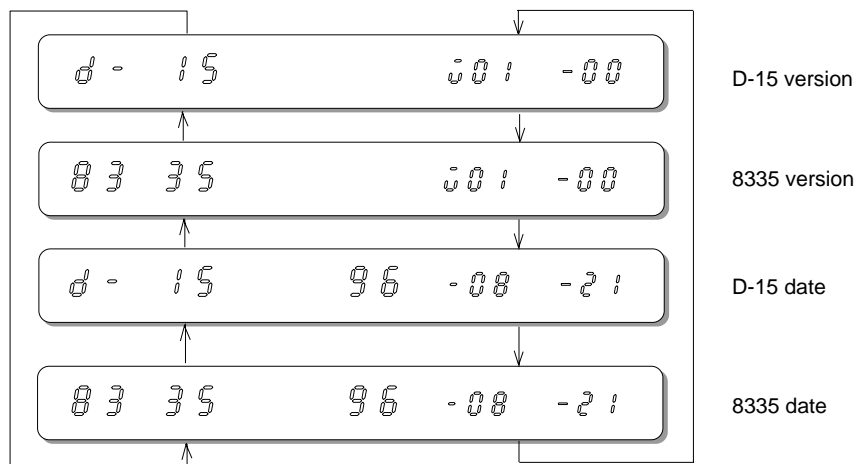
2. Setup of the playback time code format [rE Pr o tc 401 -***]

The original time data to be converted to time code (LTC) and output is selected by this menu. Time data can be selected and setup from three types - "IEC AUTO," "IEC MANUAL" and "A-time."

After entering the SETUP mode, rotate the [**JOG**] dial, select the [**rEProtc 401 -***]** menu, and press the [**EXECUTE/SET**] key. Then, after rotating the [**JOG**] dial CW and CCW to select the desired time data, press the [**EXECUTE/SET**] key again to set it up (* is the initial setting).
This setup content will be held even though power is switched OFF.

Functional note	Menu No.	Setup No.	Functional content
IEC AUto	401	000(*)	Converted to LTC from IEC time code. Frame rate will be "Auto."
IEC MANU	401	001	Converted to LTC from IEC time code. Frame rate is setup by the next item "402 -***."
A-time	401	002	Converted to LTC from A-TIME. Frame rate is setup by "402 -***."

*If "401-000" (IEC AUTO) is selected, it will be output automatically in the same frame rate as at recording regardless to the frame rate setup by the next item "Frame 402 -***."*

3. Frame rate setup of playback time code [Fr A ME 402 -***]

When the original time data to be converted is set in "401 -001" or "401 -002" and played back by converting A-TIME or IEC time code to LTC, the frame rate, of the time code to be played back, can be randomly setup. Frame rates can be selected can be selected from the following six types. Should the time data be set in "401 -000" (IEC AUTO), this setting will be ineffective and will be output automatically in the frame rate that was recording.

After entering the SETUP mode, rotate the [**JOG**] dial, select the [**FrAME 402 -***]** menu, and press the [**EXECUTE/SET**] key. Then, after rotating the [**JOG**] dial CW and CCW to select the desired frame rate, press the [**EXECUTE/SET**] key again (* is the initial setting).
This setup content will be held even though power is switched OFF.

Functional note	Menu No.	Setup No.	Functional content
Fr 24	402	000	24 frames
Fr 25	402	001 (*)	25 frames
Fr 29.97dF	402	002	29.97 drop frame
Fr 29.97	402	003	29.97 non drop frame
Fr 30	402	004	30 non drop frame
Fr 30 dF	402	005	30 drop frame

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4. Time code output ON/OFF setup at pause [PA US tc 403 -***]

Whether time code should be output or not in the PAUSE mode of D-15 is selected by this menu.

After entering the SETUP mode, rotate the [**JOG**] dial, select the [**PAUStc 403 -***]** menu, and press the [**EXECUTE/SET**] key. Then, after rotating the [**JOG**] dial CW and CCW to select the desired frame rate, press the [**EXECUTE/SET**] key again (* is the initial setting).
This setup content will be held even though power is switched OFF.

Functional note	Menu No.	Setup No.	Functional content
OFF	403	000 (*)	PAUSE TC OFF (TC not output)
ON	403	001	PAUSE TC ON (The read out time code is repeatedly out put in complete units of hour, minute, second and frame)

5. Setup of time code output at fast winding [Wi nd tc 404 -***]

Whether time code should be output or not in the fast wind mode of F FWD/ REWIND of D-15 is selected by this menu.

After entering the SETUP mode, rotate the [**JOG**] dial, select the [**Windtc 404 -***]** menu, and press the [**EXECUTE/SET**] key. Then, after rotating the [**JOG**] dial CW and CCW to select the desired frame rate, press the [**EXECUTE/SET**] key again (* is the initial setting).
This setup content will be held even though power is switched OFF.

Functional note	Menu No.	Setup No.	Functional content
1 Fr AM	404	000 (*)	The read out time code is output in complete units of hour, minute, second and frame units.
5 Fr AM	404	001	The read out time code in complete units of hour, minute, second and frame, and in addition four frames are pseudo attached for a total of 5 frames in the positive direction are converted to a continuous time code and output.
Stop	404	002	Time code will not be output in other than the PLAY and REC modes.

6. Setup of the event start mode by REF TC [rE FP LY 405 -***]

When the D-15 is in the STOP or PAUSE mode, whether D-15 should event start (in PLAY mode) automatically or not when the time of the external time code (REFERENCE TC) that is input and the time setup in the D-15 memory [00] coincide, is selected from this menu.

The event start mode can be selected from 3 different types - "oncE," "EVEry" and "oFF." If the D-15 GPI ON/OFF switch is "ON," "EVENT 0" is simultaneously output from the GPI OUT connector.

After entering the SETUP mode, rotate the [**JOG**] dial, select the [**rEFPLY 405 -***]** menu, and press the [**EXECUTE/SET**] key. Then, after rotating the [**JOG**] dial CW and CCW to select the desired frame rate, press the [**EXECUTE/SET**] key again (* is the initial setting).

This setup content will return to the initial setting when power is switched OFF or after completion of the "oncE" mode.

Functional note	Menu No.	Setup No.	Functional content
oFF	405	000 (*)	It will not event start by ignoring the REF TC time.
oncE	405	001	Functions only under the positive direction one time speed time code and will execute event start once.
EVEry	405	002	Functions only under the positive direction one time speed time code and will repeatedly execute event start.

> *If the event start mode is set to "oncE" or "EVEry," [REF] in the REF TC display will blink to indicate that it is in the event start mode.*

7. Setup of time code to be recorded [rE C Fr AM 411 -***]

When either 9.97fps or 30fps external time code is to be input and recorded or when executing time code CHASE, this menu selects the frame rate which matches the external time code that is input. Either 29.97fps or 30fps is selected for the frame rate. However, should 24fps or 25fps time codes be input, the D-15 will automatically acknowledge this.

After entering the SETUP mode, rotate the [**JOG**] dial, select the [**rECFrAM 411 -***]** menu, and press the [**EXECUTE/SET**] key. Then, after rotating the [**JOG**] dial CW and CCW to select the desired frame rate, press the [**EXECUTE/SET**] key again (* is the initial setting).

This setup content will be held even if the power is switched OFF.

Functional note	Menu No.	Setup No.	Functional content
Fr 29.97	411	000 (*)	The 29.97fps time code is selected.
Fr 30	411	001	The 30fps time code is selected.

8. Setup of the CHASE operation mode [CH SE M od 501 -***]

The mode for locking (chase locking) D-15 to the external time code is selected by this menu. Operating modes can be selected from "oncE," "Cont" or "FrAME."

After entering the SETUP mode, rotate the [**JOG**] dial, select the [**CHSEMod 501 -***] menu, and press the [**EXECUTE/SET**] key. Then, after rotating the [**JOG**] dial CW and CCW to select the desired frame rate, press the [**EXECUTE/SET**] key again (* is the initial setting).
This setup content will be held even if the power is switched OFF.

Functional note	Menu No.	Setup No.	Functional content
oncE	501	000 (*)	After CHASE ON of D-15, chase is ended upon locking once on REF TC, then D-15 will free run. Also, even if lock is disengaged, it will not enter chase again.
Cont	501	001	After CHASE ON of D-15, it will lock onto REF TC, then will free run. If lock is disengaged, it will automatically chase again.
FrAME	501	002	After CHASE ON of D-15, it will lock on to REF TC and frame sync playback executed at a sufficiently low fluctuation variable speed playback on the hearing characteristics such that it will remain locked (Refer to <NOTE>). Should lock be disengaged, it will auto-matically chase again.

When the audio sampling clock and the time code clock do not match, the lock is apt to become disengaged if the transport is run for a long time. In such a case, use the above "FrAME (002)" mode.

<NOTE>
Permissible clock deviation between external time code and chaseable clock is about 0.1 %. Therefore, it will not function if clock deviation is larger than this.

9. Setup of the lock window [Lo ck Wi nd 502 -***]

The reference frame to determine the UNLOCK state subsequent to CHASE locking when selecting the "Cont (continue)" or "FrAME" CHASE operation mode to make the D-15 CHASE by the external time code, is selected by this menu. The reference frames can be setup within the one to 20 frame range in one frame units.

After entering the SETUP mode, rotate the [**JOG**] dial, select the [**LockWind 502 -***] menu, and press the [**EXECUTE/SET**] key. Then, after rotating the [**JOG**] dial CW and CCW to select the desired frame rate, press the [**EXECUTE/SET**] key again (* is the initial setting).
This setup content will be held even if the power is switched OFF.

Functional note	Menu No.	Setup No.	Functional content
1 FrAM	502	000	The 1~20 frames can be set in one frame steps.
20 FrAM	502	020	(*) "010" = 10 frames.

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10. Setup of the external clock [Ex tC LK 503 -***]

The external sync signal to be used in phase modifying operation of the D-15 with external equipment is selected by this menu. The external sync signal can be selected from three different types - "AES/Ebu," "Word" and "VidEo."

After entering the SETUP mode, rotate the [**JOG**] dial, select the [**ExtCLK 503 -***]** menu, and press the [**EXECUTE/SET**] key. Then, after rotating the [**JOG**] dial CW and CCW to select the desired frame rate, press the [**EXECUTE/SET**] key again (* is the initial setting).

This setup content will be held even if the power is switched OFF.

Functional note	Menu No.	Setup No.	Functional content
AES Ebu	503	000	Select the AES/EBU digital signal.
Word	503	001	Select the word sync signal.
VidEo	503	002 (*)	Select the video sync signal.

> **<NOTE>**
> *If external sync is not normal, the display [EXT CLOCK] will blink in warning. In such a case, check the connection and the setup content of the SETUP menu [ExtCLK 503 -***].*

> **<NOTE>**
> *When SETUP "503 -000 (AES/EBU)" is selected, use the XLR type connector to input the digital signal. Note that it will function if the OPTICAL IN connector is used.*

Additional Functions

1. Recording the external time code (LTC)

By installing this equipment in the D-15, external time codes (LTC) can be converted to IEC time codes (PRO R-TIME and PRO binary) and recorded in the sub code area while recording an audio signal.

> **<NOTE>**
> *The D-15 with the Model 8335 installed cannot separately record audio and time codes. Therefore, it must be noted that if audio is inserted in a no sound recorded section, the time code of that section will be erased.*

Connection with external equipment

In order to record time codes (LTC) during recording of audio signals, the 8335 must be installed in the D-15 and external equipment connected to it as shown below.

1. Connect the external equipment time code (LTC) output to the TIME CODE IN (XLR-3-31 type or RCA) connector of 8335 installed in D-15.

> **<NOTE>**
> *If cables are connected to both XLR (balanced) and RCA (unbalanced) connectors, RCA will have priority and thus XLR cannot be used.*
> *If XLR must be used, do not plug anything in the RCA jack.*

2. Connect the audio input to the D-15 DIGITAL IN (or ANALOG IN) connector.

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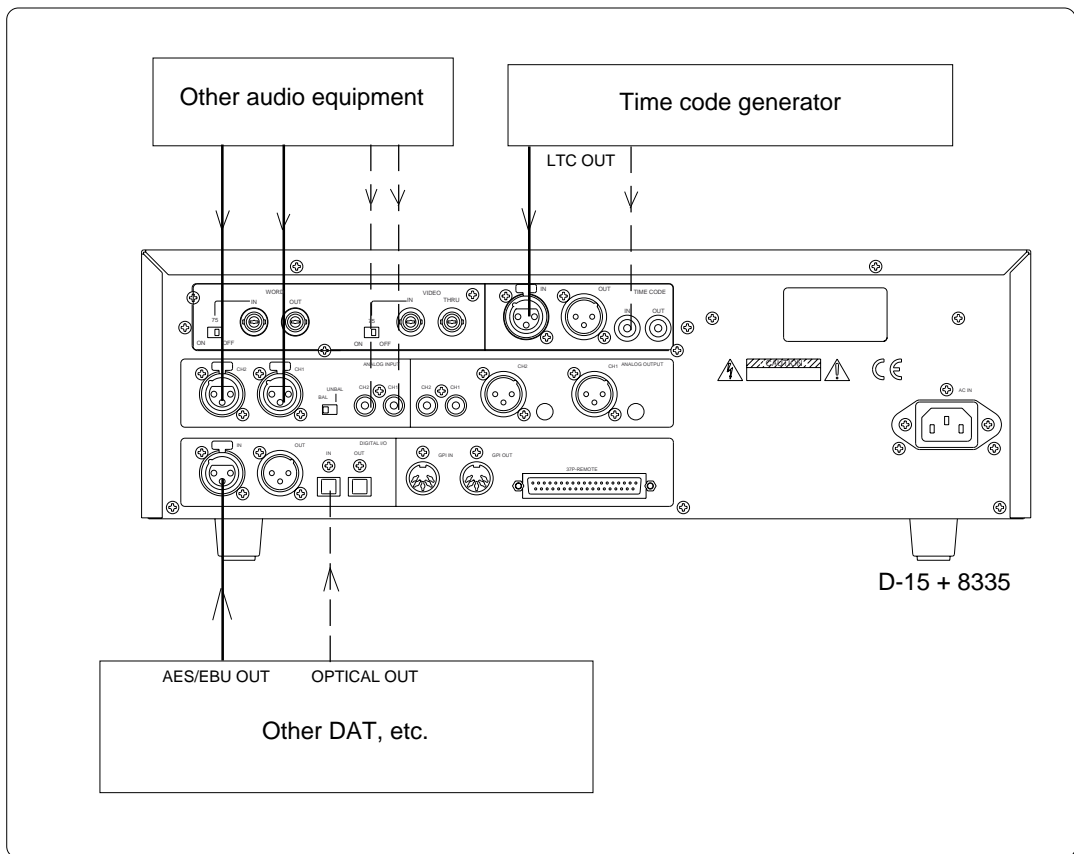
Recording
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1. Set the D-15 front panel [**CLOCK**] switch to [**INT**].
When an external sync signal is input as a reference to record the time code in sync with this sync signal, set the [**CLOCK**] switch to [**EXT**] using the SETUP menu "503 -***." Set it to the external clock identical with the external sync signal (Refer to <***NOTE***> below).

> *Refer to page [15] for setup of the SETUP menu "503 -***."*

2. Setup the frame rate by the SETUP menu "**411 -***"** when time code to be recorded is **29.97**fps or **30**fps.
When recording the 24fps, 25fps time codes, they will be automatically acknowledged and recorded regardless to the setting of the SETUP menu.

> *The D-15 will automatically acknowledge 24 and 25fps time codes and record them but 29.97 and 30fps cannot be acknowledged. Therefore, if 29.97 or 30fps time codes are to be recorded, they must be specified by the SETUP menu "411 -***."*

> *Refer to page [13] for setting by the SETUP menu "411-***."*

3. Start the externally connected audio equipment and the TC generator.

4. Start the D-15 in the record mode by pressing the [**PLAY**] button while pressing the [**RECORD**] button.

5. After completing the recording, press the [**STOP**] button.

> ***<NOTE>***
> *Because ASSEMBLE recording only can be made by the D-15, if recording is temporarily stopped and then resumed, continuous time code cannot be recorded.*
>
> ***<NOTE>***
> *If a recording is made with the [CLOCK] switch at [INT], a slight deviation of the clock will be created between the recorded time code (LTC) and the inner sampling clock.*
> *In such a case, synchronize the entire system by input of an external video sync signal as a reference to the VIDEO IN connector of this equipment.*

2. Conversion of A-TIME/IEC time code to LTC and output

A-TIME or IEC time code recorded on the tape can be converted to LTC and output by installing the 8335 in the D-15. However, it must be noted that discontinuous or missing IEC time codes are not guaranteed).

Procedures in converting A-TIME or IEC time code to LTC is explained here.

Setup procedure

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1. Select **time data** to be converted.

Time data to be converted to time code (LTC) is selected by SETUP menu "**401 -*****."

Select "**401 -002 (A-time)**" to convert A-TIME and setup a random frame rate according to procedure [**2**] below, in regards to SETUP menu "**401 -*****."

On the other hand, select either "**401 -000 (IEC AUTO)**" or "**401-001 (IEC MANUAL)**" to convert IEC time code.

If "**401-000 (IEC AUTO)**" is selected, it will be output automatically, regardless to the frame rate setting, at a frame rate identical with that at recording. When "**401-001 (IEC MANUAL)**" is selected, it can be setup for a random frame rate by procedure [**2**] below, explaining SETUP menu "**401 -*****" (For example, even though the frame rate recorded on the tape is 25 frames, it can be set to 29.97 Drop Frame).

> *Refer to page [11] for setup of SETUP menu "401-***."*

> *When A-TIME or IEC time code is converted and output, the time code figure can be confirmed by switching to the TC display with the [DISP TIME] key.*
> *Thus, the time code time can be confirmed by changing the display to show TC at which [A-TIME TC] will be shown during conversion of A-TIME, and [TC] when converting the IEC time code.*

2. Set **frame rate** of time code (LTC) to be output.

When "**401 -001 (IEC MANUAL)**" or "**401 -002 (A-TIME)**" is selected and output as specified in above step [**1**], frame rate of the time code that is output can be setup. The frame rate can be set by the SETUP menu "**402-*****."

> *Refer to page [11] for setup of SETUP menu "402-***."*

3. Setup the output type as necessary for time code outputs in the PAUSE and F FWD/REWIND modes.

These can be setup by SETUP menus "**403 -*****" and "**404 -*****."

> *Refer to page [12] on SETUP menus "403 -***" and "404 -***."*

## 3. Chase synchronizing by external TC (Playback only)

This function is for playing back tape in sync with externally input time codes which is possible when external time code is input to the TIME CODE IN (XLR or RCA) of the 8335 installed in the D-15, and then switching "ON" (by pressing the D-15 front panel CHASE key) the CHASE mode which is activated by installing of the 8335.

> **<NOTE>**
> *Time code CHASE is executed at playback only and recording cannot be executed.*

Interconnections

As an example, a D-15 installed with the 8335 is connected as the slave and a VTR as the master are interconnected as shown in the schematic.
In this example, time codes recorded in the VTR is input to D-15+8335, then the audio signal is played back by letting the VTR chase it.
In this operation, the video sync signal or word sync signal from the VTR is input as a reference by the connections shown in the schematic.

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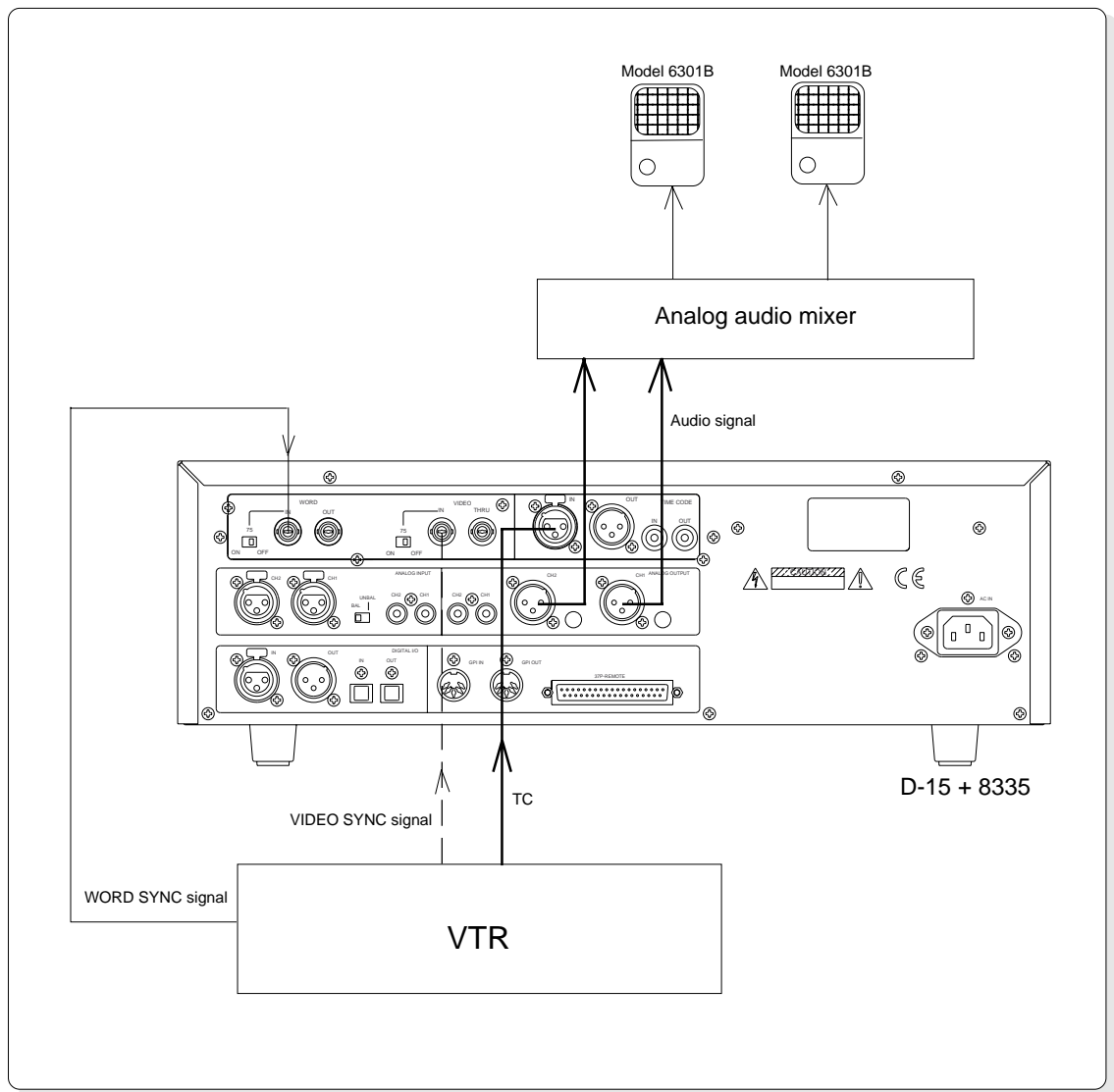
Settings Prior to Operation

Setup the following items prior to actual operation.

1. Set the D-15 front panel [**CLOCK**] switch to [EXT].

2. Set the 8335 external clock to match that of the master.
[**EXT CLOCK**] will be shown in the display.
Set the external clock by the SETUP menu "**503-***.**"

> *Refer to page [15] on setup of the SETUP menu "503-***."*

3. Setup **CHASE mode** of 8335.
Select and setup the CHASE operation mode suitable for your application from among "**501 -000 (ONCE),**" "**501 -001 (CONTINUE)**" or "**501 -002 (FRAME)**" in the SETUP menu "**501 -***.**"

> *Refer to page [14] on setup of the SETUP menu "501-***."*

4. Setup **LOCK WINDOW** when "**501 -001 (CONT)**" or "**501 -002 (FrAME)**" is selected for the CHASE mode.
Setup the reference frame by the SETUP menu "**502 -***"** to determine the UNLOCK state after entering the CHASE LOCK mode.

> *Refer to page [14] on setup of the SETUP menu "502-***."*

5. Setup the **CHASE OFFSET** figure.
If the **CHASE OFFSET** figure is randomly set, the D-15 will chase by maintaining the interval for the time setup by CHASE OFFSET.

CHASE OFFSET can be setup with the OFFSET data edit mode by pressing the D-15 front panel [**OFFSET**] key, then the [**QUIT/RCL**] key.

> *Refer to page [26] for details on editing the OFFSET figure.*

Executing CHASE SYNC

After finishing the previous "**Settings Prior to Operation**," chase sync is executed.

1. Start playback of the master machine (VTR in this case).

2. Switch on the D-15 front panel [**CHASE**] key (CHASE LED blinks).
By using the playback time code of D-15 (slave), it will start playback in chase lock with the master machine time code.
When the slave machine is chase locked to the master machine, [**CHASE LOCK**] will appear in the display and, at the same time, CHASE LED will change from blinking to constant lighting.

3. To stop the chase operation, press the [**CHASE**] key again (CHASE LED will be extinguished).

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4. Phase Modified Operation by External Sync Signal

Even though time code is not recorded on the tape, the D-15 can be locked onto external sync signals such as WORD IN, VIDEO IN, AES/EBU digital signals in phase modified operation.

Interconnections

As shown in the schematic, external sync signals are input to either WORD IN, VIDEO IN or AES/EBU IN which matches the output of external equipment.
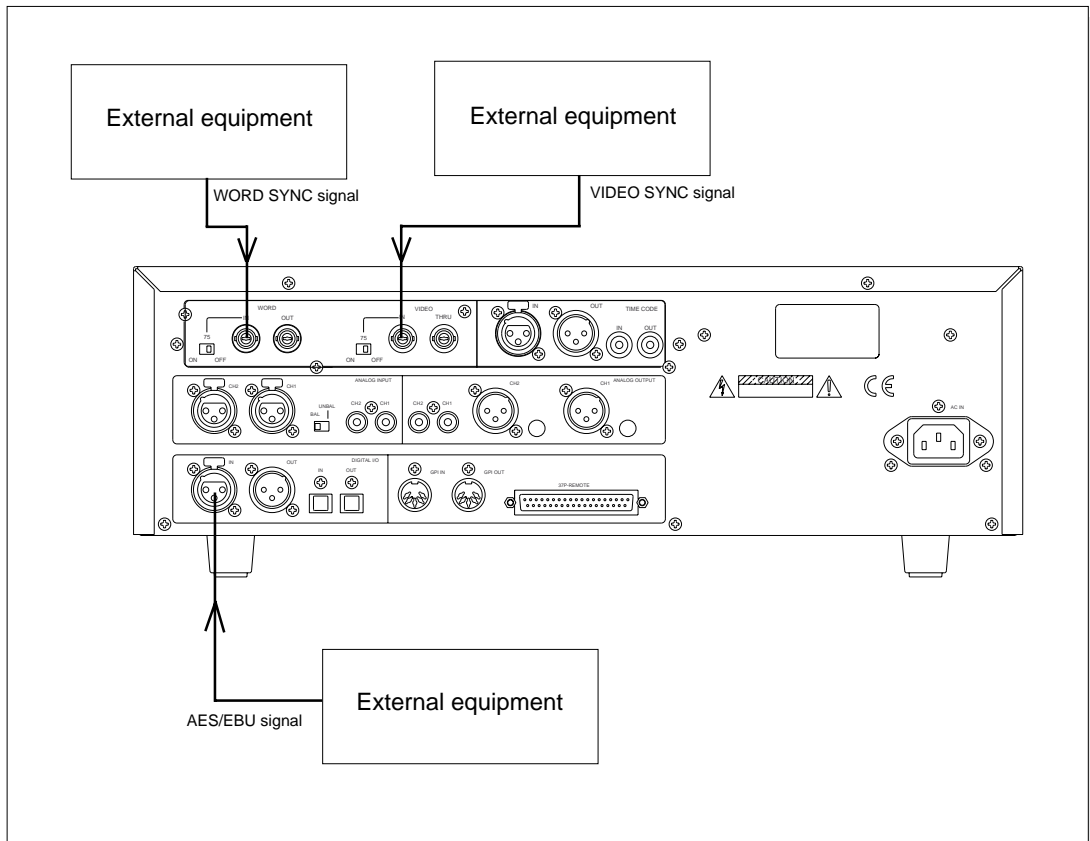
Settings Prior to Phase Modified Operation

Any one of the following setups are made depending on type of external sync signal that is to be input.

<When using WORD IN>

1. Set the D-15 front panel [**CLOCK**] switch to [**EXT**].

2. Select "**503-001 (WORD)**" by the SETUP mode "**503-*****" (Selecting the external sync signal).
When the external sync signal is correctly input, [**EXT CLOCK**] will be lit in the display.

3. Set FS to the same FS of the external sync signal which is input.
Set to [**44.1kHz**] or [**48kHz**] with the D-15 front panel [**SAMPLING FREQ**] switch.

<When using VIDEO IN>

---

1. Set the D-15 front panel [**CLOCK**] switch to [**EXT**].

2. Select "**503 -002 (VIDEO)**" by the SETUP mode "**503 -******" (Selecting the external sync signal).
When the external sync signal is correctly input, [**EXT CLOCK**] will be lit in the display.

<When using AES/EBU>

---

1. Set the D-15 front panel [**CLOCK**] switch to [**EXT**].

2. Select "**503 -003 (AES/EBU)**" by the SETUP mode "**503 -******" (Selecting the external sync signal).
When the external sync signal is correctly input, [**EXT CLOCK**] will be lit in the display.

3. Set FS to the same FS of the external sync signal which is input.
Set to [**44.1kHz**] or [**48kHz**] with the D-15 front panel [**SAMPLING FREQ**] switch.

> *Refer to page [15] for setup of the SETUP menu "503-***.\""*

5. Using the Event Start Mode

The event start mode is one of the additional functions after installing the 8335 in the D-15. With this function, when the D-15 is in the STOP or PAUSE mode, it will automatically playback when an external time code is input to a D-15 installed with an 8335, and becomes the same as the time previously set in the D-15 memory [00]. That is, the same as the data used for AUTO REC in which the TC figure is previously edited and stored in memory [00].

If the D-15 front panel [GPI] switch had been switched [ON] prior to above operation, [EVENT 0] will be simultaneously output from the GPI OUT connector.

Use this function for situations such as simultaneously starting two D-15's connected to external equipment at a randomly set time.

Interconnections

In the example shown in the schematic, a D-15 installed with the 8335 is connected to a VTR and time code from the VTR is input to TIME CODE IN of the first D-15. Then, the first D-15 GPI OUT is connected to the 2nd D-15 GPI IN (or other external equipment containing GPI IN).

Furthermore, to guarantee perfect sync of the two D-15's, AES/EBU signal lines from the first D-15 to the second D-15 should be provided (Refer to schematic below).
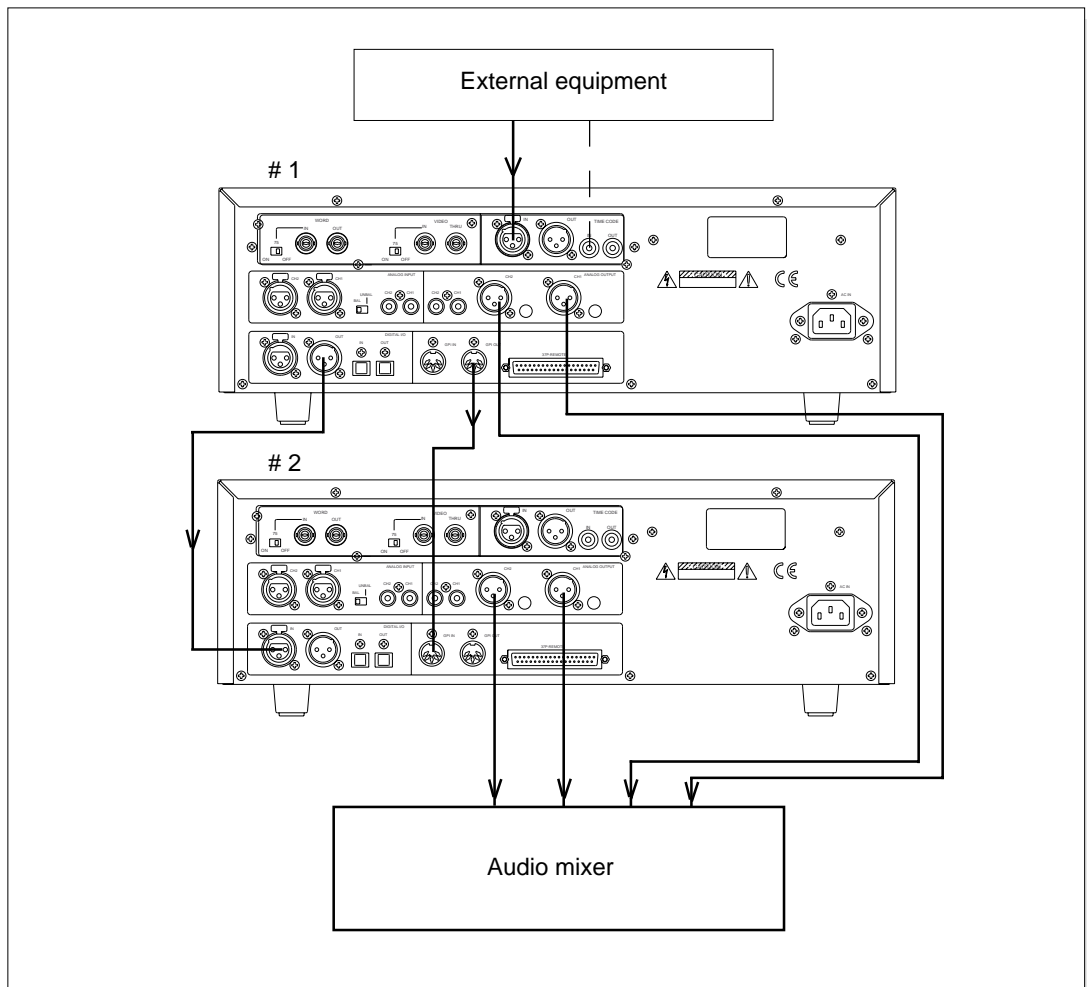
Setup of the First D-15

---

1. Switch [**ON**] the front panel [**GPI**] switch.

2. Switch [**ON**] the **event start mode** by the SETUP mode.
Select and setup either "**001 (oncE)**" or "**002 (EVEry)**" by the SETUP menu "**405 -***"." Simultaneous with setup of the SETUP menu "**405 -***"" to either one of these, [**REF**] will blink in the display to indicate that the **event start mode is [ON].**

> **<NOTE>**
> *When "001 (oncE)" is selected by the SETUP menu "405-***," event start is executed once and simultaneously switch to "000" (OFF) and [REF] will be extinguished. When power is switched off, the setup content will not be held but switch to "000" (OFF).*

> *Refer to page [13] for details on setup of SETUP menu "405-***."*

3. Set recording to head of playback.

4. Press the [**INSTANT START**] key to switch [ON] the INSTANT START mode.
INSTANT START can then be executed from head of recording.

Setup of the 2nd D-15

---

1. Switch [**ON**] the front panel [**GPI**] switch.

2. Switch [**ON**] the INSTANT START mode.

3. Set the external clock to "**503-000 (AES/EBU)**" by the SETUP menu "**503-***"."

4. Set recording to head of playback.

> *Refer to page [15] for details on the SETUP menu "503-***."*

Setup of Memory [00]

The time figure identical to the reference time code from which event is to be started is edited and stored in memory [00] of the first D-15.

Although memory [00] is setup using by the same procedure as for executing the AUTO REC mode, it can also be set by TC time in addition to A-TIME by installing 8335. In order to setup by A-TIME, change the display to A-TIME and if TC time is to be setup, change to the TC display.

> *Refer to [AUTO REC mode] of the D-15 Owners Manual for setup method of memory [00].*

> **<NOTE>**
> *When editing to the same time as the external time code, either A-TIME or TC can be used to match down to second units.*
> *However, if it is to be set in frame units with external time code, frame errors will be created and thus accurate event start cannot always be expected. Therefore, in order to operate the recorder more accurately (down to frame units), use the following method in setup of memory [00].*
>
> > **1**. *Set to "IEC MANU" by the SETUP menu "401-***" and likewise use SETUP menu "402-***" to set the frame rate same as in the external time code.*
> >
> > **2**. *Change the display to [TC].*

Executing Event Start

1. Start playback of the external equipment.
At the instant the external time code time and the time set in memory [**00**] of the first D-15 becomes the same, the D-15 in standby in the STOP or PAUSE mode will start to playback. At the same time, [**EVENT 0**] is output from GPI OUT of the first D-15 and the second D-15 will start playback at the same timing.

6. MEM NO Locate / TIME Locate by TC Time

By installing the 8335, in addition to the time of A-TIME, memory by TC time, MEM NO locate and time locate then becomes possible.

The actual operating method is the same as when the 8335 is not installed but before operation, the display must be changed to [**TC**] by the [**DISP TIME**] key. For operating methods of memory/locate, refer to the D-15 Owners Manual.

> **<NOTE>**
> *To execute memory/locate with the TC time, the display must always be changed to TC. For example, when attempting to locate to the MEM NO stored in TC time in the memory, if this is executed while A-TIME is displayed, the TC time for locating will be by the A-TIME and thus be located by this time.*

7. Editing the OFFSET Figure

By installing the 8335, it will then be possible to edit memory data of TC time aside from A-TIME. The same method as when an 8335 is not installed can be used by changing the display to TC.

In addition, editing **CHASE OFFSET** is now possible as a new function. When executing **CHASE** operation in sync with external time codes, a certain amount of time difference (CHASE OFFSET TIME) can be set between two time codes functioning in synchronization.

If this OFFSET figure is setup, when the slave D-15 starts the CHASE operation, it can be synchronized with the external time code while maintaining an interval equal to the CHASE OFFSET time. The operating method below, as explained by "**Chase Synchronizing**" on page 19, is explained in the situation of inputing an external time code to the D-15.

Editing Method

1. Press **once** the D-15 front panel [**OFFSET**] key.

When the key is pressed, time difference between the presently input external time code and time code on the tape, and the frame rate is displayed (Example below shows that the present OFFSET is 00: 01: 18: 03: 84 and frame rate is 25).
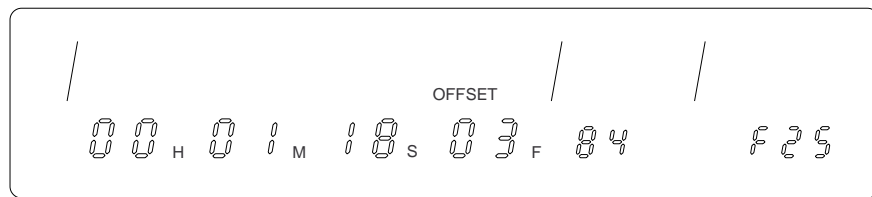
2. **Next**, press the [**QUIT/RCL**] key.

It is entered in the OFFSET data edit mode and [**H**] will blink as shown in the schematic.(Example: OFFSET is set to [00:00:00:00:00])
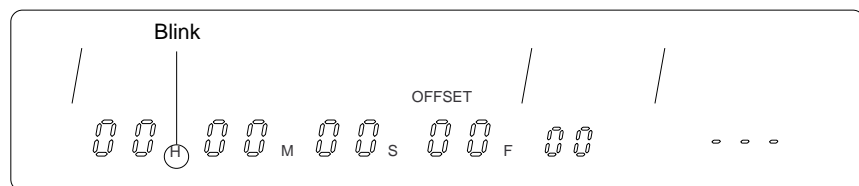
3. Input the desired **OFFSET** data.

A new number can be input at the blinking digit.
The blinking digit can be shifted to right or left by the [**SHUTTLE**] dial and numbers input at the blinking digit with the [**JOG**] dial or the [**10**] key (numerical keypad).

Input by JOG	When rotated clockwise at the blinking digit other than [H], it will count up, and count down in the counter clockwise rotation.
Input by [10] key	At the instant two numbers are input at the blinking digit, the blinking digit will shift to the right.

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4. After input of a **new OFFSET data**, press the [**EXECUTE/SET**] key. Simultaneous with fixing the input data as the CHASE OFFSET figure, the D-15 will be released from the edit mode and return to the OFFSET display.

Depending on the CHASE OFFSET setup content, D-15 will operate as follows:

    1*. If OFFSET is set to (+) time, the D-15 will sync ahead of the master machine time code by the OFFSET amount.*

    2*. If OFFSET is set to (-) time, the D-15 will sync behind of the master machine time code by the OFFSET amount.*

    3*. If OFFSET is set to (00:00:00:00:00) time, the D-15 will catch up with the master machine and sync at the same time as the time code.*

Major Specifications

TIME CODE INPUTS/OUTPUTS

    Format   : SMPTE/EBU

<Time code in (XLR type)>

    Connector   : XLR-3-31 type (x1)
    Standard input level   : 2V p-p
    Minimum input level   : 0.25V p-p
    Input impedance   : 20k   or more

<Time code in (RCA type)>

    Connector   : RCA pin (x1)
    Standard input level   : 1V p-p
    Minimum input level   : 0.25V p-p
    Input impedance   : 10k   or more

<Time code out (XLR type)>

    Connector   : XLR-3-32 type (x1)
    Standard output level   : 2V p-p
    Load impedance   : 600   or more

<Time code out (RCA type)>

    Connector   : RCA pin (x1)
    Standard output level   : 1V p-p
    Load impedance   : 600   or more

VIDEO IN

    Connector   : BNC type (x1)
    Format   : Composite
    Standard input level   : 1V p-p
    Input impedance   : 75   (On/off by terminating switch)

VIDEO THRU

    Connector   : BNC type (x1)
    Standard output level   : Video input is directly output.

WORD IN

    Connector   : BNC type (x1)
    Standard input level   : TTL level
    Input impedance   : 75   (On/off by terminating switch)

WORD OUT

    Connector   : BNC type (x1)
    Standard output level   : TTL level
    Load impedance   : 75   or more

POWER SUPPLY   : Supplied from D-15 (DC +5V, DC ± 15V)

* Specifications and appearance of this product subject to change without notice.

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Declaration of EC Directive

This equipment is compatible with the EMC Directive (89/336/EEC) - Directive on approximation of member nation's ordinance concerning the electromagnetic compatibility and with the Low Voltage Directive (73/23/EEC) - Directive on approximation of member nation's ordinance connecting electric equipment designed to be used within the specified voltage range.

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