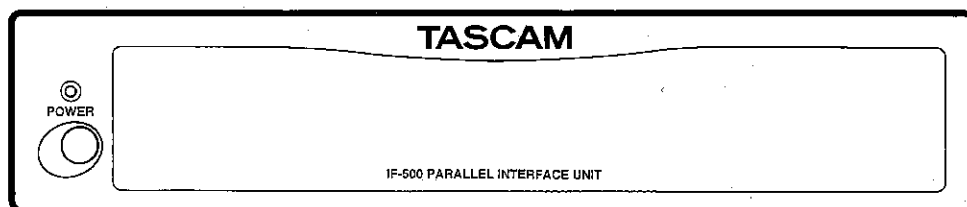
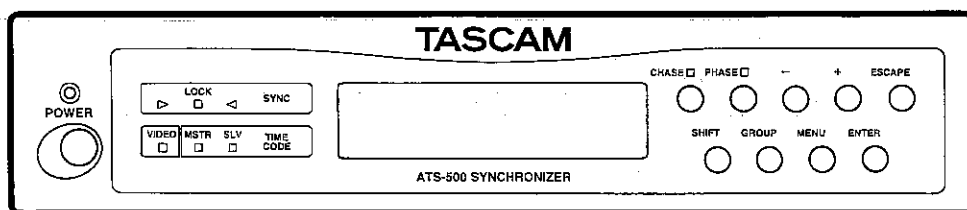


# TASCAM

TEAC Professional Division

## ATS-500/IF-500

Synchronizer/Parallel Interface Unit



**OWNER'S MANUAL**

5700132800

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### ADVARSEL!

Lithiumbatteri — Eksplosionsfare ved fejlagtig  
 handling. Udsiftning må kun ske med batteri  
 af samme fabrikat og type.  
 Levér det brugte batteri tilbage til leverandøren.

### VARNING

Explosionsfara vid felaktigt batteribyte.  
 Använd samma batterityp eller en ekvivalent  
 typ som rekommenderas av apparattillverkaren.  
 Kassera anvant batteri enligt fabrikantens instruktion.



**CAUTION**  
 RISK OF ELECTRIC SHOCK  
 DO NOT OPEN



CAUTION: TO REDUCE THE RISK OF ELECTRIC SHOCK, DO NOT REMOVE COVER (OR BACK). NO USER-SERVICEABLE PARTS INSIDE. REFER SERVICING TO QUALIFIED SERVICE PERSONNEL.



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.

This appliance has a serial number located on the rear panel. Please record the model number and serial number and retain them for your records.  
 Model number \_\_\_\_\_  
 Serial number \_\_\_\_\_

**WARNING: TO PREVENT FIRE OR SHOCK HAZARD, DO NOT EXPOSE THIS APPLIANCE TO RAIN OR MOISTURE.**

# SAFETY INSTRUCTIONS

## CAUTION:

- Read all of these instructions.
- Save these instructions for later use.
- Follow all warnings and instructions marked on the audio equipment.

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, etc.
6. **Carts and Stands** — The appliance should be used only with a cart or stand that is recommended by the manufacturer.
- 6A. 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.

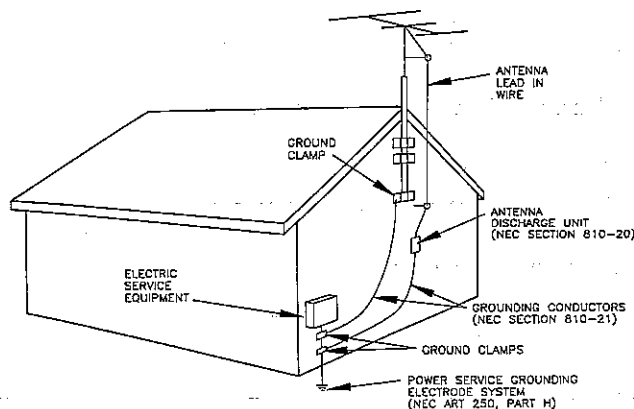


7. **Wall or Ceiling Mounting** — The appliance should be mounted to a wall or ceiling only as recommended by the manufacturer.

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. **Power Lines** — An outdoor antenna should be located away from power lines.
15. **Outdoor Antenna Grounding** — If an outside antenna is connected to the receiver, be sure the antenna system is grounded so as to provide some protection against voltage surges and built up static charges. Section 810 of the National Electrical Code, ANSI/NFPA No. 70 — 1984, provides information with respect to proper grounding of the mast and supporting structure, grounding of the lead-in wire to an antenna discharge unit, size of grounding conductors, location of antenna-discharge unit, connection to grounding electrodes, and requirements for the grounding electrode. See Figure below.

EXAMPLE OF ANTENNA GROUNDING  
AS PER NATIONAL  
ELECTRICAL CODE



NEC — NATIONAL ELECTRICAL CODE

16. **Nonuse Periods** — The power cord of the appliance should be unplugged from the outlet when left unused for a long period of time.
17. **Object and Liquid Entry** — Care should be taken so that objects do not fall and liquids are not spilled into the enclosure through openings.
18. **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.
19. **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.

## Introduction

### ATS-500 SYNCHRONIZER

The TASCAM ATS-500 is a synchronizer that makes an ATR (Audio Tape Recorder) and VTR (Video Tape Recorder) or two or three ATRs work together by referring to SMPTE/EBU time code coming from these machines.

Its features include the following :

- Compatible with all SMPTE/EBU time code standards, 29.97 fps (SMPTE Non Drop Frame), 30 fps (SMPTE Drop Frame), 25 fps (EBU : European standard), and 24 fps (Film). The ATS-500 automatically recognizes them.
- Automatic advance or delay (offset) setting and sub-frame accurate (1/100 frame) offset trimming

The ATS-500 includes a time code generator which can :

- Generate all SMPTE/EBU time codes ;
- Read composite video signal from VTRs and use it as the time base for generating time code.
- Achieve a "Force Jam" (p.32)

### IF-500 PARALLEL INTERFACE UNIT

The ATS-500 synchronizes machines having "serial" interface ports (labelled "ACCESSORY 2" on TASCAM tape machines such as the 238, MSR-16, and TSR-8). To synchronize machines with "parallel" interface ports (such as the TASCAM MS-16 and 40 Series, most video cassette recorders, or machines made by other manufacturers), you need the optional IF-500 Parallel Interface Unit.

The IF-500 is almost a "plug-and-go" proposition. Once "set up," the ATS-500 automatically recognizes the IF-500, and the system is ready to operate.

- The IF-500 is a highly sophisticated, microcomputer-controlled serial-parallel converter. It is "delicate." Some non-TASCAM machines may not respond to commands you send through the IF-500.

### PRELIMINARY NOTES

- Many consumer, home video recorders have not the necessary functions for them to be controlled from the ATS-500 or any other synchronizers.
- Not all audio tape recorders are capable of being controlled from the ATS-500 or any other synchronizers. Also, some tape recorders may be used as the master, but not as the slave.
- Tape machines use either a DC (voltage) or FM (frequency) signal as reference for controlling their capstan servo system. Almost all FM servo systems use a 9.6 kHz signal and the ATS-500 sends this frequency signal (and not any other frequency signals) to the capstan motor of the slave causing it to speed up or slow down to match the master.

The ATS-500 can of course control machines with DC capstan servo systems. The DC voltage signal the ATS-500 sends is factory preset to match most DC servo tape machines. It is adjustable, but never try to change it unless you have trouble (p.10).

### NOTE FOR U.K. CUSTOMERS

Due to the variety of plugs being used in the U.K., this unit is sold without an AC plug. Please request your dealer to install the correct plug to match the mains power outlet where your unit will be used as per these instructions.

#### IMPORTANT

The wires in this mains lead are coloured in accordance with the following code:

BLUE:	NEUTRAL
BROWN:	LIVE

As the colours of the wires in the mains lead of this apparatus may not correspond with the coloured markings identifying the terminal in your plug, proceed as follows:

The wire which is coloured blue must be connected to the terminal which is marked with the letter N or coloured BLACK. The wire which is coloured BROWN must be connected to the terminal which is marked with the letter L or coloured RED.

## What SMPTE Time Code Is

SMPTE is an acronym (pronounced simpti) for the Society of Motion Picture and Television Engineers. The SMPTE Time Code was defined in 1970, and it is now accepted as a universal standard. It is coded audio signal that is based on the universal time concepts of hours, minutes, and seconds. Due to its early and most prominent use in video, it also further divides into frames, a frame being 1/24th, 1/25th, or 1/30th of a second depending on the type of SMPTE code (see below). It gives magnetic tape the same indexing method that sprocket holes and frame lines give to film. Each small section has its own unique identity number that can be located precisely time and time again by machines that can read time code. You can think of it as an electronic voice recorded on tape that says, "the time is now X hours, X minutes, X seconds, and X frames".

There are different types of SMPTE codes designated for different film/video formats :

- SMPTE Non-Drop Frame (30 frames per second) for American black and white television ;
- SMPTE Drop Frame (29.9 frames per second) for American color television (NTSC) ;

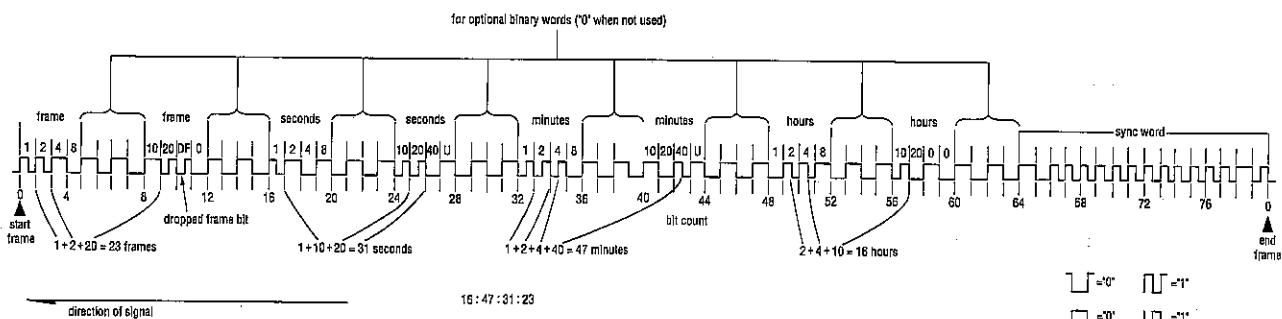
EBU (25 frames per second) for European black and white and color television (PAL/SECAM) ;  
FILM (24 frames per second)

(EBU is an abbreviation for the European Broadcasting Union.)

SMPTE has "bits" as its smallest increment. There are 80 bits per frame. Each set of 80 bits has not only time information but also a "sync word" which represents the end of each set of 80 bits and the beginning of the next 80 bits and also tells the direction the tape is traveling. See diagrams.

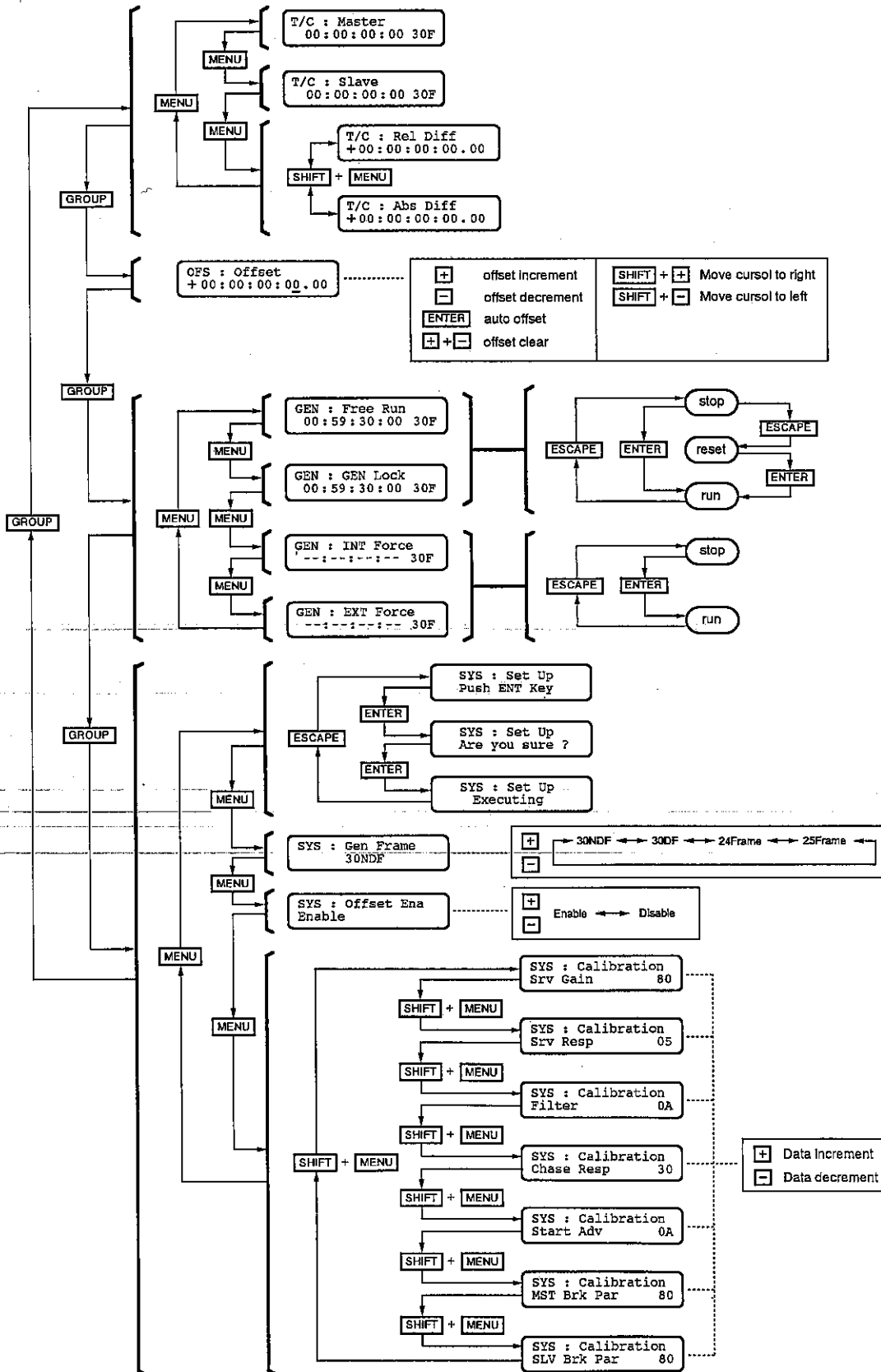
To make machines run in sync using time code, you need a synchronizer. This reads the master and slave time codes, compares the two, and issues "speed up" or "slow down" commands continually to the slave so that this chases and, when its time reading coincides with the master's, locks to the master.

FUNCTION	FRAMES UNITS	BINARY GROUP No. 1	FRAMES TENS	BINARY GROUP No. 2	SECONDS UNITS	BINARY GROUP No. 3	SEC'S TENS	BINARY GROUP No. 4	MINUTES UNITS	BINARY GROUP No. 5	MIN'S TENS	BINARY GROUP No. 6	HOURS UNITS	BINARY GROUP No. 7	HOURS TENS	BINARY GROUP No. 8	SYNCHRONIZING WORD
BCD OR BIT	1 2 4 8		1 2		1 2 4 8		1 2 4		1 2 4 8		1 2 4		1 2 4 8		1 2		0 0 1 1 1 1 1 1 1 1 1 1 1 1 1 1
BIT NO	0 1 2 3	4 5 6 7	8 9	10 11	12 13 14 15	16 17 18 19	20 21 22 23	24 25 26 27	28 29 30 31	32 33 34 35	36 37 38 39	40 41 42 43	44 45 46 47	48 49 50 51	52 53 54 55	56 57 58 59	60 61 62 63 64 65 66 67 68 69 70 71 72 73 74 75 76 77 78 79

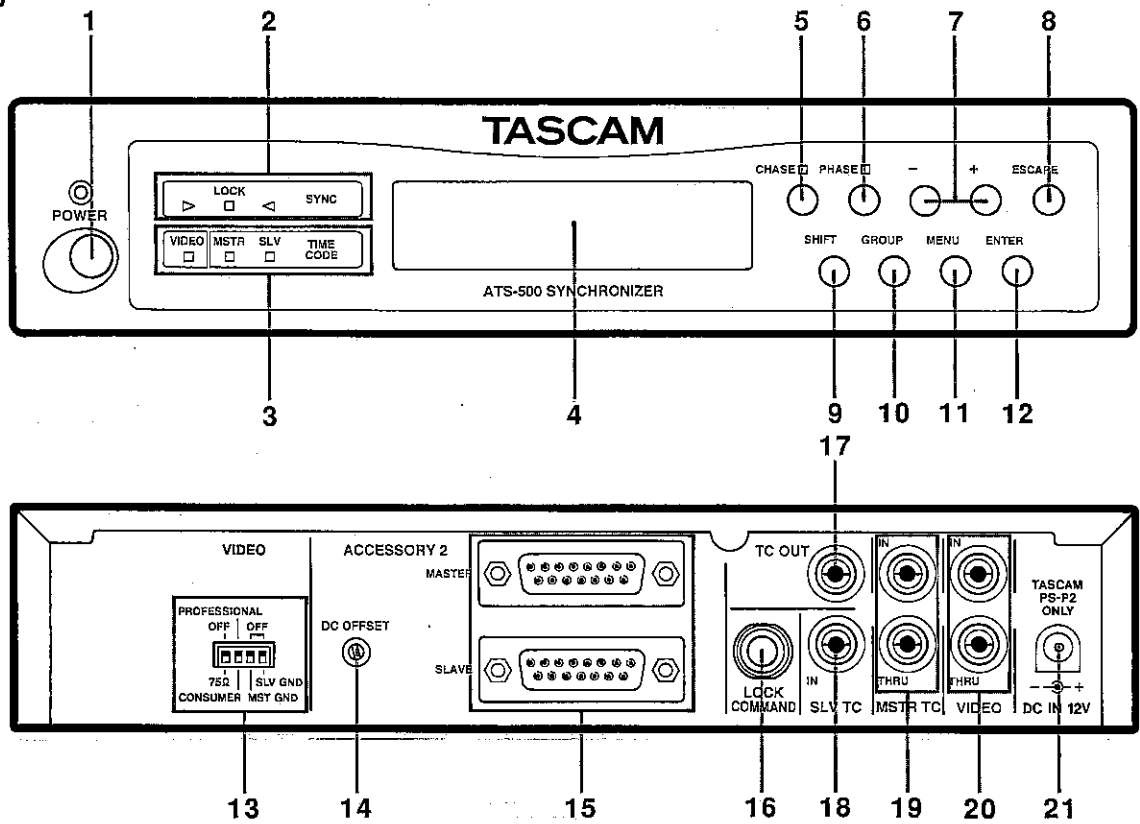


Example of SMPTE Edit Code (1 Frame)

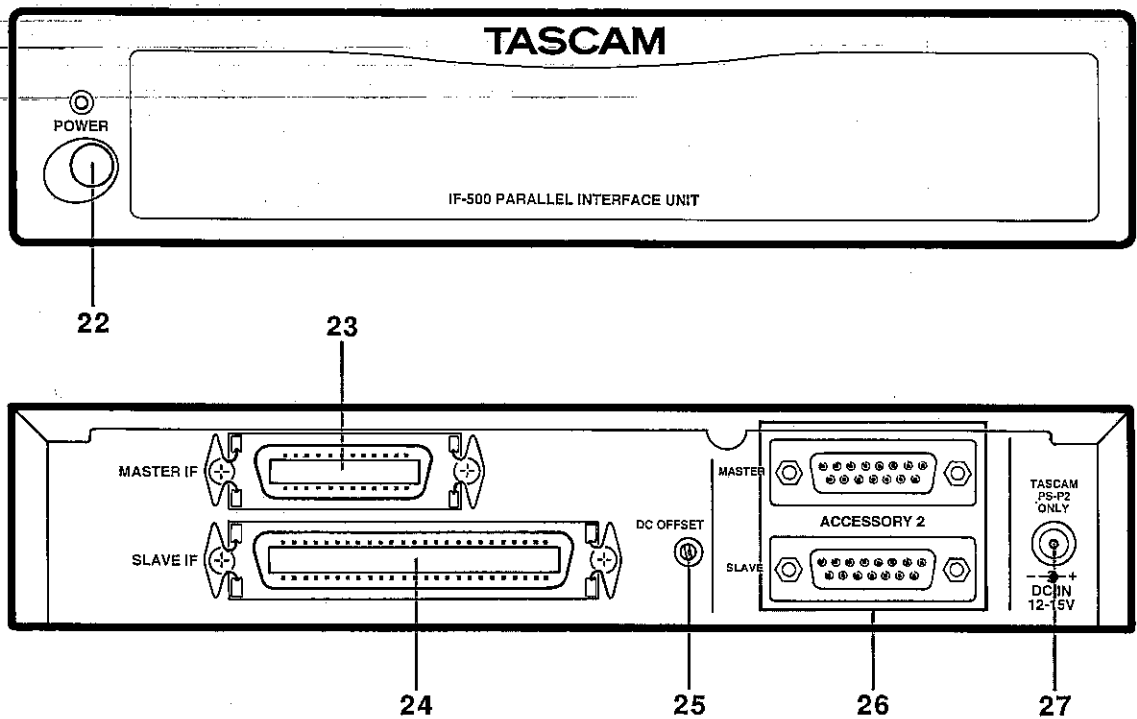
# ATS-500 Display Switching Chart



# ATS-500



# IF-500



## Specifications

### ATS-500

#### Input

##### Time Code Input (both Master and Slave)

Input impedance : 10 kohms

Nominal input level : 0.15 V<sub>p-p</sub> to 3 V<sub>p-p</sub>

Compatible time code : 30DF (SMPTE)

30NFD (SMPTE)

25F (EBU)

24F (Film)

#### Video Sync Signal Input

Type : NTSC or PAL Negative Sync Composite

Level : 1.0V  $\pm$  0.2V Composite Sync Signal

#### Output

##### Time Code Output

Output impedance : 2 kohms or less

Nominal output level : 0.6V<sub>p-p</sub>

Compatible time code : 30DF (SMPTE)

30NFD (SMPTE)

25F (EBU)

24F (Film)

##### FM Servo Output

Output center frequency : 9.6 kHz

Output impedance : 1 kohms or less

##### DC Servo Output

Offset voltage variable range : +5 V  $\pm$  0.5 V

Output impedance : 1 kohms or less

Lock Command Output : Open collector

**Power Requirements** : 12-15 V DC, via the provided

AC-DC adaptor PS-P2

**Power Consumption** : 500 mA at 12V DC

**Dimensions (WxHxD)** : 218 mm x 44 mm x 305 mm

(8-9/16 x 1-3/4 x 12")

**Weight** : 2.6 kg (5-12/16 lbs.)

**Standard Accessory** : PS-P2 AC adaptor

### IF-500 PARALLEL INTERFACE UNIT

#### Input

**Tally (Master/Slave)** : PLAY, STOP, F.FWD, REW and REC

**Input Level : High** = +4 to +24 V

**Low** = +0 to 0.5 V

**Tach Pulse (Master/Slave)** : 4 kHz or higher

**Input Level : High** = +4 to +24 V

**Low** = +0 to +0.5 V

#### Output

**Transport Command (Master/Slave)** : PLAY, STOP, F.FWD, REW and REC in open collector

##### FM Servo

**Output Center Frequency** : 9.6 kHz

**Output Impedance** : 100 ohms or lower

**Output Level : High** = +4 V

**Low** = +0.4 V

##### DC Servo

**Adjustable Range** : +10 to -10 V

**Output Impedance** : 1 kohms or less

**Power Requirements** : DC 12-15 V, via the provided

AC-DC adaptor PS-P2

**Consumption** : 500 mA at DC 12V

**Dimensions (WxHxD)** : 218 mm x 44 mm x 305 mm

(8-9/16 x 1-3/4 x 12")

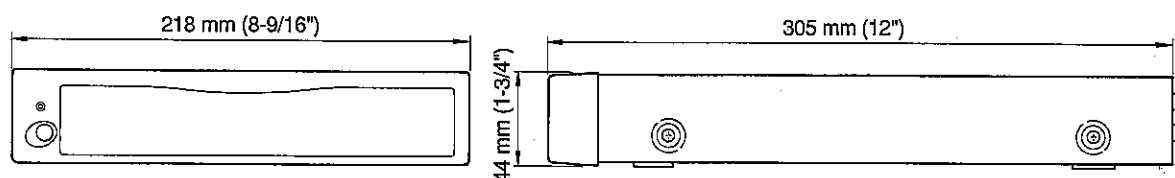
**Weight** : 2.6 kg (5-12/16 lbs.)

**Standard Accessory** : PS-P2 AC adaptor

### OPTIONAL ACCESSORY

- IF-500 Parallel Interface Unit
- PW-5MD Serial Interface Cable
- RM-1U Rack Mount Adaptor
- ATS-IF Cable (for connection between the ATS-500 and IF-500)

## Dimensional Drawings





## Features and Controls

### ON THE FRONT PANEL

#### 1. POWER switch

Used to switch on power to the unit.

#### 2. SYNC indicators

These show the relative position of the slave with respect to the master.

- LOCK : This light is on green when the slave and master are synchronized within +/-3 sub-frames.
- ◁ : This light is on red when the slave is within 2 frames but "catching up" to the master.
- ▷ : This light is on red when the slave is within 2 frames but slowing down so the master can catch up to it.

#### 3. TIME CODE indicators

These indicate which reference signal the ATS-500 is currently reading.

**VIDEO** : This light is on when the ATS-500 is receiving a video sync signal.

**MSTR** : This light is on when the ATS-500 is getting time code from the master.

**SLV** : This light is on when the ATS-500 is getting time code from the slave.

#### 4. LCD (Liquid Crystal Display) screen

Shows the time code from the master and slave, "offset" value, and various other messages or data depending on the mode.

#### 5. CHASE key

Lets the slave chase and lock to the master (p.25). An LED lights above the key when the function is on.

#### 6. PHASE key

Lets the slave lock to the master using a "sync word" of time code ignoring the actual time code address (pp.26-27). An LED lights above the key when the function is on.

#### 7. +/- key

Provides various functions : Used together with the SHIFT key, the +/- key acts as a "cursor" key. When setting an "offset" this key is used to increase or decrease the displayed values. For more see p.28.

#### 8. ESCAPE key

Stops the internal time code generator or resets its start time (p.21).

#### 9. SHIFT key

This is used together with MENU or +/- key. With MENU, the key switches the LCD screen (pp.25 and 38). With +/- key, the SHIFT key is used to move the cursor (p.28).

#### 10. GROUP key

Each time this is pressed, the LCD screen switches to the following modes in sequence :

T/C (Time Code) → OFS (Offset) → GEN (Generator) → SYS (System)

#### 11. MENU key

Used to select "menus" whose contents depend on the GROUP mode (above) selected.

#### 12. ENTER key

When setting an offset, this key is used to record the data into memory, completing the procedure. The key is also used to let the internal time code generator start.

THE APPLIANCE CONFORMS WITH EEC DIRECTIVE 87/308/EEC REGARDING INTERFERENCE SUPPRESSION

CONFORME AL D.M. 13 APRILE 1989  
DIRETTIVA CEE/87/308

#### Bescheinigung des Herstellers/Importeurs

Hiermit wird bescheinigt, daß der/die/das

**SYNCHRONISIERGERÄT TASCAM ATS-500,  
PARALLELE SCHNITTSTELLEN-EINHEIT TASCAM IF-500**

(Gerät, Typ, Bezeichnung)

in Übereinstimmung mit den Bestimmungen der

**AMTSBLATT 163/1984, VFG 1045/1984, VFG 1046/1984**

(Amtsblattverfügung)

funk-entstört ist.

Der Deutschen Bundespost wurde das Inverkehrbringen dieses Gerätes angezeigt und die Berechtigung zur Überprüfung der Serie auf Einhaltung der Bestimmungen eingeräumt.

**TEAC CORPORATION**

Name des Herstellers/Importeurs

## REAR PANEL

### 13. VIDEO switches

When using a video machine as the master, these switches must be set as follows :

**75 Ohms :** Disables the VIDEO THRU jack by terminating the VIDEO IN circuitry with a 75-ohm resistor. Set the switch to this position when the VIDEO THRU jack is not used.

**OFF :** Turns off the 75-ohm resistor and the VIDEO THRU jack is effective, the VIDEO IN signal passing along to other video equipment.

**PROFESSIONAL :** Set the switch to this position when the master is a U-matic or other professional format video machine.

**CONSUMER :** If your video recorder is a consumer type, set the switch to this position.

Leave the remaining two other switches (MST GND and SLV GND) to OFF.

### 14. DC OFFSET adjustment

If your machine connected to the ACCESSORY 2 SLAVE jack (directly or through the IF-500) uses a direct current voltage as reference for controlling its capstan, the ATS-500 need be set to that reference voltage. It is factory preset to the best position. DON'T TOUCH IT. If you have trouble consult TASCAM or the nearest TASCAM dealer.

### 15. ACCESSORY 2 MASTER and SLAVE jacks

For connecting to the master and slave TASCAM machines having an ACCESSORY 2 jack. The optional PW-5MD cables are required.

### 16. LOCK COMMAND jack

Lets the appropriate external lamp light when synchronization is achieved.

### 17. TC OUT jack

Supplies time code while in GEN (time code generator) mode (pp.20 and 31).

### 18. SLV TC IN jack

The output of the audio track carrying time code from the slave machine is connected to this jack.

### 19. MASTER TC IN and THRU jacks

The IN jack is used to connect the output of the audio track carrying time code from the master machine. The THRU jack lets the time code from the master pass along to other external devices.

### 20. VIDEO IN and THRU jacks

The IN jack accepts a video sync signal from your video machine when this is used as the master. The THRU jack passes along the VIDEO IN signal to other external devices.

### 21. DC IN 12V jack

For connecting to the PS-P2 AC adaptor.

■ Don't use any other AC-DC adaptors.

## ACCESSORY 2 MASTER (D-Sub 15P)

Pin #	Signal	Function
1	—	
2	TxD	Data Send
3	—	
4	RxD	Data Receive
5	DIR	Up/Down
6	TACH/CTL	Counter-pulse
7	—	
8	GND	Common Return
9	—	
10	—	
11	—	
12	—	
13	—	
14	—	
15	—	

## Pre-Operating Procedure

### CONNECTIONS

#### Audio-Audio Synchronization (with One Master and One Slave)

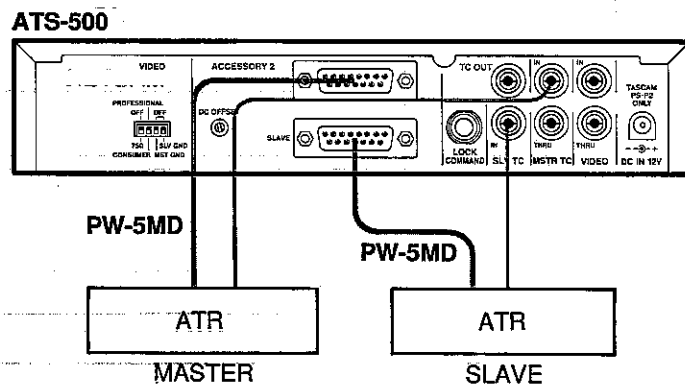
##### Precaution

##### ACCESSORY 2 Connector on Both the Machines (Serial Interface)

Check to see that the master and slave machines and ATS-500 are all turned off.

If your master and slave machines have each an ACCESSORY 2 connector (such as the TASCAM 238, MSR-16 and TSR-8), connect them to the ATS-500 as follows:

1. Connect the Time Code output from the master to the ATS-500's **MSTR TC IN** terminal (#19).
2. Connect the Time Code output from the slave to the ATS-500's **SLV TC IN** terminal (#18).
3. Use the optional PW-5MD cables to achieve the following two connections :  
Master's ACCESSORY 2 and ATS-500's **MASTER ACCESSORY 2** ;  
Slave's ACCESSORY 2 and ATS-500's **SLAVE ACCESSORY 2**.



ATR = Audio Tape Recorder

##### "Parallel" Interface Port on Either or Both Machines

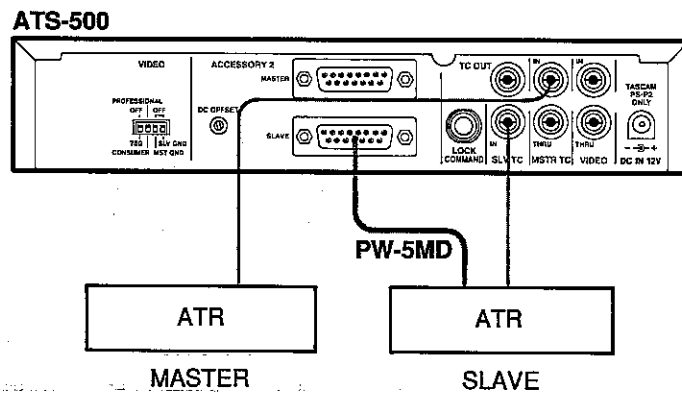
##### "Code Only Master" Sync

If your machines have a "Parallel" interface (labelled ACCESSORY 1 on TASCAM machines such as the ATR-60/50/40 series), you need the optional IF-500 interface unit. For information on how to connect the IF-500 see p.36.

A "code only master" is one of the simplest ways to synchronize two machines. In this case, the ATS-500 synchronizer receives only time code from the master to control the slave, and you don't need to connect the master's ACCESSORY 2 connector to the ATS-500's ACCESSORY 2. Any tape machine can be used as a master if it has a time code track. Remember, since there are no tallies or tachometer coming from the master to the ATS-500 it has no way of knowing "where you're headed" when you put the master into a fast wind mode. So, to get the slave to locate, you have to put the master into PLAY so the ATS-500 can read time code and figure out where to send the slave.

Connect as follows :

1. Connect the master's Time Code Output to the ATS-500's **MSTR TC IN** terminal (#19).
2. Connect the slave's Time Code Output to the ATS- 500's **SLV TC IN** terminal (#18).
3. Use the optional PW-5MD cable to connect the slave's **ACCESSORY 2** connector to the ATS-500's **ACCESSORY 2 SLAVE** connector.



## Audio-Audio Synchronization (with One Master and Two Slaves)

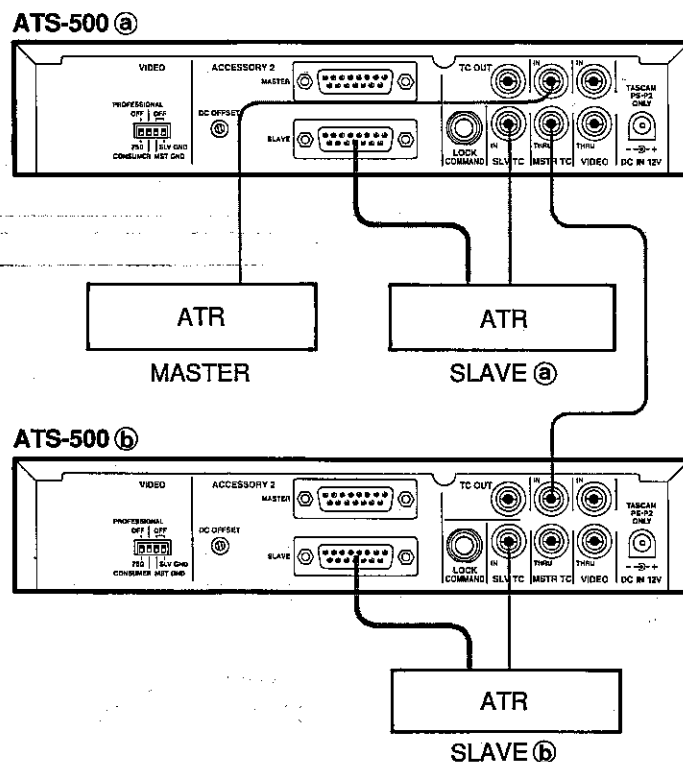
### Precaution

You can let two slaves synchronize to the master in a "Code Only Master" configuration. You need two ATS-500s.

Check to see that all tape machines and ATS-500s are turned off.

### Connections

1. Connect the master's Time Code Output to the first ATS-500's **MSTR TC IN** terminal (#19). In diagram the first ATS-500 is marked "a."
2. Connect the first slave's Time Code Output to the first ATS-500's **SLV TC IN** terminal (#18), and the second slave's Time Code Output to the second ATS-500's **SLV TC IN** terminal.
3. Connect the first ATS-500's **MSTR THRU** terminal (#19) to the second ATS-500's **MSTR TC IN** terminal (#19).
4. Connect the first slave's **ACCESSORY 2** connector to the first ATS-500's **ACCESSORY 2 SLAVE** connector, and the second slave's **ACCESSORY 2** connector to the second ATS-500's **ACCESSORY 2 SLAVE** connector.



## Video-Audio Synchronization (with One Master VTR and One Slave Audio)

### Precaution

#### Home-use (Consumer) Video Deck used as the Master

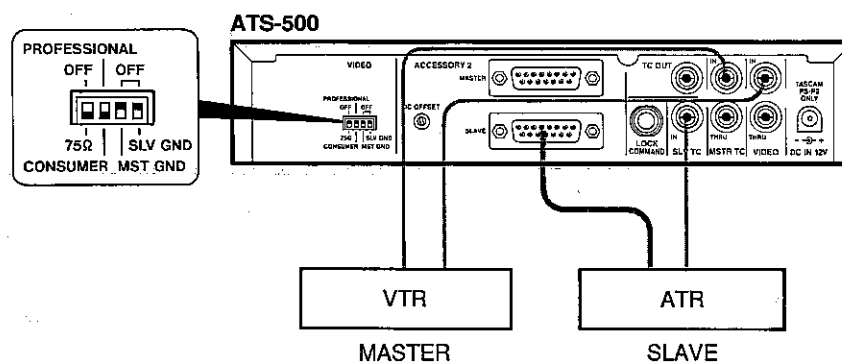
### IMPORTANT NOTE FOR VIDEO-AUDIO SYNCHRONIZATION:

If you are synchronizing audio with video, video must always be the master. Why? Because in video, tape speed is internally controlled so the rotation of the video head matches the frame lines on the tape; if you attempt to have video follow an audio master, in trying to follow the slightly-off speed of the audio, the picture will "roll" through the vertical interval on the screen.

Check to see that the VTR, audio tape machine, and ATS-500 are all turned off.

- Not every consumer video decks have the necessary functions.

Connect as shown.



### "Chase and Phase Lock"

With this configuration the slave will "chase" the master and lock to the actual time code address and then drop into "Phase Lock."

Your video deck must supply time code to the ATS- 500. (If your deck has an Audio Stereo/Mono switch, set it to the Mono position, then you can record time code on video tape without damaging the sounds on it unless these were not recorded with the switch set to Mono. For more information, or if you are not sure whether or not your deck has the capability, check the manual of your video recorder or consult its manufacturer or dealer.)

1. Connect the Time Code Output of the master (video) to the ATS-500's **MSTR TC IN** terminal (#19).
2. Connect the Video Output of the master to the ATS-500's **VIDEO IN** terminal (#20).

3. Set the ATS-500's **VIDEO** switches to **75 ohms** and **CONS.**
4. Connect the slave's Time Code Output to the ATS- 500's **SLV TC IN** terminal (#18).
5. If your audio tape machine (slave) has an **ACCESSORY 2** port :

Use the optional PW-5MD cable to connect the slave's **ACCESSORY 2** port to the ATS-500's **ACCESSORY 2 SLAVE** port.

If your slave machine has a "parallel" port and not **ACCESSORY 2** :

You need the optional IF-500 Parallel Interface Unit. For its connection, see p.36.

- If your video deck has not a "Flying Erase" head, sync lock will be unlocked at edited points.

## "Phase Lock"

This connection permits a "Phase Lock" (also called "Resolving") only. Sync is achieved to the "sync word" of time code ignoring the actual time address. Only when the master and slave machines start at the same time and run at exactly the same speed, they remain "in sync."

1. Connect the Video Output of the master (video) to the ATS-500's **VIDEO IN** terminal (#20).

2. Set the ATS-500's **VIDEO** switches (#13) to **75 ohms** and **CONS.**

3. Connect the Time Code Output of the slave (audio) to the ATS-500's **SLV TC IN** terminal (#18).

4. If your audio tape machine has an **ACCESSORY 2** port :

Use the optional PW-5MD cable to connect the slave's **ACCESSORY 2** port to the ATS-500's **ACCESSORY 2 SLAVE** port.

If the audio tape machine has a "parallel" port and not **ACCESSORY 2** :

You need the optional IF-500 Parallel Interface Unit. For its connection, see p.36.

## Using an Industrial (Pro-Use) VTR as the Master

If you have an industrial video recorder such as a 3/4-inch U-matic VTR, proceed as follows :

1. Connect your VTR's Time Code Output to the ATS- 500's **MSTR TC IN** terminal (#19).

2. If your VTR has an "External Sync Input" terminal :

Connect the output of an outboard sync generator to the VTR's "External Sync Input" and the ATS-500's **VIDEO IN** terminal (#20).

3. Set the ATS-500's **VIDEO** switches to **75 ohms** and **PRO**.

4. Connect the slave's Time Code Output to the ATS-500's **SLV TC IN** terminal (#18).

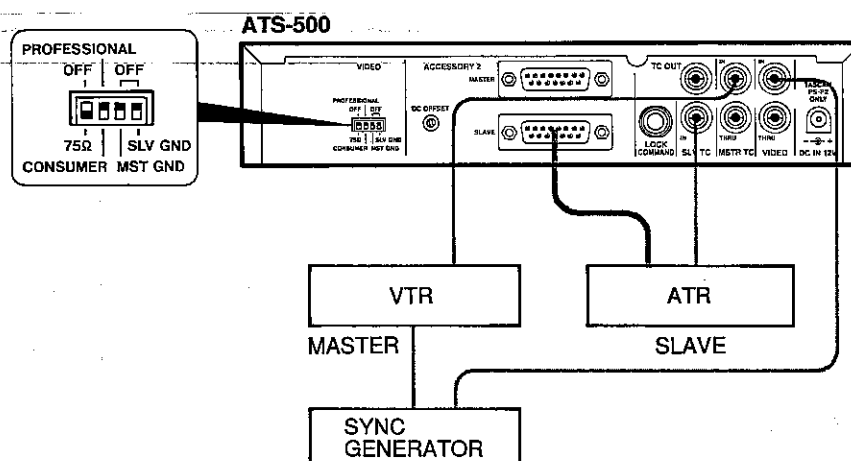
5. If the slave has an **ACCESSORY 2** port :

Use the optional PW-5MD cable to connect the slave's **ACCESSORY 2** port to the ATS-500's **ACCESSORY 2 SLAVE** port.

If the slave has a "parallel" port and not **ACCESSORY 2** :

You need the optional IF-500 Parallel Interface Unit. For its connection see p.36.

- The use of a sync generator will ensure a more precise sync operation.





## One Master VTR and Two Slave Audios

This configuration allows two audio tape machines to slave to a VTR and run them in "Code Only Master" sync. Two ATS-500s are required.

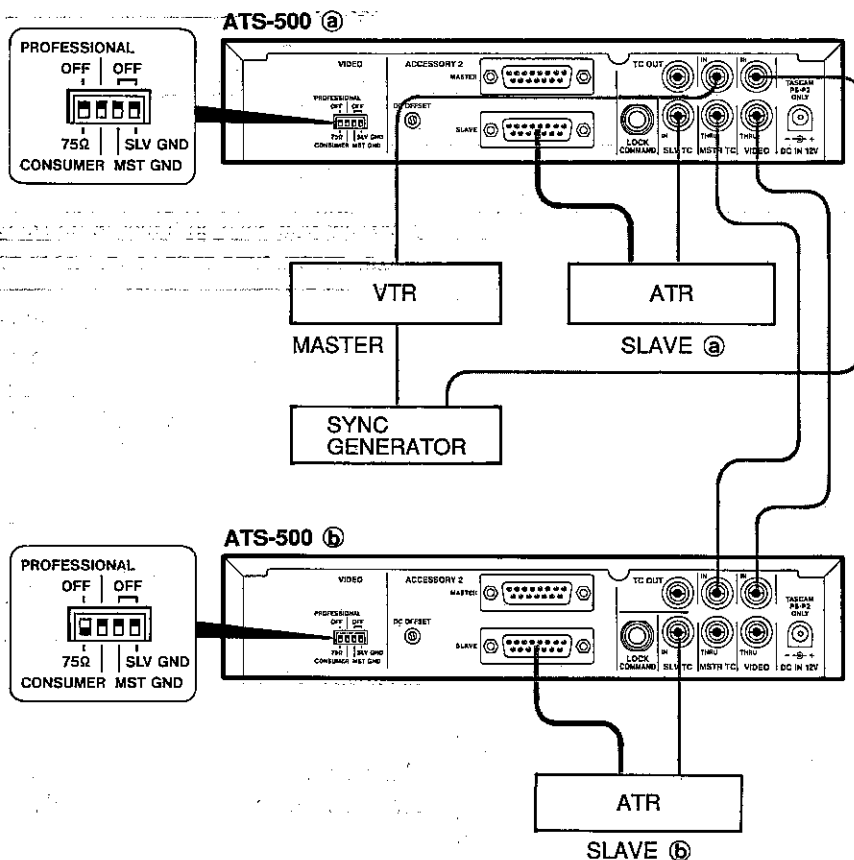
Run-of-the mill consumer video decks have not the necessary functions. Use U-matic or other industrial video recorders.

Proceed as follows :

1. Connect the VTR's "Time Code" output to the ATS- 500's **MSTR TC IN** terminal (#19).
2. Connect the first ATS-500's **MSTR TC THRU** terminal (#19) to the second ATS-500's **MSTR TC IN** terminal (#19). (The first and the second are shown "a" and "b" respectively in diagram.)
3. If your VTR has an "External Sync Input" :

Connect the output of the appropriate outboard sync generator to the master's "External Sync Input" and the first ATS-500's **VIDEO IN** terminal (#20).

4. Connect the first ATS-500's **VIDEO THRU** terminal (#20) to the second ATS-500's **VIDEO IN** terminal (#20).



5. Set the **VIDEO** switches (#13) on the first ATS-500 to **OFF** and **PRO**.  
Set the counterpart on the second ATS-500 to **75 ohms** and **PRO**.
  6. Connect the first slave's Time Code Output to the first ATS-500's **SLV TC IN** terminal (#18).  
Connect the second slave's Time Code Output to the second ATS-500's **SLV TC IN** terminal (#18).
  7. If your first slave machine has an **ACCESSORY 2** port :  
  
Use the optional PW-5MD cable to connect the first slave's **ACCESSORY 2** to the first ATS-500's **ACCESSORY 2 SLAVE** port.  
  
If the first slave has a "parallel" port :  
  
You need the optional IF-500 Parallel Interface Unit. For its connection see p.36.
  8. Similarly, connect the second slave's **ACCESSORY 2** port to the second ATS-500's **ACCESSORY 2 SLAVE** port.
- The use of an external sync generator will ensure a more precise sync operation.

## STRIPING TIME CODE ONTO THE TAPES

Now that you have both master and slave connected, you have to "stripe" the tapes — i.e., record time code on one track of the master and slave machines.

The ATS-500 achieves synchronization by this process : it reads time code off the master and slave tapes, compares the two readings, knows how far ahead or behind is the slave with respect to the master in terms of actual time code address, and let the slave slow down or speed up until it catches up the master (that is, until both the master and slave align at exactly the same time address).

If the master is a VTR and this does not send out time code, the ATS-500 reads vertical sync signal contained in the composite video signal from the VTR and compares this reading to time code from the slave. Because the vertical sync signal has no location indicators, the slave does not "chase" the master. You have to use the transport controls of the slave to let this locate to a point where both the master and slave need start.

Time code is generally recorded on the highest track on the recorders. Some recorders have a time code dedicated track.

### NOTES

- Turn off noise reduction system on the track onto which you intend to record time code. If it is on, time code error will occur.
- Don't stop the recorders when they are recording time code. Stripe the entire length of the tapes at once.
- When you record musical program later on, allow 30 seconds (or so) of time code before your program starts (that is why the time code generator inside the ATS-500 is factory-preset to start from "00:59:30:00"--this setting is valid only in "Free Run" and "GenLock," pp.31-32). Similarly, don't record program fully up to the end of time code. Stop program leaving behind some length of time code.
- Record the same type of time code on both the master and slave (p.5). Mixture of types does not provide the correct synchronization.
- Dirty and magnetized heads could cause a time code "drop out" or no code can be read off. Regularly clean and demagnetize the heads and other components in the tape path.

## Striping Procedure

As an example, we use the TASCAM 238 and record time code on it only. (You can also record on both master and slave at the same time. See the section with the corresponding heading, below.)

### TC OUT

1. Connect the **TC OUT** terminal (#17) on the ATS-500's rear to the track 8 input of the 238.

Set the 238's TAPE SYNC switch to IN (this turns off noise reduction on track 8), and set the FILTER switch to OUT (this removes a medium-pass filter from track 8).

2. Set the 238's TAPE SPEED switch to FIX.

- If your slave has a "Fix/Ext" speed mode switch, be sure to set it to FIX (internal), and not to EXT(ernal).

3. Set the time code generator for the desired type of time code as follows :

## Selecting a Time Code

### GROUP

- 1) Press the **GROUP** key (#10) three times to enter SYS (system) mode. The display will change in sequence like the following :

T/C:Master                      ⇒ **GROUP** ⇒                      OFS:Offset  
00:00:00:00 30F                      +00:00:00:00.00

⇒ **GROUP** ⇒                      GEN:Free Run                      ⇒ **GROUP** ⇒                      SYS:Set Up  
00:59:30:00 30F                      PUSH ENT KEY

## MENU

+/-

### Entering Time Code Generator Mode

## GROUP

### Starting the Internal Time Code Generator

## ENTER

### Recording the Selected Time Code

- 2) Press the **MENU** key (#11) once to enter GEN FRAME mode.  
The display will change like this :

**SYS:Set Up**                      **SYS:Gen Frame**  
   ⇒ **MENU** ⇒  
**PUSH ENT KEY**                      **30NDF**

- 3) Press the +/- key (#7) until the desired type of time code shows :

**30NDF**            (Non-Drop Frame, SMPTE) for 30 frame per sec.  
**30DF**            (Drop Frame, SMPTE) for 29.97 frame per sec.  
**25FRM**           (EBU, European standard) for 25 frame per sec.  
**24FRM**           (Film standard) for 24 frame per sec.

■ For Audio-Audio synchronization, 30NDF is generally used.

- 4) Press the **GROUP** key three times to enter GEN mode.

The display will change like the following :

**SYS:Gen Frame**                      **T/C:Master**  
**30 NDF**                                      ⇒ **GROUP** ⇒                      **00:00:00:00 30F**  
  
⇒ **GROUP** ⇒                      **OFS:Offset**                      ⇒ **GROUP** ⇒                      **GEN:Free Run**  
   **+00:00:00:00.00**                                           **00:59:30:00 30F**

- 5) Press the 238's REW button to rewind tape back to the beginning.  
6) Press the 238's RECORD FUNCTION switch to have track 8 ready for recording (the switch LED will blink).

A pilot signal is now sending out from the **TC OUT** terminal on the ATS-500 to the 238. Adjust the 238 to set the record level to between -10 and 0 dB. (For more information on how to adjust, consult the recorder's manual.)

- 7) Press the **ENTER** on the ATS-500's front to start the built-in time code generator. The display will change like this :

**GEN:Free Run**                      **GEN:Free Run**  
**00:59:30:00 30F**                      ⇒ **ENTER** ⇒                      **00:59:31:25 30F**

- 8) Hold the 238's RECORD button pressed down and press its PLAY button to start recording.  
9) When recording is made up to the end of tape, press STOP on the recorder.

## ESCAPE

10) Press **ESCAPE** (#8) to stop the time code generator.

- A second press of **ESCAPE**, resets the time display to 00:59:30:00.

GEN:Free Run      ⇒ **ESCAPE** ⇒      GEN:Free Run  
01:15:31:25 30F                     01:15:31:25 30F

⇒ **ESCAPE** ⇒      GEN:Free Run  
                         00:59:30:00 30F

## Check

11) To check that the time code was correctly recorded, proceed as follows :

1. Press **GROUP** twice to enter T/C (time code) readout mode. The display will change as follows :

GEN:Free Run      ⇒ **GROUP** ⇒      SYS:Set Up  
00:59:30:00 30F                     PUSH ENT KEY

⇒ **GROUP** ⇒      T/C:Master  
                         00:00:00:00 30F

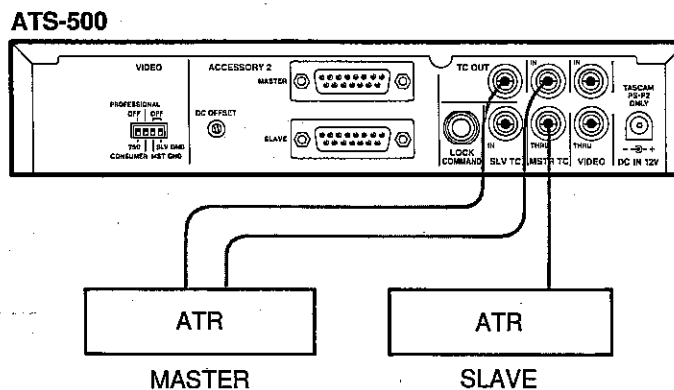
2. Press the 238's **PLAY** button to start playing (reading) time code on track 8.
3. Watch the display. If the time code showed advances you can judge that the time code was correctly recorded.

- Don't try to run master and slave yet. You can't synchronize without going through a "set-up" procedure.

## Striping Time Code onto Both the Master and Slave

Proceed as follows :

1. Refer to diagram below and connect the ATS-500, master and slave recorders as shown.
2. Follow the "striping procedure" above.



- If your master recorder is a 3-head type, set its monitor "In/Ext" switch to "In."

## "SET-UP"

We suppose that you have already recorded time code on both the master and slave. Now, it is time to let the ATS-500 "learn" and remember the transport characteristics of both master and slave machines. This process is called "Set-up."

The ATS-500 first "learns" the type of time code recorded on the master and slave. Be sure to record time code before performing the "set-up" procedure.

### NOTES

- The "Set-up" will fail if there is a time code "drop out" or reading error. Time code must have correctly been recorded on the master and slave (pp.18-22).
- Even if your master is a video recorder and it does not carry time code, you have to let the ATS-500 learn its dynamic characteristics.
- Before you start the automatic set-up sequence be sure to switch the Master transport to FIX and the Slave to EXTERNAL control mode if they have the functions (some serial-controlled transports will do this automatically.)
- Don't interrupt the set-up process. If you do accidentally, go through the procedure again from the start.
- If you perform the "set-up" toward the beginning or the end of tape, the ATS-500 could not read time code correctly. Run tape for several seconds beforehand if necessary.
- In "code only master" configuration (p.11), note the following :
  - Before starting the "set-up" let the master tape play for a few seconds, so that the ATS-500 knows the type of time code in use.
  - Completion of "set-up" does not automatically stop the master transport. It will play continuously until you press STOP.
- In principle, once "set-up" is complete, there is no need to repeat the procedure as long as you use the same machines in the same configuration. But, if you are using multi-cassette tape recorders having ACCESSORY 2 port (such as the TASCAM 238, 644, 688), you have to perform "set-up" each time you change tape or turn the power off.

## CHECK

### Starting the "Set-up" Sequence

GROUP

ENTER

ESCAPE

1. Check to see that the ATS-500, master and slave are properly connected (pp.11-17).

2. If the master is an audio tape recorder :

Check that time code was recorded both on the master and slave.

If the master is a video tape recorder :

Check that time code was recorded on the slave.

3. Press the **GROUP** key (#10) three times to enter SYS (system) mode.

```
T/C:Master      OFS:Offset
00:00:00:00 30F  ⇒ GROUP ⇒ +00:00:00:00.00

⇒ GROUP ⇒ GEN:Free Run  ⇒ GROUP ⇒ SYS:Set Up
           00:59:30:00 30F          PUSH ENT KEY
```

4. Press the **ENTER** key (#12) twice to start "set-up."

```
SYS:Set Up      SYS:Set Up
PUSH ENT KEY    ⇒ ENTER ⇒ Are you sure?

⇒ ENTER ⇒ Set Up      MASTER 238
           Executing    SLAVE MSR-24
```

■ When "SYS : Set Up Are you sure ?" shows, pressing the **ESCAPE** key (#8) brings you back to the initial display, quitting the "set-up" mode.

■ "NO T/C !! PUSH ESC Key" will show if the ATS-500 is not getting time code. In this case, repeat "Check" (steps 1 and 2 above), and try again.

5. When "set-up" is complete, the following message will show in the display :

```
MASTER  END
SLAVE   END
```

6. Press the **ESCAPE** key to switch the display to show the initial SYS message.

```
MASTER  END      ⇒ ESCAPE ⇒ SYS:Set Up
SLAVE   END          PUSH ENT KEY
```



# Synchronizer Functions

## TRY TO SYNCHRONIZE

### Chase and Lock

#### CHASE

#### MSTR

#### SLV

#### LOCK

#### GROUP

Now that you have recorded time code and performed "set-up," you can try to synchronize.

1. Press the **CHASE** key (#5).

The slave will speed up to catch the master if the slave is 1 second or more ahead or behind the master.

2. Play the master. The slave should automatically start playing.

"**MSTR**" will light in the **TIME CODE** indicator section (#3) when time code from the master gets into the ATS-500.

"**SLV**" will light in the **TIME CODE** indicator section (#3) when time code from the slave gets into the ATS-500.

3. The **LOCK** indicator will light when the slave comes within  $\pm 3$  sub-frames of the time code on the master, showing that the slave is locked to the master.

4. Once "locked," the slave will imitate the master's movements, stopping if the master stops, fast- winding if the master fast-winds...

5. If you want to see time code as it is read off the master and slave tapes or an occasional difference between them, press the **GROUP** key (#10) once to switch the display to T/C (time code) mode :

<b>SYS:Set Up</b>	$\Rightarrow$ <b>GROUP</b> $\Rightarrow$	<b>T/C:Master</b>	
<b>PUSH ENT KEY</b>		00:59:35:00 30F .....	Time code coming from the master
<b>T/C:Master</b>	$\Rightarrow$ <b>MENU</b> $\Rightarrow$	<b>T/C:Slave</b>	
00:59:35:00 30F		00:59:33:00 30F .....	Time code coming from the slave
<b>T/C:Slave</b>	$\Rightarrow$ <b>MENU</b> $\Rightarrow$	<b>T/C:Rel Diff</b>	
00:59:33:00 30F		00:00:02:00.00 .....	"Relative" difference between the master and slave (see below)
<b>T/C:Rel Diff</b>	$\Rightarrow$ <b>SHIFT + MENU</b> $\Rightarrow$	<b>T/C:Abs Diff</b>	
00:00:00:00.00		00:00:02:00.00 .....	"Absolute" difference between the master and slave (see below)

"Relative" and "Absolute" ? Pretty abstract stuff. The "relative" difference shows how much times remain before a slave running with an offset entered locks to a master. Once the slave locks to the master, there is no "relative" difference, but there *is* a difference between the actual master and slave time code readings. This

difference is not any other than the offset.

The "absolute" difference shows how much differ the actual time code numbers currently being read off the master and slave tapes. When the slave locks to the master, there is no difference between the two time code readings (no "absolute" difference) if there is no "offset" entered. With an offset, the actual two time readings are all the time different, whether the slave locks to the master or not.

## Disabling Synchronization

6. Press **CHASE** again. Now that you can operate the slave independently from the master.

The ATS-500 offers two modes of synchronization : the "Chase and Lock" and the "Phase Lock."

## CHASE AND LOCK

In this mode of synchronization, the ATS-500 controls the slave's tape movements so that its current point expressed in time code address (i.e., in hour, minute, second and frame) becomes, and remains identical with the current time code address of the master's tape.

For instance, suppose that the master is at 01:00:00:00 and the slave is at 00:30:00:00. That is, the slave is at a point 30 minute behind the master. When you press **CHASE** on the ATS-500, the slave will speed up in the forward direction, "chasing" the master. When the slave catches up the master, that is, when both the master and slave align with each other in terms of time code address, the slave "locks" to the master (LOCK indicator lit). Once locked, the slave follows the master, speeding up when the master speeds up, stopping when the master stops..., both remaining in sync.

## Starting "Chase and Lock"

1. Press the **CHASE** key (#5) on the ATS-500.
2. Let the master tape machine start playing.

## Disabling the Function

Press **CHASE** again.

## PHASE LOCK

In this mode, synchronization is achieved using the "sync word" of time code (p.5) ignoring the actual numerical time address. The ATS-500 reads a stream of "sync words" from both master and slave, compares their "phases" and controls the slave so that both machines keep running at the same speed.

If the master is a video deck, a sync signal contained in the video signal is used instead of the "sync word."

Both the "sync word" and "video sync signal" have no location indicators. The ATS-500 has no way of knowing where the slave is with respect to the master. The slave cannot be made to "chase" the master. Only while the machines are running at exactly the same speed, they remain "in sync."

## ing "Phase Lock"

1. Press the **PHASE** key (#6)
2. Let the master start playing.
3. When the master reaches a point where the slave should start, let the slave do so.

If the master is a video deck, first locate the audio to a point where the desired sound starts, then start playing video tape, and, upon the appearance of the desired picture in the monitor screen, start the audio. This process is called "lip sync." Remember, all "offset" has no effect on "Phase Sync."

## ing "Phase Lock"

Press the **PHASE** key again.

## "CHASE" and "PHASE" Used together

- When the master is a video tape recorder and this supplies both time code and video sync signal, you can press both **CHASE** and **PHASE**. Then, the slave will chase the master and, when both time code addresses match, the slave will drop into "Phase Lock." Thereafter, each time the address difference between both machines reach a certain limit, the slave will repeat the sequence of "chase" and "phase lock."

If the time code is short of length, only "phase lock" continues beyond the end of time code recording. You will want to use this function when, for example, the video tape has time code only at its beginning for some reason.

## TRY TO SYNCHRONIZE WITH AN "OFFSET" ENTERED

The ATS-500 allows you to enter an "offset" value so that the master and slave run together with a distance maintained between them. You can trim the distance in sub-frame (1/100 frame) steps.

For example, if you want to start a piece of music from an audio slave when this reads 01:00:00:00 and a video master reads 01:15:00:15, the required offset is -00:15:00:15. Then the slave is locked 15 minutes and 15 frames behind the master.

### Offset Setting

**GROUP**

**SHIFT and +/-**

**GROUP**

**MENU**

**CHASE**

1. Press the **GROUP** key (#10) to switch the display to OFS (offset) mode.

```
T/C:Master      ⇒ GROUP ⇒      OFS/offset
00:59:35:00 30F      +00:00:00:00.00
```

2. Enter an offset value using the **SHIFT** and **+/-** keys as follows :

- To increase numbers, press the "+" key.
- To decrease numbers, press the "-" key,
- To move the cursor right, hold **SHIFT** down and press the "+" key.
- To move the cursor left, hold **SHIFT** down and press the "-" key.
- To change the + to a -, press the "-" key when the cursor is there.

3. Press the **GROUP** key twice to switch the display to SYS (system) mode.

```
OFS/offset      ⇒ GROUP ⇒      GEN:Free Run
+00:00:00:00.00      00:59:30:00 30F

⇒ GROUP ⇒      SYS:Set Up
                  PUSH ENT KEY
```

4. Press the **MENU** key (#11) twice and check to see that the display shows "Enable." If "Disable" shows, press the + or - key so that "Enable" shows.

```
SYS:Set Up      ⇒ MENU ⇒      SYS:Gen Frame
+PUSH ENT KEY      30NDF

⇒ MENU ⇒      SYS:Offset Ena
                  Enable
```

5. Let the master start. The "MSTR" indicator will light on the ATS-500.

6. Press the **CHASE** (#5) key.

## Auto Offset Entry

**GROUP**

**ENTER**

The current difference between the master and slave time code addresses can be entered as an offset "on the fly" by hitting a single key.

1. Press the **GROUP** key (#10) to switch the display to OFS (offset) mode.
2. Press the **ENTER** key (#12). The difference of the current master and slave time code numbers will be stored as an offset.

Example :

Master reading 01:30:15:02

Slave reading 01:30:10:00

Offset of -00:00:05:02.00

## Disabling an offset

Press the + or - key so that "**Disable**" shows.

The two machines will continue to run, the slave chasing and locking to the master's actual time numbers. To stop the machines, press **STOP** on the master.

## Time Code Generator Functions

The ATS-500 incorporates a time code generator, and one of the functions of which you have already used to stripe time code onto your machines (p.20).

The ATS-500's time code generator offers :

Four functions :

1. Free Run
2. GenLock
3. Internal Force Jam
4. External Force Jam

AND

Four types of time code :

1. 30NDF (Non Drop Frame), 30fps
2. 30DF (Drop Frame), 29.97 fps
3. 25FRM (EBU), 25 fps
4. 24FRM (Film), 24 fps

### Connections

See diagrams on pp.11-17 showing typical connections.

### Selecting a Frame Rate (Type of Time Codes)

Set the time code generator for the desired type of time code as follows :

1. Press the **GROUP** key (#10) three times to enter SYS (system) mode. The display will change in sequence like the following :

**GROUP**

```

T/C:Master          OFS:Offset
00:00:00:00 30F    ⇒ GROUP ⇒    +00:00:00:00.00

⇒ GROUP ⇒    GEN:Free Run    ⇒ GROUP ⇒    SYS:Set Up
                00:59:30:00 30F                PUSH ENT KEY
    
```

**MENU**

2. Press the **MENU** key (#11) once to enter GEN FRAME mode. The display will change like this :

```

SYS:Set Up          SYS:Gen Frame
PUSH ENT KEY    ⇒ MENU ⇒    30NDF
    
```

**+/-**

3. Press the **+/-** key (#7) until the desired type of time code shows :

```

30NDF    (Non-Drop Frame, SMPTE) for 30 frame per sec.
30DF     (Drop Frame, SMPTE) for 29.97 frame per sec.
25FRM    (EBU, European standard) for 25 frame per sec.
24FRM    (Film standard) for 24 frame per sec.
    
```

- For Audio-Audio synchronization, 30NFD is generally used.

## NOTES

- Turn off noise reduction system on the track onto which you intend to record time code. If it is on, time code error will occur.
- Don't stop the recorders when they are recording time code. Stripe the entire length of the tapes at once.
- When you record musical program later on, allow 30 seconds (or so) of time code before your program starts (that is why the time code generator inside the ATS-500 is factory- preset to start from "00:59:30:00"--this setting is valid only in "Free Run" and "GenLock") Similarly, don't record program fully up to the end of time code. Stop program leaving behind some length of time code.
- Record the same type of time code on both the master and slave (p.5). Mixture of types does not provide the correct synchronization.
- Dirty and magnetized heads could cause a time code "drop out" or no code can be read off. Regularly clean and demagnetize the heads and other components in the tape path.

g the Time Code  
tor Mode

**GROUP**

Press the **GROUP** key (#10) until the "GEN" display shows.

```

SYS:Set Up          ⇒ GROUP ⇒ T/C:Master
PUSH ENT KEY       00:00:00:00 30F

⇒ GROUP ⇒ OFS/offset          ⇒ GROUP ⇒ GEN:Free Run
+00:00:00:00.00      00:59:30:00 30F
  
```

UN

"Free Run" is used for striping time code onto the entire length of tapes. The time code generator uses its internal clock as the time base for generating time code.

**ENTER**

1. Press the **ENTER** key (#12). The time code is generated starting from 00:59:30:00.

**ESCAPE**

2. To stop the time code generator, press the **ESCAPE** key (#8) once.

Pressing **ESCAPE** again resets the displayed numbers to 00:59:30:00.

```

GEN:Free Run          ⇒ ESCAPE ⇒ GEN:Free Run
01:15:31:25 30F      01:15:31:25 30F

⇒ ESCAPE ⇒ GEN:Free Run
00:59:30:00 30F
  
```

## GEN LOCK

**MENU**

**ENTER**

**ESCAPE**

This feature is used for striping time code onto the slave when the master machine is a video recorder. The generator uses video signal plugged into the VIDEO IN terminal (#20) as the time base for generating time code.

1. Press the **MENU** key (#11). The display will look like this :

<b>GEN:Free Run</b>	⇒ <b>MENU</b> ⇒	<b>GEN:GEN Lock</b>
00:59:30:00 30F		00:59:30:00 30F

2. Put the slave into Record mode.
3. Put the video master recorder into Play mode.
4. Press the **ENTER** key (#12). Time code is generated starting from 00:59:30:00 and recorded onto the slave tape.
5. To stop the time code generator, press the **ESCAPE** key (#8).

■ The generator does not generate time code if the time code frame rate selected does not match the video frame rate. In this case, set the generator to the correct frame rate (type of time code) and try again from the beginning. As for the types of time code, see p.5.

■ If the error message "No Video !! PUSH ESC Key" shows, video signal is not properly connected. Check the connection.

If time code is not available or its continuity is lost on a tape for some reason such as an edit point, you have to "mend" it using a feature called Jam.

## INTERNAL FORCE JAM

**MENU**

This Jam is used in Audio-Audio configuration.

Why "Internal" jam ? Because the generator uses its "internal" clock as the time base for generating time code while the "External" jam uses an "external" video signal instead.

1. Press the **MENU** key (#11). The display will change like this :

<b>GEN:GEN Lock</b>	⇒ <b>MENU</b> ⇒	<b>GEN:INT Force</b>
00:59:30:00 30F		--:--:--:-- 30F

2. Put the slave into Record mode.
3. Put the master into Play mode.



**ENTER**

**ESCAPE**

## **EXTERNAL FORCE JAM**

**MENU**

**ENTER**

**ESCAPE**

4. Press the **ENTER** key (#12). The generator starts generating time code from the time point where the master was at the moment **ENTER** was pressed.

Example : If **ENTER** is pressed when the master time code reads 01:21:30, the generator starts generating time code from that time : 01:21:30. One frame or so will advance or retard depending on the timing of your pressing

5. To stop the generator, press the **ESCAPE** key (#8).

- If the generator and master frame rates (types of time codes) differ, the generator does not provide time code. If this is the case, set the generator to the correct frame rate and try again from the start (p.30).
- An error message of "**Waiting T/C... PUSH ESC Key**" will show if time code from the master is not connected to the generator (or is connected but not firmly). Check the connection (pp.11-17).

This Jam is used in Video-Audio configuration.

The video master must be able to send time code to the ATS- 500's internal generator. If your video deck has no time code output, you cannot use this feature.

The feature is called "External" jam because the generator uses video signal plugged into the VIDEO IN terminal (#20) as the time base for generating time code and does not use its "internal" clock.

1. Press the **MENU** key (#11). The display will change like this :

GEN:INT Force	⇒ MENU ⇒	GEN:EXT Force
--:--:--:-- 30F		--:--:--:-- 30F

2. Put the slave into Record mode.
3. Put the master into Play mode.
4. Press the **ENTER** key (#12). The generator starts generating time code from the time point where the master was at the moment **ENTER** was pressed.

Example : If **ENTER** is pressed when the video master time code reads 01:21:30, the generator starts generating time code from that time : 01:21:30. One frame or so will advance or retard depending on the timing of your pressing **ENTER**.

5. To stop the generator, press the **ESCAPE** key (#8).

■ **"Waiting T/C... PUSH ESC Key"** will show if time code from the video master is not connected to the generator (or is connected but not firmly). Check the connection (pp.11-17) and try again from the start.

■ **"No Video!! PUSH ESC Key"** will show if video signal is not coming into the generator (or it is coming but the connection is not firm). In this case check the connection (pp.11-17) and try again from the start.

---

## IF-500 Parallel Interface Unit

### FEATURES AND CONTROLS

#### 22. POWER switch :

Used to switch on power to the unit.

#### 23. MASTER I/F connector :

This 24-pin connector has inputs and outputs necessary for parallel interfacing to the master.

#### 24. SLAVE I/F connector :

This 50-pin connector has inputs and outputs necessary for parallel interfacing to slave machines.

- You need the optional ATS-IF cable for connecting the IF-500 to the ATS-500. You also need special cables for connecting the IF-500 to your parallel machines. Ask TASCAM or your nearest TASCAM dealer.

#### 25. DC OFFSET adjustment :

If your machine connected to the SLAVE I/F connector uses a direct current voltage as reference for controlling its capstan, the IF-500 need be set to that reference voltage. It is factory preset to the best position. ~~DON'T TOUCH IT.~~ If you have trouble consult TASCAM or the nearest TASCAM dealer.

#### 26. ACCESSORY 2 MASTER and SLAVE jacks :

For connecting to the corresponding jacks on the ATS-500's rear. The optional ATS-IF cables are required.

#### 27. DC IN 12V jack :

For connecting to the supplied PS-P2 AC adaptor.

- Don't connect any other AC-DC adaptors.

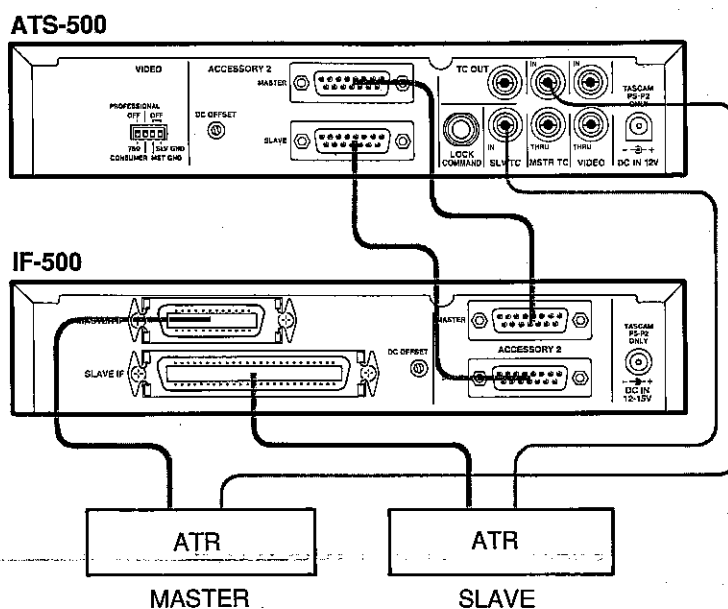
## CONNECTIONS

### Both the Master and Slave with a Parallel Interface

#### Check

Make sure the master and slave machines, ATS-500 and IF-500 are all turned off.

#### Connection Example

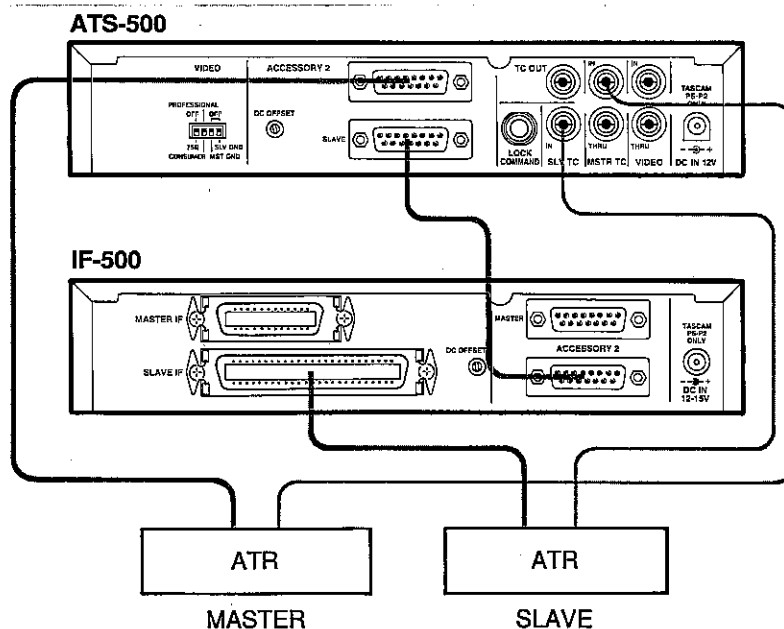


### With a Serial Master and Parallel Slave

#### Check

Make sure the master and slave machines, ATS-500 and IF-500 are all turned off.

#### Connection Example



## Technical Information

### CALIBRATION

The internal variables that govern how the ATS-500 controls the master and slave transports are automatically set during the "set up" procedure. There may be times when you want to adjust these variables to different settings for a smoother transport operation.

#### CAUTION

If you don't have a good reason for changing the variables, or don't understand what they are, **DON'T CHANGE** them — you could damage the tape or transport.

Generally, lower settings will match transport with good response. Inversely, higher settings will match transport with relatively poor response.

- The use of larger size of reel or wider width of tape likely lessens transport response.

#### 1. Servo Gain

Sets the servo loop gain. Set higher to increase the gain.  
Variable range : 00-FFH

#### 2. Servo Response

Sets where the ATS-500 starts controlling the capstan of the slave. The lower the setting is, the more ahead of the master the slave starts being controlled.  
Variable range : 00-FFH

#### 3. Digital Filter

Sets the degree of the servo damping. The higher the setting is, the tighter the damping is.  
Variable range : 00-0AH

#### 4. Chase Response

Sets where the slave switches from "search" to "chase" mode. The higher the setting, the farther the "search" to "chase" switching point will be.  
Variable range : 00-FFH

- The chase response is not automatically set during the "set up" procedure.

#### 5. Start Advance

Sets how far the chasing slave overshoots the master. The higher the setting is, the longer the overshoot distance is.  
Variable range : 00-FFH

- The start advance is not automatically set during the "set up" procedure.

#### 6. Master Brake

Sets where the master starts braking leaving "search" mode. The lower the setting, the farther the braking start point will be.  
Variable range : 00-FFH

#### 7. Slave Brake

Sets where the slave stops "search" and starts braking. The lower the setting, the farther the braking start point will be.  
Variable range : 00-FFH

## Calibration Procedure

**GROUP**

## MENU

## SHIFT + MENU

1. Press the **GROUP** key (#10) three times to switch the LCD screen to the SYS mode.

```
T/C:Master                                OFS:Offset
00:00:00:00 30F ⇒ GROUP ⇒ +00:00:00:00.00
```

⇒ GROUP ⇒ GEN:Free Run      SYS:Set Up  
00:59:30:00 30F ⇒ GROUP ⇒ PUSH ENT KEY

2. Press the **MENU** key (#11) three times to select the Calibration mode.

**SYS:Set Up**                      **SYS:Gen Frame**  
**PUSH ENT KEY** ⇒ **MENU** ⇒      **30NDF**


	<b>SYS:Offset Ena</b>		<b>SYS:Calibration</b>	
⇒ MENU ⇒	Enable	⇒ MENU ⇒	Srv Gain	80

3. Hold the **SHIFT** key (#9) down and press the **MENU** key until the item whose setting you want to change.


1) To change the Servo Gain setting :      SYS:Calibration

↓

Srv Gain      80

**SHIFT**  **+** **MENU**  



2) To change the Servo Response setting : **SYS:Calibration**

**SHIFT**  **MENU**


3) To change the Digital Filter setting : **SYS:Calibration**

**SHIFT + MENU**



4) To change the Chase Response setting : **SYS:Calibration**

**SHIFT**  **MENU**

5) To change the Start Advance setting : **SYS:Calibration**

**SHIFT**  **+** **MENU**

6) To change the Master Brake setting : **SYS:Calibration**

**SHIFT**  **+** **MENU**  


7) To change the Slave Brake setting : **SYS:Calibration**

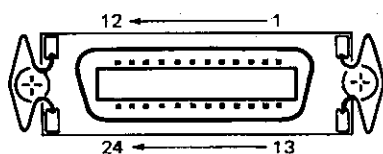
SLV Brk Par 80

4. Press the +/- key (#7) to enter the desired values.

**+/-**

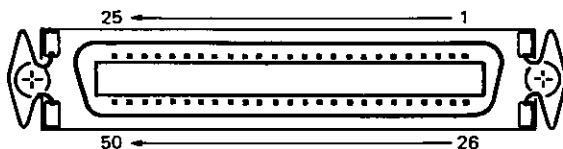
## PIN ASSIGNMENT CHARTS

### MASTER I/F Connector (24 Pin)



Pin #	Signal	Description
1	TALLY SUPPLY	Supply voltage (+5 to +24 V) is fed via this pin to the tally input circuits.
2	STOP?	Each pin receives the corresponding tally signals. Active in Low.
3	FF?	
4	REW?	
5	PLAY?	
6	REC?	
7	TACH+	Receive tach and CTL pulses ("High" via pin 7, "low" via pin 8).
8	TACH-	
9	DIRECTION +	Receive tape direction signals ("High" via pin 9, "low" via pin 10).
10	DIRECTION -	
11	0 V	
12	+5 V	
13	COMMAND SUPPLY	Only when a voltage +5 to +24 V is supplied via this pin, the commands below can be issued.
14	STOP!	
15	FF!	
16	REW!	
17	PLAY!	
18	REC!	
19	—	
20	—	
21	COMMAND COMMON	
22	—	
23	0 V	
24	+5 V	

### SLAVE I/F Connector (50 Pin)



? : TALLY  
! : COMMAND

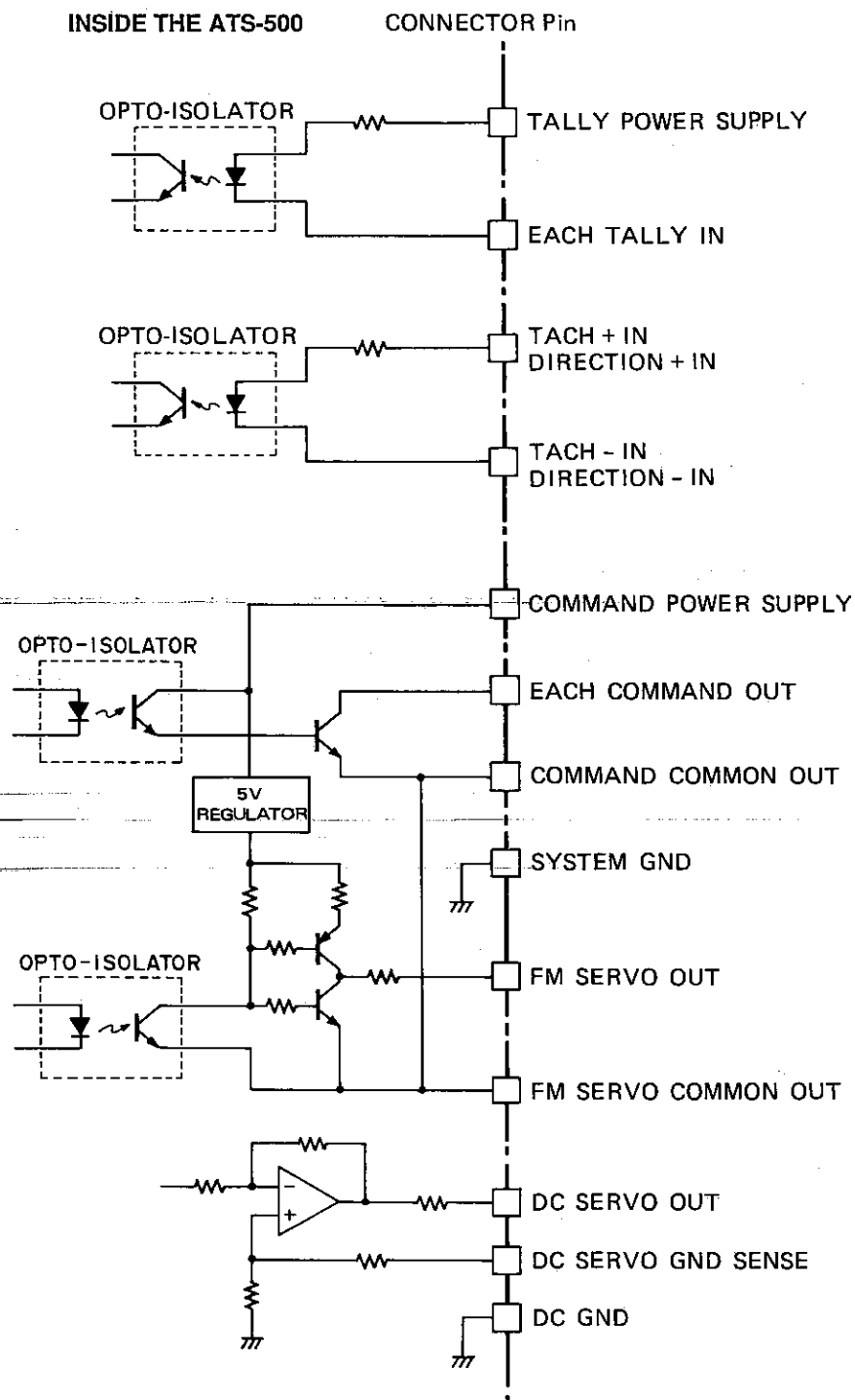
Pin #	Signal	Description
1	TALLY SUPPLY	Supply voltage (+5 to +24 V) is fed via this pin to the tally input circuits.
2	STOP?	Each pin receives the corresponding tally signals. Active in Low.
3	FF?	
4	REW?	
5	PLAY?	
6	REC?	

Pin #	Signal	Description
7	TACH+	} Receive tach and CTL pulses ("High" via pin 7, "low" via pin 8).
8	TACH-	
9	DIRECTION +	} Receive tape direction signals ("High" via pin 9, "low" via pin 10).
10	DIRECTION -	
11	FM SERVO OUT	Issues capstan FM servo reference, square wave of 5 V <sub>p-p</sub> and 50 % duty factor.
12	FM SERVO COMMON	Issues capstan DC servo reference, $\pm 10$ V. Voltage rises as capstan speed increases.
13	DC SERVO 1 OUT	
14	DC SERVO 2 OUT	Issues capstan DC servo reference, in opposite phase to DC SERVO OUT 1.
15	DC SERVO GND SENSE	
16	DC SERVO GND	
17	—	
18	LOCK NC	
19	LOCK COM	
20	LOCK NO	
21	—	
22	SYSTEM GND	
23	—	
24	0 V	
25	+5 V	Only when a voltage +5 to +24 V is supplied via this pin, the commands below can be issued.
26	COMMAND SUPPLY	
27	STOP!	
28	FF!	
29	REW!	
30	PLAY!	
31	REC IN!	
32	REC OUT!	
33	RECORD!	
34	REHEARSAL!	
35	LIFTER!	Issues a signal that enables to retract tape lifters.
36	MUTE!	Issues a signal that enables to mute audio outputs during Search mode.
37	LOCK!	Issues in open collector a signal that enables to lock the slave to the master. Active when and while lock is achieved.
38	SERVO ENABLE!	Goes active enabling slave servo.
39	SYNC!	Goes active when lock is achieved and will remain active for as long as lock is held.
40	COMMAND COMMON	
41	—	
42	—	
43	SERVO ENABLE NC	
44	SERVO ENABLE COM	
45	SERVO ENABLE NO	
46	—	
47	SYSTEM GND	
48	—	
49	0 V	
50	+5 V	

SHEET 2 OF 2



## Signals To/From Machines



# TASCAM

TEAC Professional Division

## ATS-500/IF-500

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### TEAC CORPORATION

Musashino Center Bldg., 1-19-18, Nakacho, Musashino-shi, Tokyo 180, Japan Phone: (0422) 52-5081

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### TEAC AMERICA, INC.

7733 Telegraph Road, Montebello, California 90640 Phone: (213) 726-0303

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### TEAC CANADA LTD.

340 Brunel Road, Mississauga, Ontario L4Z 2C2, Canada Phone: 416-890-8008

---

### TEAC UK LIMITED

5 Marlin House, Marlin's Meadow, The Croxley Centre, Watford, Herts. WD1 8YA, U.K. Phone: 0923-225235

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### TEAC DEUTSCHLAND GmbH

Bahnstrasse 12, 6200 Wiesbaden-Erbenheim, Germany Phone: 0611-71580

---

### TEAC FRANCE S.A.

17, Rue Alexis-de-Tocqueville, CE 005 92182 Antony Cedex, France Phone: (1) 42.37.01.02

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### TEAC Belgium SA/NV

Machelen-Diegem, Woluwelaan 143C, Unit 1, Belgium Phone: (02) 725 6555

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### TEAC AUSTRALIA PTY., LTD.

106 Bay Street, Port Melbourne, Victoria 3207, Australia Phone: (03) 646-1733

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