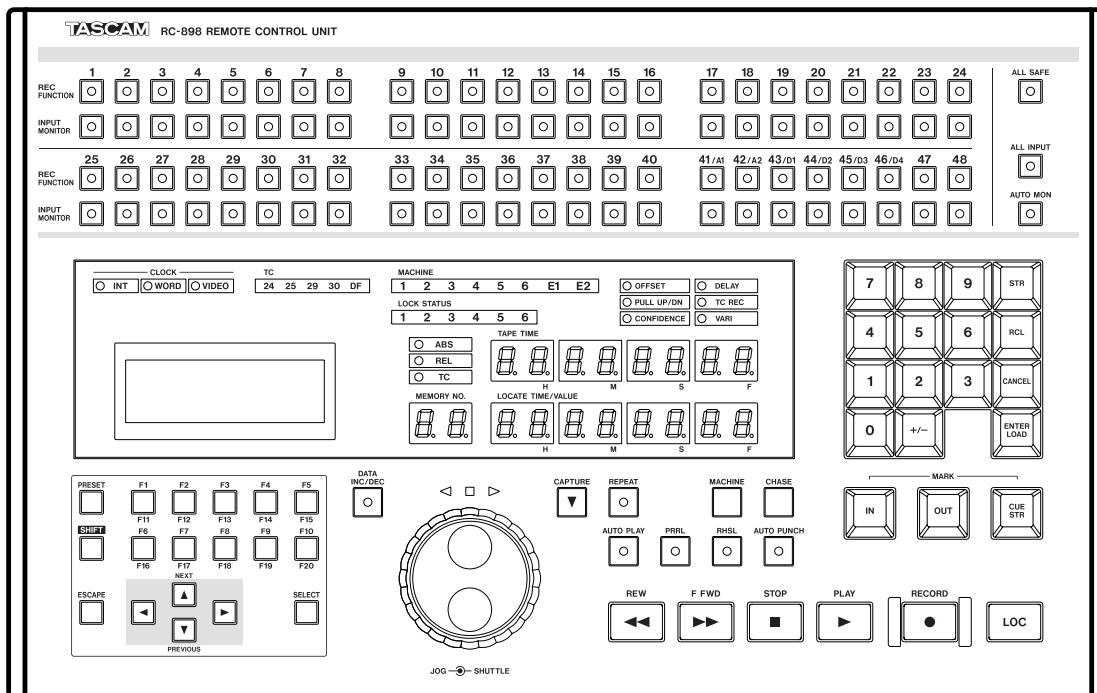


TASCAM

TEAC Professional Division

RC-898

Remote Control Unit



OWNER'S MANUAL

D00376100A

For U.S.A

TO THE USER

This equipment has been tested and found to comply with the limits for a Class A digital device, pursuant to Part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference when the equipment is operated in a commercial environment. This equipment generates, uses, and can radiate radio frequency energy and, if not installed and used in accordance with the instruction manual, may cause harmful interference to radio communications.

Operation of this equipment in a residential area is likely to cause harmful interference in which case the user will be required to correct the interference at his own expense.

CAUTION

Changes or modifications to this equipment not expressly approved by TEAC CORPORATION for compliance could void the user's authority to operate this equipment.

For the consumers in Europe

WARNING

This is a Class A product. In a domestic environment, this product may cause radio interference in which case the user may be required to take adequate measures.

Pour les utilisateurs en Europe

AVERTISSEMENT

Il s'agit d'un produit de Classe A. Dans un environnement domestique, cet appareil peut provoquer des interférences radio, dans ce cas l'utilisateur peut être amené à prendre des mesures appropriées.

Für Kunden in Europa

Warnung

Dies is eine Einrichtung, welche die Funk-Entstörung nach Klasse A besitzt. Diese Einrichtung kann im Wohnbereich Funkstörungen verursachen ; in diesem Fall kann vom Betreiber verlang werden, angemessene Maßnahmen durchzuführen und dafür aufzukommen.

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1 – Introduction

The RC-898 is a fully-featured remote control unit, which allows you to control up to six DTRS units (DA-98, DA-88 or DA-38 units) with a single cable, as well as units implementing the Sony P2 protocol, or using parallel control. As an alternative to parallel control, up to five GPI event-controlled units can be connected.

In addition to providing almost all functions available from the front panels of the DTRS units, the RC-898 in some cases actually extends the capabilities of the basic DTRS system.

1.1 Key features

- DTRS units controlled by the RC-898 are locked to sample accuracy, providing you with a “virtual” digital multitrack recorder, with up to 48 tracks.
- Up to 99 location memories may be entered (or captured) and edited to frame accuracy, for marking important points in a recording project.
- Timecode values are entered and edited using a positive-feel numeric keypad.
- The DTRS units’ transport functions, including the shuttle control, are duplicated on the RC-898. These transport controls may also be used to control the RS-422 or parallel external machine.
- The RC-898 also features a jog dial, allowing frame-by-frame manual location.
- The jog dial can also be used as a data entry control for the entry of location point and other values.
- Auto-punch operations are fully supported. The RC-898 provides one-key operation for rehearsal and recording with automated punch points.
- System settings, for the DTRS units and for the RC-898 itself, are made using a convenient menu system, and displayed on a clear backlit 20-character x 4-line display.
- The most frequently-accessed setting menus can be assigned to function keys, so that they may be easily recalled.
- Lighted indicators give an instant indication of the status of the most important functions.
- All timecode formats are supported, as well as pull-up/pull-down, making the RC-898 the ideal choice for post-production work in both the movie and video fields.

- Up to ten different setups can be stored and recalled, allowing instant re-configuration, not only of the RC-898, but also of all DTRS units connected to it.

1.2 Unpacking

The box contains the following.

- RC-898 Remote Control Unit (x 1)
- Accessories:
 - Remote/sync connection cable (x 1)
 - Remote/sync terminator (x 1)
 - This manual (x 1)
 - Warranty card (x 1)

1.3 About this manual

This manual is written in sections according to the function that you will be performing.

- Section 1 - “Introduction”: This section.
- Section 2 - “RC-898 features”: The front and rear panel features of the RC-898.
- Section 3 - “Connections”: How to hook up the RC-898 with other equipment.
- Section 4 - “Menu and basic operations”: How to use the menu system, and the basic principles of operating the RC-898.
- Section 5 - “Basic DTRS operations”: The main everyday transport and other operations that you will perform when using the RC-898 with DTRS units.
- Section 6 - “Location functions”: Using the location functions of the RC-898.
- Section 7 - “Making settings on the DTRS units”: more advanced DTRS settings, that you will probably not need to make every day.
- Section 8 - “Timecode functions”: Functions related to timecode and DTRS units.
- Section 9 - “External control and settings”: Other control functions, and control of units other than DTRS (P2, GPI, etc.).
- Section 10 - “Menu and parameter reference”: A guide to the menu items, together with parameters and default values.

Please check both the Table of Contents and the Index when you are searching for a particular function or operation. There is also a guide to the different menu screens available on the RC-898 (10, “Menu and parameter reference”).

When describing a control, display or connector, the name of the control is emphasized, as: “Press the **STR** key [17]”, or “the **CONFIDENCE** indi-

Section 1.4 - Precautions and recommendations

cator [10] will light". The number in brackets following the name of the control is the number of the control as shown on the front panel illustration, as well as that used in the appropriate sections describing the front and rear panels.

A special font is used for showing the messages that appear on the LCD display screen [11], for example: `9Pin Locate Preroll`.

When describing a value as shown on the **TAPE TIME** [13], **MEMORY NO** [14], or **LOCATE TIME/VALUE** [15] displays, the following font is used: `00:23:45:12` or `on`.

Some functions of the RC-898 apply to all DTRS recorders, some only to DA-98 units, some to DA-38 units and some to DA-88 units with the SY-88 synchronizer board fitted. Wherever appropriate, this manual will use combinations of the following symbols to show what operations may be performed with the different units in the DTRS range:

Unit	Symbol in text
All units	No symbol
DA-88 with SY-88	88
DA-38	38
DA-98	98

This manual may also make references to the manuals of the DTRS units and the SY-88. In the case of the DA-98 and DA-38, these references will be made in terms of section numbers (e.g. "4.2" and "4-5" respectively). In the case of the DA-88 and SY-88, page numbers will be provided (e.g. "p16" and "p5-7" respectively).

1.4 Precautions and recommendations

As with every precision piece of electronic equipment, common-sense precautions apply with the RC-898.

However, you should note the following points in particular with regard to the operation of the unit:

1.4.1 Environmental conditions

The RC-898 can be operated in most environments, but we suggest that you keep the environmental conditions within the following limits:

- Ambient temperature between 5° and 35° C (41° and 95° F).

- Relative humidity should be between 30% and 80% non-condensing
- Avoid spraying polish, insecticides, etc. near the RC-898.

WARNING

If you need to clean the unit, use a soft cloth, moistened if necessary with a little detergent and water. Do not use abrasive cleaners or solvents such as alcohol or thinner.

- Avoid subjecting the RC-898 to jolts, sudden shocks, etc.

WARNING

If you have to return the unit for service or repair, use the original packing materials if possible. If the unit is to be transported to a recording location, etc., use a suitable transport case with sufficient shock protection.

TASCAM does not accept responsibility for damage resulting from neglect or accident.

1.4.2 Battery backup

The RC-898 requires no power supply of its own, drawing its power from the DTRS units to which it is connected.

Location memories and configuration settings are stored using a battery backup system. The battery should provide power for several years of use. When the battery eventually degrades to the point where it cannot provide enough power to retain settings, the message `Memory Error` will be shown on the display screen (this can be removed by pressing the **ESCAPE** key).

When this message appears, all memories (location memories and configuration settings) are cleared and reset to the default settings.

If you see this message, contact your TASCAM dealer for details of battery replacement. Do not attempt to replace the battery by yourself.

1.4.3 Digital audio cables

When making connections between TASCAM digital audio units, always use genuine TASCAM cables. This applies particularly to any T-DIF dig-

ital audio connections between DTRS recorders, DTRS recorders and digital mixing consoles, etc.

WARNING

Only use TASCAM-supplied and TASCAM-approved cables when making such connections. Though the cables and connectors may resemble computer cables, they serve different purposes, and meet a different set of specifications. The use of cables other than TASCAM cables will at best cause the equipment to work erratically, and at worst cause damage to the equipment.

If the use of cables other than TASCAM cables causes or results in damage, the warranty is voided.

1.4.4 Reference clock in a digital studio

It is likely that the RC-898 will be operated in an environment where there is more than one digital audio source available.

If this is the case, you must make sure that all digital audio sources in the setup are driven by the same reference clock signal (“word clock” or “Word sync”).

If different clock sources are used throughout a setup, it is actually possible to damage speakers, etc. because of mismatches.

1.5 Accessories

Despite the powerful range of functions which may be controlled from the RC-898, the unit is relatively compact. It may be found convenient to mount the RC-898 on a roll-around stand, available as CS-898.

Should you need extension meters from the tape decks, this can be achieved using MU-8824 meter units and appropriate mounting hardware (MK-8924).

Section 1.5 - Accessories

2 – RC-898 features

Section 2.1 - Front panel

This section gives a brief overview of the front and rear panel controls and their functions.

2.1 Front panel

[1] REC FUNCTION keys

These keys with integral indicators allow you to set and view the track arming status of up to six DTRS units attached to the RC-898, or five DTRS units and another recorder.

Tracks 1 through 8 apply to the first unit, 9 through 16 to the second, and so on.

The last eight are used to control tracks 41 through 48 (the sixth DTRS unit) or may be used for the two analog and four digital tracks of a P2 recorder, as marked (**A1**, **A2**, and **D1** through **D4**). These keys are only available for this purpose when recording is enabled for the P2 unit (see 9.3.5, “Controlling recording operations on the serial unit”). When used to control the P2 unit in this way, the last two **REC FUNCTION** keys are unused.

[2] INPUT MONITOR keys

These keys with integral indicators allow you to set and view the input monitoring status of the tracks of any DA-98 units attached to the RC-898. See section 7.1 of the DA-98 manual for details of the operation of these keys, which function in the same way as the keys on the RC-898.

When the RC-898 is used to control DA-88 and DA-38 units, the keys cannot be used, but the indicators still reflect the current monitoring status, on a track-by-track basis, of the connected units.

[3] ALL SAFE key

This key (with integral indicator) is equivalent to turning off all the **REC FUNCTION** keys [1]. When all tracks are safed in this way, the **ALL SAFE** indicator lights. When the **ALL SAFE** mode is turned off (the indicator goes out), the previous track arming status will be restored.

[4] ALL INPUT key and indicator

This key (with integral indicator) performs the function of the **ALL INPUT** key on the connected DTRS units. The indicator lights when the function is active.

The **INPUT MONITOR** keys on a DA-98 also affect the switching between source and tape. Changing the **REC FUNCTION** status of any tracks while the **ALL INPUT** function is on will lose the relationship between the **REC FUNCTION** and **INPUT MONITOR** status for individ-

ual tracks when **ALL INPUT** is turned off again. Start recording or re-set the **REC FUNCTION** keys to restore this.

[5] AUTO MON key and indicator

This key performs the same function as the **AUTO MON** key on a DA-98. However, the DA-88 and DA-38 are not equipped with a key with this label, so the function is slightly different when controlling one of these units.

Pressing this key is the equivalent of pressing the **INSERT** key on a connected DA-38, and pressing both the **AUTO INPUT** and **INSERT** keys on a DA-88. It is used in punch modes to switch automatically between tape and source when punching in and out automatically. The indicator lights when this function is active.

Note that the status of the **INPUT MONITOR** keys on a DA-98 will be overridden by the **AUTO MON** key. However, when **AUTO MON** is turned off again, the original status of these keys will be restored.

Changing the **REC FUNCTION** status of DA-98 tracks while **AUTO MON** is on will lose the relationship between the **REC FUNCTION** and **INPUT MONITOR** status for individual tracks when **AUTO MON** is turned off again. Start recording or re-set the **REC FUNCTION** keys to restore this.

[6] CLOCK indicators (INT, WORD and VIDEO)

These indicators correspond to the indicators with the same names on the currently-selected DTRS unit.

To use the RC-898 to change the clock source on a DTRS unit, see 7.2.6, “Clock selection”.

[7] TC indicators (24, 25, 29, 30, DF)

These indicators correspond to the system time-code type of the currently-selected DTRS unit.

Here, the **29** on the RC-898 panel is an abbreviation for “29.97”. The **DF** indicator will light if the timecode is in drop-frame format. The supported timecode types are therefore:

24	24fps (cine)
25	25fps (PAL/SECAM)
29	29.97 (NTSC color non-drop)
29 DF	29.97 (NTSC drop-frame)
30	30fps (NTSC mono)
30 DF	30fps drop-frame (NTSC color)

NOTE

30 fps drop-frame is only supported by DA-98 units.

To change the timecode type used by the system, see 8.1.3, “Selecting a timecode type”.

[8] MACHINE number indicators (1 through 6, E1, E2)

This indicator shows the machine currently selected for control with the transport keys, using the **MACHINE** key [31]. **1** through **6** refer to DTRS units. **E1** and **E2** refer to VTRs, etc. which may be connected to the RC-898. E1 is connected to the parallel port, and E2 to the 9-pin RS-422 port

[9] LOCK STATUS indicators

These indicators show the current lock status of the DTRS units as they chase to external synchronization sources. For units 2 through 6, the external synchronization master will typically be the first DTRS unit (1) in the chain.

There are four modes displayed by these indicators:

On	The slave unit is chasing the master and is locked to it.
Fast flashing	The slave unit is in chase mode, is in fast forward or rewind mode, and is not locked to the sync master.
Slow flashing	The slave unit is in chase mode, stopped, and is not locked to the sync master.
Off	The unit is not in chase mode.

[10] OFFSET, PULL UP/DN, CONFIDENCE, DELAY, TC REC, VARI indicators

These indicators are used to show the status of the appropriate mode on the currently-selected unit. The status is changed using the menus on the display screen.

In addition, changing the values from the front panel of a DTRS unit connected to the RC-898 will change the status of this indicator, if the unit's number corresponds to the current **MACHINE** number [8].

[11] LCD display screen

This 20-character x 4-line backlit display screen is used to show and set the different parameters available with the RC-898.

[12] Time Mode indicators

Only one of these indicators will be lit at any one time. They indicate the timecode reference (time-

code; **TC**, or absolute time; **ABS**) in use by the currently-selected DTRS unit and shown on the **TAPE TIME** indicator [13].

The **REL** indicator, when lit, shows that the current time, relative to a user-defined reference point, as explained in 6.3, “Setting a relative time reference”, is currently being displayed.

[13] TAPE TIME display

This display shows the current tape time on the currently-selected unit. The time reference is shown by the indicators at [12].

[14] MEMORY NO. display

This 2-digit counter shows the location memory which is currently in use (for storage, recall or location).

[15] LOCATE TIME/VALUE display

This display shows the time of the location memory currently referenced by the **MEMORY NO.** indicator [14] or entered using the numeric keypad [16].

It is also used to show time values which are set as control parameters in various menu screens.

[16] Numeric keypad

The ten number keys are used for direct entry of values for location memories, etc., to select location memories for store, recall, etc., or for the entry of time values into LCD display menu parameters. The **+/-** key is used to change a positive to a negative value, or *vice versa*.

The **+/-** key is also used with relative times, as explained in the relative time setting section in see 6.3, “Setting a relative time reference”.

[17] STR key

This key is used to start the process for storing a timecode value to a location memory. See 6.5.6, “Storing the location in a memory” for details.

[18] RCL key

This key is used to start the process for recalling a timecode value from a location memory. See 6.5.7, “Recalling a location memory” for full details.

[19] CANCEL key

This key is used to cancel the selection of a location memory with the number keys, before storing a time to it or recalling a time. It may also be used to cancel the setting of a numerical value if it has been wrongly entered.

Section 2.1 - Front panel

[20] ENTER/LOAD key

This key is used to confirm the entry of numerical values of location times or memories or when used with the **SHIFT** key [23], transfers the data shown in the **LOCATE TIME/VALUE** display [15] to the parameters being set in the display screen.

[21] PRESET key

This key is used to assign specific software menus to the function keys [22]. See 4, “Menu and basic operations” for details of menu operations.

[22] F1 through F10 function keys

These keys are used with frequently-used menus, so that one keypress will bring up these menus. The keys may be “shifted” [23] to provide a second bank of 10 less frequently-used menu keys.

[23] SHIFT key

This key is used to provide a second bank of ten function keys for quick access to frequently-used menus.

It is also used with the **UP** and **DOWN** keys [25] to use them as **NEXT** and **PREVIOUS** keys for the selection of machines in the display screen menus.

It is also used in conjunction with the **ENTER/LOAD** key [20] to transfer entered values to the parameters being set in the display screen.

[24] ESCAPE key

This key is used to move “up” through the menu tree to the preceding menu screen.

[25] Cursor keys

The cursor keys are represented in this manual by the words:

- up key **UP**
- down key **DOWN**
- left key **LEFT**
- right key **RIGHT**

These keys are used to navigate through the menu system and the parameters available.

The **UP** and **DOWN** keys are also used with the **SHIFT** key [23] to choose the connected unit on which the menu operation will be performed (when shifted, they are known as the **NEXT** and **PREVIOUS** keys, respectively). within each screen. For details of menu operations, see 4, “Menu and basic operations”.

[26] SELECT key

This key is used as an “enter” key, to select an item or to confirm the entry of a value.

[27] DATA INC/DEC key and indicator

This key, with its integral indicator, is used to change the function of the **JOG** dial [28] between controlling the transport (indicator is unlit) and incrementing or decrementing the values being edited in the **LOCATE TIME/VALUE** display [15] (indicator is lit).

[28] JOG dial and SHUTTLE wheel

These controls work with DTRS units and with units connected to the **EXT 2** control port [43].

They are used to simulate the “rock and roll” of an open-reel tape deck, allowing precise positioning of the controlled units. The indicators above the controls show the current direction of the medium’s movement.

When the **DATA INC/DEC** indicator [27] is lit, the **JOG** dial acts as a data editing control for the least significant field of the value shown in the **LOCATE TIME/VALUE** display [15].

[29] CAPTURE key

When this is pressed, the current time is displayed on the **LOCATE TIME/VALUE** display [15] where it may be edited and stored as a location memory, or used for “one-shot” location purposes.

[30] REPEAT key and indicator

This key serves the same function as the **REPEAT** key on the DTRS units, repeating playback between the memory locations assigned for repeat (see 6.6, “Repeating a section”).

The integral indicator will light steadily when repeat mode is selected and the current time is between these two locations, and flash when repeat mode is selected, and the current time is outside these locations.

[31] MACHINE key

Pressing this key repeatedly will cycle the machine number indicators [8]. The indicator which is lit shows which machine will be controlled by the transport controls of the RC-898.

[32] CHASE key

Pressing this **CHASE** key together with the unit number toggles the chase mode of the appropriate unit.

See 7.2.1, “Chasing to ABS sync” and 8.1.8, “Chasing to external timecode” for further details.

It is also possible to select “Machine 0” (only with this **CHASE** key). This will control the second (first slave) DTRS unit, and toggle the chase status of this unit, with all other slave units in the chain then changing to reflect the chase status of this first slave unit.

[33] **AUTO PLAY key and indicator**

This key with its integral indicator works with DTRS units. It allows the units to start playing back automatically when a location point is reached.

[34] **PRRL key and indicator**

This key with its integral indicator works with DTRS units. It is used to locate the tape to the punch-in position, minus the pre-roll time set for punch operations (see 6.7.5, “Setting pre-roll and post-roll times”).

For instance, if the punch pre-roll value is set to 5 seconds, and the punch-in point is “00:55:12:12”, the unit will finish locating at 00:55:07:12.

[35] **RHSL key and indicator**

This key allows you to rehearse auto-punch operations on the units connected to the RC-898. For full details, see 6.7, “Punch operations”.

[36] **AUTO PUNCH key and indicator**

This key allows you to perform auto-punch operations on the units connected to the RC-898. For full details, see 6.7, “Punch operations”.

NOTE

The two keys above do not work in the same way as the rehearsal and auto punch keys on DTRS units. Even if you are an experienced user of DTRS equipment, we recommend that you read 6.7, “Punch operations” to get a full understanding of punch operations when using the RC-898 to control recording operations.

[37] **MARK IN key**

This key allows you to set and check the punch-in point for automatic punch operations. For full details of how to use this key, see 6.7.1, “Setting punch points”.

[38] **MARK OUT key**

This key allows you to set and check the punch-out point for automatic punch operations. For full details of how to use this key, see 6.7.1, “Setting punch points”.

[39] **CUE STR key**

This key is used to capture a series of location points (a cue list) “on the fly”. Successive presses

of this key will store the current position to a location memory, and automatically increment the location memory number, ready for the next store operation. The memories can later be “fine-tuned” using the jog dial [28] in the appropriate mode.

[40] **Transport controls**

These transport controls duplicate those available on DTRS units. They may also be used to control units connected to the E1 (parallel) and E2 (9-pin serial) ports when the appropriate machine is selected ([8] and [31]).

[41] **LOC key**

This key provides one-touch operation to allow location to the memory position shown on the **LOCATE TIME/VALUE** display [15]. If a location pre-roll time has been set (see 6.5.1, “Setting the location pre-roll value”) the pre-roll offset will be subtracted from the location value, and the location will be to that new calculated value.

2.2 Rear Panel

[42] **EXT 1 – parallel and GPI port**

This port provides parallel control and tally signals or GPI control for event control, which may be triggered from a small “cue list” in the RC-898.

The pinout for this 15-pin ‘D’-sub connector is given in 3.2, “Connections (parallel units)”. You will need to make your own cable, referring to the table above, and to the equivalent table in the manual of the other equipment if you wish to control an external unit through parallel control, or if you wish to send GPI events from the RC-898.

[43] **EXT 2 - serial port**

This 9-pin ‘D’-sub connector is used for the control of devices implementing the Sony P2 protocol. A cable designed for P2 connections may be used with this port.

[44] **REMOTE OUT connector**

This connector is used for the control of the DTRS units. It should be connected to the **REMOTE IN/ SYNC IN** of the first DTRS unit in the chain.

Only use a TASCAM cable, as supplied with the RC-898, to make this connection. If your DTRS units are at a greater distance than the cable provided (e.g. your machine room is some distance from your control room), consult your TASCAM dealer for details of the availability of longer DTRS control cables.

[45] DIP switches (1 & 2)

The two DIP switches are both on when in the down position. As shipped from the factory, switch 1 is off (up) and switch 2 is on (down), and you probably will not need to change them.

However, when a passive device is connected to the **EXT 1** connector and power is not provided from the device to the tally supply pin, this switch 1 (**TALLY POWER**) should be set to the on (down) position, allowing the RC-898 to use its own power for this purpose.

Switch 2, **GND LIFT** (ground lift) controls the isolation of the ground of the RC-848/DTRS system from the ground of devices attached to the **EXT 1** and **EXT 2** ports. Usually this switch is in the on (down) position, but you may need to turn it off (up) if your system suffers from hum problems. However, a full discussion of ground loops and their associated problems is outside the scope of this manual, and we recommend that you consult one of the many reference works on this subject if necessary.

[46] Contrast

This control alters the contrast on the backlit LCD display screen [11]. Use it to set the screen so that it is easily visible from your preferred viewing angle.

3 – Connections

This section describes not only the connection of the RC-898 to other equipment, but also provides some information on setting up a digital audio system using the RC-898.

WARNING

All connections to the RC-898 should be made with the power to all units turned off. If this is not done, the operation of the units may become unstable, and damage may possibly occur.

3.1 Connection to DTRS units

The RC-898 and DTRS units form a “daisy-chain”, with the RC-898 being at the head, and the “tail” unit being terminated with the terminator supplied with the RC-898.

NOTE

When you connect a number of DTRS units which are of different types, including DA-98s, the DA-98 units should be at the head of the chain immediately following the RC-898. Any DA-38 and DA-88 units should then be connected following the DA-98s. If there is more than one DA-98 in the chain, they should be connected together, before the DA-38s and DA-88s. The order of the DA-38 and DA-88 units is not important.

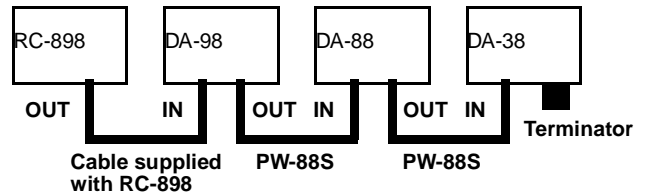
If a DTRS unit other than a DA-98 is used as a master unit, the automatic Output TC Source function and Timecode Offset functions of the DA-98 may not work correctly (see the DA-98 Owner’s Manual, 10.5 and 13.2). In addition, remote control operation may not work correctly.

If the DTRS units are DA-88s and DA-38s only, they may be connected in any order.

However, if you are operating a mixed set of DA-38s, and DA-88s fitted with the SY-88 synchronizer board, we suggest that the SY-88-equipped DA-88 should follow the RC-898, allowing it to serve as a timecode slave, and a DTRS chase master for the DA-38s.

Use the supplied cable to connect the RC-898 to the **REMOTE IN/SYNC IN** of the first DTRS unit, and a PW-88S cable to connect the **SYNC OUT** of the first unit to the **REMOTE IN/SYNC IN** of the next unit, and so on, until the terminator

is connected to the **SYNC OUT** of the last unit in the chain.



WARNING

Turn off power to all units when making connections. If you do not do this, there is a possibility that the RC-898 will malfunction or even be damaged.

The RC-898’s **REC FUNCTION** and **INPUT MONITOR** keys **1** through **8** now control the first unit, Keys **9** through **16** control the next unit in the chain, and so on (regardless of the actual Machine IDs of the units).

Tighten the screws holding the cable connector to the RC-898 and to the DTRS unit. This will prevent accidental disconnection of the RC-898 in the middle of a session.

WARNING

Use only TASCAM cables to connect the RC-898 to the first DTRS unit, and to connect the DTRS units to each other. If the use of cables other than TASCAM cables causes or results in damage to the units, the warranty is voided.

No power connection is needed for the RC-898. All power for the operation of the RC-898 is supplied by the first DTRS unit.

NOTE

The TASCAM TM-D8000 digital mixing console also allows the control of DTRS units. However, it is not possible to use a TM-D8000 and RC-898 for control of DTRS units in the same setup. Naturally, however, a TM-D8000 console can be used to mix the audio to and from DTRS units controlled by an RC-898 unit.

3.1.1 Machine IDs

Set the machine IDs of the DTRS units so that the IDs run in a sequence from the unit at the “head” of the chain, closest to the RC-898 (lowest possible ID) to the “tail” unit (highest ID). There should be no gaps in this sequence.

A DA-88 uses a rotary switch to set the ID and uses 0 as the lowest ID, and a DA-38 or DA-98 uses software to make this setting, and uses 1 as

Section 3.2 - Connections (parallel units)

the lowest ID. Refer to the units' manuals for full details of setting the ID.

Unit	ID as shown	'Real' ID	How the ID is set (see the unit's manual for details)	Power on or off when ID is set
DA-98	1	1	Menu system (see 9.2)	ON
DA-88	0	1	Rotary switch on rear panel (see p23–24)	OFF
DA-38	1	1	Tape counter menu system (see 7-2)	ON

NOTE

When you set the machine IDs, you can set the ID of any machine first, but we recommend doing this in a standard sequence, working from the head of the chain to the tail.

3.2 Connections (parallel units)

The RC-898 allows transport control of a unit connected to the **EXT 1** parallel port. Before making this connection, check the specifications of the other unit to ensure that the control pins available match those provided by the RC-898, as shown below in 3.2.2, "Parallel control/GPI pinout".

NOTE

The RC-898 provides only transport control for a unit connected to the parallel port. Functions such as track arming, etc. are not possible when using the **EXT 1** parallel port.

If a passive unit that does not supply power to the tally supply pin (8) is being used, switch 1 (**TALLY POWER**) of the RC-898 [45] must be set on (down) to allow the RC-898 to provide this power.

3.2.1 Connections (GPI event units)

The **EXT 1** parallel port may also be used for the purpose of controlling up to five GPI event-controlled devices.

The way in which these devices may be triggered from the RC-898 is explained in 9.2, "Controlling GPI devices".

3.2.2 Parallel control/GPI pinout

The following table gives the pin assignments for the parallel/GPI connector (**EXT 1**). GPI connections are shown in square brackets:

- 1 STOP/[Event 1]
- 2 PLAY/[Event 2]
- 3 FF/[Event 3]
- 4 REW/[Event 4]
- 5 REC/[Event 5]
- 6 N/C
- 7 Common
- 8 Tally supply
- 9 PLAY tally
- 10 FF tally
- 11 REW tally
- 12 STOP tally
- 13 REC tally
- 14 REC COMMAND tally
- 15 GND

3.3 Connections (RS-422 units)

The RC-898 allows control of a unit implementing the Sony P2 protocol. This connection is made through the **EXT 2** serial port [43], using a serial cable designed for this purpose. The pinout for this connector is as follows:

- 1 Shield
- 2 RX+
- 3 TX–
- 4 GND
- 5 —
- 6 GND
- 7 RX–
- 8 TX+
- 9 Shield

Make the connection using a cable designed for RS-422 connection (check the pinout of your P2 device before making the connection). This machine may now be controlled by the RC-898 when the **E2 MACHINE** indicator [8] is lit.

3.4 A note on system clocks

When working with many digital audio units, all these units must be fed from the same clock source (either word or video). If this is not done, there is a risk that speakers, etc. may be damaged.

Note that this clock master is entirely different from the timecode master in a studio setup. It is perfectly possible for a clock slave to be a timecode master and vice versa.

3.5 Memory and batteries

As you have noticed, the RC-898 requires no power supply of its own, drawing its power from the DTRS units to which it is connected.

Location memories and configuration settings are stored using a battery backup system. The battery should provide power for several years of use. When the battery eventually degrades to the point where it cannot provide enough power to retain settings, the message `Memory Error` will be shown on the display screen (this can be removed by pressing the **ESCAPE** key).

When this message appears, all memories (location memories and configuration settings) are cleared and reset to the default settings.

If you see this message, contact your TASCAM dealer for details of battery replacement. Do not attempt to replace the battery by yourself.

4 – Menu and basic operations

The RC-898 sets parameters on the connected units using a menu system, with the parameters and their values displayed on the LCD display screen and selected and entered using cursor and data entry keys.

4.1 Navigation

The menus are arranged hierarchically, from a top (master) menu, through to individual parameters. The master “top” menu appears like this:

```

Select Menu Group
>0 1 2 3 4 5 6 7
  8 9 A      E F
Dly/Tr.C/Vari /Loct

```

The cursor is represented here by the > symbol.

Use the **LEFT** and **RIGHT** keys to move the cursor along a row, and the **UP** and **DOWN** keys to move it between rows.

As the cursor moves over the menu group numbers, the bottom line of the screen will change to show an abbreviated summary of the contents of the menu group. In the example above, the contents of the 0 menu group are: track delay, track copy settings, varispeed and the location pre-roll setting.

When the cursor is over the menu group which you wish to enter, press the **SELECT** key to enter the menu group (menu group 0 is shown here):

```

>Delay      Trk Copy
  Vari Spd  Loc Pre
  1        0000 sample

```

Again, the bottom line of the display shows an abbreviated version of some or all of the settings made in the menu to which the cursor points.

When in a menu group, use the cursor keys to move between options, and press **SELECT** when the cursor is to the left of the menu you wish to

enter. For the purposes of this example, we will examine the Vari Spd menu.

```

Vari Speed
  Machine  1
  Fix      + 0.0%

```

In this menu, there are two editable fields, as you will see if you move the cursor with the **LEFT** and **RIGHT** cursor keys. The cursor changes so that the field which is currently to be edited is highlighted by an underline cursor.

The first editable field is the Fix field, which may be changed between the values of Fix and Vari. The second field is the numerical field which sets the amount of the varispeed as a percentage of normal speed. The values of both fields are set with the **UP** and **DOWN** cursor keys.

As soon as a value is changed, it is set. There is no need to press any key to confirm the entry.

To return to a level above the current level, press the **ESCAPE** key. You can continue pressing the **ESCAPE** key until the top menu is reached.

NOTE

Note that the Machine value (i.e. which machine is being controlled) cannot be set in this way (this is explained in 4.3, “Selecting the unit controlled by the menus”).

4.1.1 Invalid operations

Some operations are only possible on certain models of DTRS recorder. For instance, timecode functions are only available on the DA-98 and DA-88 units equipped with the SY-88 board, and dithering is only possible with DA-38 and DA-98 units. If you attempt to perform an operation on a unit where this operation is impossible, the message `Not available!` will be shown on the display screen to let you know that you cannot perform this operation on the connected DTRS unit.

Another kind of invalid operation is when a DTRS unit can perform a certain operation, but the selected operation cannot be performed under the current set of conditions (e.g. TDIF word length cannot be set while analog inputs are selected). In these cases, the word `Inoperable` will be shown on the display.

4.2 Data entry

Typically, the **UP** and **DOWN** keys are used to set the values in the display screen menus. However, there are one or two additional features regarding data entry which are explained here.

4.2.1 Resetting values to zero

In the case of large numerical values, it is sometimes tedious to keep pressing the cursor keys until the value returns to zero.

Accordingly, to reset a value to zero:

- 1) **Press and hold down either the UP or DOWN key.**
- 2) **While holding down this key, press the other (i.e. DOWN if you are holding the UP key, and vice versa).**

4.2.2 Fast setting of values

In addition to being able to reset large values to zero, it also sometimes necessary to input large values. This can be done easily in the following way:

- 1) **Press and hold down the UP or DOWN key (as appropriate).**
- 2) **While holding down this key, press and hold down the SELECT key. As long as this key is held down, the values will change quicker than if this UP or DOWN key on its own is held down.**

4.2.3 Setting values using the VALUE display

As well as using the LCD display, the **LOCATE TIME/VALUE** LED display [15] and numeric keypad [16] may be used for entry of time values into certain parameters which are set through the menu system.

The machine offset value from menu group 3, which is expressed in hours, minutes, seconds and frames, is a useful example of this operation.

- 1) **In the top level menu, move the cursor to menu group 3 and press SELECT:**

```
>McnOffset Ctrl Prt
  TimeMode Trk Arm
+00:00:00:00 ABS
```

- 2) **With the cursor as shown (next to the Machine Offset menu item), press SELECT again:**

```
Machine Offset
      Machine 1
+00:00:00:00 ABS
```

- 3) **Use the numeric keypad to enter the offset time (use the +/- key to change between positive and negative offset).**

The values entered using the keypad will appear in the **LOCATE TIME/VALUE** display [15], and “fill up” from the right. For instance, if the time to be entered is 01:23:07:10, the following keys should be pressed:

Key	Display shows
1	00:00:00:01
2	00:00:00:12
3	00:00:01:23
0	00:00:12:30
7	00:01:23:07
1	00:12:30:71
0	01:23:07:10

The display will flash while the numbers are being entered, to show that the value has not yet been confirmed.

Negative values are shown on the **LOCATE TIME/VALUE** display by a period after the last “frames” digit of the display.

NOTE

If you enter the wrong number by mistake, you can press the **CANCEL** key of the numeric keypad to reset the number to the previous value.

- 4) **Press and hold down the SHIFT key [23] and then press the ENTER/LOAD key [20].**

If the value is a valid one (i.e. you do not attempt to enter 71 frames in a second, etc.), it will be transferred from the LED display, which will stop flashing, to the LCD display screen:

```
Machine Offset
      Machine 1
+01:23:07:10 ABS
```

Invalid values will be rounded down to the nearest valid value (e.g. a value of 78 seconds will be rounded down to 59 seconds).

4.2.4 “Fine-tuning” values

The **JOG/SHUTTLE** controls [28] may also be used to “fine-tune” the values entered and displayed on the LED **VALUE** display.

- 1) Press the **DATA INC/DEC** key [27] so that the indicator lights.
- 2) Use the jog dial to change the value shown on the **VALUE** display in the same way as you would use them to locate a tape (i.e. the jog dial increments (clockwise) or decrements (counter-clockwise) the numbers.

NOTE

The jog dial can only be used for data entry and editing of values which may be entered through the **VALUE** display, not for values which may be entered only on the LCD display screen.

4.3 Selecting the unit controlled by the menus

As explained above, the **Machine** parameter which appears in many menus cannot be changed directly using the **UP** or **DOWN** keys.

The DTRS units connected to the RC-898 are numbered in order, starting at 1. The machine with the lowest logical number (see 3.1.1, “Machine IDs”), i.e. the one connected directly to the RC-898, is Machine 1, the next in the chain is Machine 2, and so on.

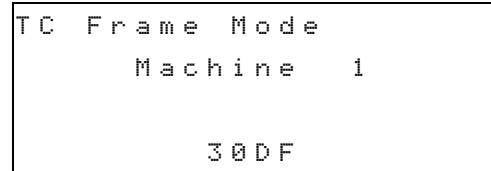
However, as you can see from the front panel of the RC-898, the **UP** and **DOWN** keys have another meaning when used in combination with the **SHIFT** key [23], and they change to being **NEXT** and **PREVIOUS** keys, allowing you to select the next unit in the chain, or the previous one, respectively.

NOTE

This selection has no effect on the transport or location section of the RC-898 and *vice versa*. The unit shown on the **MACHINE** indicator [8] selected with the **MACHINE** key [31] is independent of any settings made on the LCD display screen to select the unit whose parameters are to be set.

If the display screen shows a menu with a **Machine** parameter, and you want to change

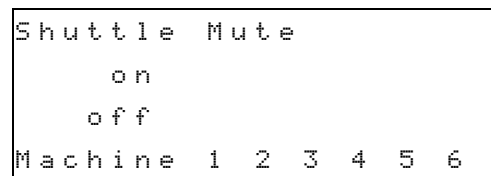
the unit controlled by the menu’s other parameters, as in the example menu below.:



- 1) Press and hold down the **SHIFT** key
- 2) While holding down the **SHIFT** key, press the **UP** or **DOWN (NEXT or PREVIOUS)** key to increment or decrement the **Machine** number.

The machine number can be set from 1 through 6.

Other menus will present the 6 units on one screen (where there is only an on/off parameter). In these cases, use the **LEFT** and **RIGHT** keys to select the machine, and the **UP** and **DOWN** keys to enable or disable the function:



4.4 Commonly-used menus

The **F1** through **F10** function keys [22] may be used to recall the ten functions (menu screens) that you use most often.

When the **SHIFT** key [23] is held down, these keys can be used as an additional ten function keys; **F11** through **F20**.

NOTE

The menu-to-key assignments made on the RC-898 are entirely independent of any menu-to-key assignments made on the RC-898.

Section 4.5 - Storing and recalling user setups

If you have not assigned a menu to a function key, the default (factory) menu-to-key assignments will be used as follows:

Key	Menu	Menu group
F1	Track Delay Time	0
F2	Track Copy	0
F3	Vari Speed	0
F4	Locate Preroll	0
F5	Machine Offset	3
F6	Time Mode	3
F7	Timecode Offset	4
F8	TC Frame Mode	5
F9	Generate Start Time	8
F10	Generate Mode	8
F11	Crossfade Time	1
F12	Confidence Mode	9
F13	Output TC Source	5
F14	Repeat Start/End	3
F15	Analog In/Out	2
F16	Ext TC	E
F17	Abs Diff	E
F18	Tape TC	E
F19	Rel Diff	E
F20	Gen TC	E

4.4.1 Assigning menus to function keys

To assign a menu to a function key:

- 1) Use cursor keys and the **SELECT** key until you see the menu you want to assign to a function key.
- 2) Press the **PRESET** key [21]:

```
Function Preset
Push Function Key

Shuttle Monitor
```

The "Shuttle Monitor" screen is an example only. The current menu title will be displayed on the bottom line of the display.

- 3) Press the function key to which you wish to assign the menu.

To use the second "bank" of function keys, press and hold down the **SHIFT** key [23] before pressing the function key.

4.4.2 Recalling menus using the function keys

- 1) Simply press the function key where you have previously assigned the menu you want to recall.
If you have not assigned a menu to the function key that you press, the display will remain unchanged.
- 2) If you used the **SHIFT** key [23] to assign the menu to **F11** through **F20**, press and hold down the **SHIFT** key before pressing the function key to recall the "shifted" menu.

4.5 Storing and recalling user setups

The RC-898 allows you to store and recall almost all parameters set using the menu system, so the same remote control unit can be used with a variety of different equipment setups with the minimum of reconfiguration.

This is a great time-saver, as not only are the RC-898's parameters stored and recalled, but the settings for the DTRS units connected to the RC-898 are also stored and recalled. In this way, up to six DTRS units can be reconfigured to preset configuration patterns with the press of one key.

4.5.1 Saving the current setup

- 1) From the top menu, move the cursor to menu group **F**, and press **SELECT**:

```
Key Mode  FrameDisp
DispTime >Setup

Setup
```

- 2) Move the cursor to **Setup** (as shown above), and press **SELECT**:

```
Setup

Load 0123456789F
```

As you can see, there are 10 user setups, numbered from 0 through 9, and a factory setup (F). Naturally, you can reload the factory settings, but you cannot overwrite them with your own settings; you must choose one of the 10 user areas.

- 3) Highlight the **Load** field, and change it so that it reads **Save**, using the **UP** key.
- 4) Use the **LEFT** and **RIGHT** keys to highlight the user memory into which you wish to store the current settings, and press the **UP** key.
- 4) Press **SELECT** to confirm the load, or any of the following: **ESCAPE**, **DOWN**, **LEFT** or **RIGHT** keys to cancel
 - The selected user setup will replace the current settings.

```

Setup
  Are you sure?
      0
Save  123456789F
    
```

If you try to load from a setup into which data has not been saved, the display will briefly show **No Data**, and the load operation will not take place.

- 5) Press **SELECT** to confirm the save, or any of the following: **ESCAPE**, **DOWN**, **LEFT** or **RIGHT** keys to cancel.

The display will briefly show **Executing...**, and the current settings will be saved into the user setup.

4.5.2 Recalling a user setup or restoring factory settings

Any of the ten user setups, as well as the factory defaults, can be recalled, using the screen above.

- 1) From the top screen, select menu group **F**, and select the **Setup** menu:

```

Setup
Load  0123456789F
    
```

- 2) Make sure that the left parameter shows **Load** by moving the cursor under it, and the **DOWN** key to change its value to **Load** from **Save**.
- 3) Move the cursor under the user area (or factory setting, represented by **F**), and press the **UP** key to recall the setup.

```

Setup
  Are you sure?
      0
Load  123456789F
    
```


5 – Basic DTRS operations

This section covers the basic operations of controlling the DTRS units connected to the RC-898. For details of how to make parameter settings, etc. and timecode operations, see 4, “Menu and basic operations”, 7, “Making settings on the DTRS units” and 10, “Menu and parameter reference”.

5.1 Transport controls

The transport controls on the RC-898 replicate those on the DTRS units.

The logic of the transport controls is such that any mode can be entered from any other mode. There is no need to go through **STOP**.

5.1.1 Selecting the unit to which operations refer

Generally speaking, the unit controlled by the transport keys will be the first unit in the chain (the other units in the chain are assumed to be using the ABS chase protocol through DTRS synchronization).

However, transport operations, etc. can also be performed on individually-selected machines other than the first one:

1) **Press the MACHINE key [31].**

The word **MACHINE** will start to flash in the **LOCATE TIME/VALUE** display [15].

2) **Use the numeric keypad to enter the number(one digit only) of the machine that you want to control .**

This number will be shown in the **LOCATE TIME/VALUE** display [15], and the appropriate **MACHINE** number indicator[8] will light.

If you enter a machine number of 0, this is equivalent to setting all DTRS units except the first into slave mode, to follow the first unit.

Machine 7 is equivalent to a unit attached to the parallel port [42], and machine 8 is equivalent to a unit attached to the serial port [43].

5.1.2 Formatting tapes

The Hi8 tapes used in DTRS units must be formatted. This can be done either from the DTRS units themselves, or from the RC-898.

1) **Insert a new tape or tapes into the DTRS unit or units. Make sure that it is rewound to the beginning of the tape.**

NOTE

Do not use a tape which has previously been used for recording video.

2) **From menu group 9, move the cursor to Format, and press SELECT:**

```

Format
      Machine  1
      off      44.1 k
  
```

3) **In this menu, as well as using the NEXT (SHIFT + UP) and PREVIOUS (SHIFT + DOWN) keys to select an individual unit, all DTRS units connected to the RC-898 can be selected to format tapes together.**

4) **Move the cursor to the sampling frequency field, and use the UP and DOWN keys to choose between 44.1 and 48 (kHz).**

NOTE

If a digital signal is received at the **DIGITAL IN** connector of the DTRS unit, and digital input has been selected (see 7.2.9, “Input selection”), the sampling frequency is decided by the frequency of the incoming signal and cannot be changed.

5) **Move the cursor to the “control” field and use the UP key to change the setting from off to ready**

6) **Press the UP key again to change ready to on.**

The **FORMAT** indicator on each selected DTRS unit will light.

The three values for this parameter prevent accidental formatting of a tape.

7) **Press and hold the RECORD key and press the PLAY key.**

The tape will start to be formatted.

It is possible to record audio and format a tape at the same time. This is done by arming the tracks before step 5 above. However, if you do this, you should not interrupt the formatting process half-way through a tape. Once you start formatting a

Section 5.2 - Monitoring

tape from the beginning, you should wait until the end of the tape before rewinding and ejecting it.

NOTES

The display shows a negative ABS time for a few seconds at the beginning of the tape. While a negative time is shown, no audio can be recorded on the tape.

We suggest that you leave a blank header of at least 30 seconds at the beginning of the tape. This can be marked as a virtual “zero point” if you like (see 6.3, “Setting a relative time reference”).

5.1.3 Arming tracks

The tracks of the DTRS units are armed using the **REC FUNCTION** keys with their indicators.

These keys and indicators only work for tracks of units that are actually connected.

NOTE

Before recording, you should make sure that either digital or analog inputs, as required, have been selected (see 7.2.9, “Input selection”) and the appropriate clock settings have been made (see 7.2.6, “Clock selection”).

Armed tracks, i.e. those which are ready for recording, are shown by their indicators flashing.

Tracks which are actually recording are shown by their indicators being steadily lit.

When a DA-88 or DA-38 track is recording, the **INPUT MONITOR** indicator will light, showing that the monitoring for the tracks is from the input source, rather than being off-tape. The **INPUT MONITOR** keys are not operational with a DA-88 or DA-38 unit.

When operating a DA-98 unit, the **INPUT MONITOR** keys are operational, and can be used to change between off-tape and source monitoring.

5.1.4 ALL SAFE

The **ALL SAFE** key [3] prevents accidental arming of tracks. When lit, all **REC FUNCTION** indicators go out, and the keys of both the RC-898 and the DTRS unit or units (see 7.2.2, “Key Mode” below) are locked (pressing them will not arm tracks).

When the **ALL SAFE** key is pressed to turn off the safe operation, the arming status of all tracks will return to what it was before the **ALL SAFE** key was pressed.

5.1.5 Transport controls

The RC-898 shares a common interface with all DTRS units with regard to transport functions (including entering and exiting record mode). Consult the relevant portions of the DTRS unit manual if you are unsure of the way in which transport operations are carried out.

One exception to this is the **LOC** key [41] which does not appear on the front panel of DTRS units. It is used to locate the tape to the value shown on the **LOCATE TIME/VALUE** display [15]. For full details of how this key is used and the location facilities available from the RC-898, see 6, “Location functions”.

5.1.6 Shuttle mode

The RC-898 incorporates a jog dial and shuttle wheel to allow precise positioning of the tape in the DTRS units.

When the **DATA INC/DEC** indicator [27] is not lit, moving either of these controls will control the selected unit(s) appropriately.

NOTE

When the currently-selected unit is recording, the jog and shuttle controls are disabled (this prevents accidental interruption of a take).

The indicators will go out 10 seconds after the jog/shuttle controls are last used.

The shuttle wheel allows forward motion at the following speeds (relative to normal speed): 8 x, 4 x, 2 x, 1 x, 1/2, 1/4. The same speeds, except for 1 x, are available in reverse mode. The further the shuttle wheel is turned away from the center position in either the clockwise or counterclockwise direction, the faster the tape will be moved.

The jog dial allows very precise positioning of the tape to frame accuracy.

Monitoring during shuttling is explained below (see 5.2.3, “Shuttle monitoring”).

5.2 Monitoring

The monitoring of off-tape and input source signals is complex, and varies a little between the DA-88 and DA-38 units, and the DA-98 units, due to the latter being provided with track-by-track switching facilities between source and off-tape monitoring, as well as the confidence mode method of off-tape monitoring while recording (see 7.2.12, “Confidence mode”).

Use the flowchart (5.2.5, “Monitoring flowchart”) and tables (5.2.6, “Monitoring tables”) for reference to the monitoring modes available.

The **AUTO MON** key [5] is used in punch recording, providing automatic switching between source and off-tape monitoring as the punch-in recording progresses. See 6.7, “Punch operations” for full details.

5.2.1 ALL INPUT

The **ALL INPUT** key [4] allows the switching of monitoring so that the output from all tracks on the currently-selected unit, or all units if the Key Mode has been enabled (see 7.2.2, “Key Mode”) is from the input source.

5.2.2 INPUT MONITOR keys

These keys [2] are only operational when controlling a DA-98 unit. They are used to select off-tape or source monitoring on a track-by-track basis. For full details of how these keys are used, see section 7 of the DA-98 manual.

However, these indicators will always show the track monitoring status, regardless of the model of DTRS unit connected to the RC-898. This can be seen most clearly in punch-in mode (see 6.7, “Punch operations”), when in conjunction with the **AUTO MON** key [5], these indicators automatically change to show the monitoring status of the tracks as the punch operations proceed.

Using the RC-898 **REC FUNCTION** keys to change the status of any tracks while the **ALL INPUT** function is on will lose the relationship between the **REC FUNCTION** and **INPUT MONITOR** status for individual tracks when **ALL INPUT** is turned off again. Start recording or reset the **REC FUNCTION** keys to restore this

5.2.3 Shuttle monitoring

☞ ☞ Shuttle monitoring can be enabled or disabled on a per-machine basis for DA-38 and DA-98 units connected to the RC-898.

Briefly, the shuttle monitoring, when turned on, mutes the replay from unarmed tracks, and monitors the input source of armed tracks when the machine is in shuttle mode. A fuller explanation of shuttle monitoring is given in section 9.1 (4) of the DA-38 manual, and section 7.1.3 of the DA-98 manual.

- 1) From menu group 9, move the cursor to **StlMon** and press **SELECT**:

```
Shuttle Monitor
      on
      off
Machine 1 2 3 4 5 6
```

- 2) Use the **UP** and **DOWN** keys to switch shuttle monitoring on and off on a per-machine basis.

5.2.4 Shuttle muting

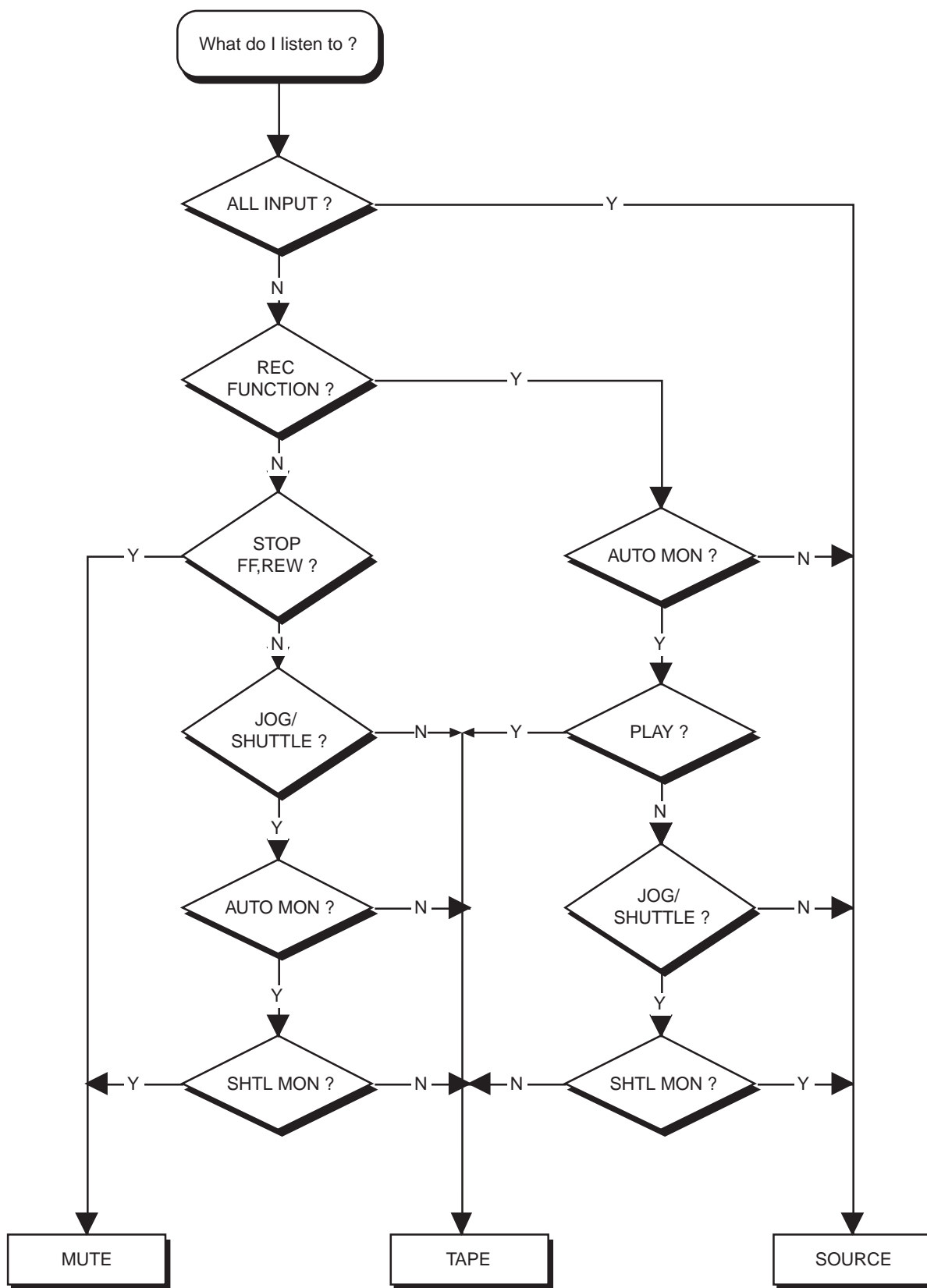
☞ DA-98 units incorporate a shuttle muting feature. The shuttle muting for DA-98 is enabled or disabled from the RC-898 in the following way:

- 1) From menu group 2, move the cursor to **Shtl Mute**, and press **SELECT**:

```
Shuttle Mute
      on
      off
Machine 1 2 3 4 5 6
```

- 2) Use the **UP** and **DOWN** keys to change the setting between on and off for each machine. For a full explanation of shuttle muting, see section 8.6.2 of the DA-98 manual.

5.2.5 Monitoring flowchart



This flowchart is applicable to DA-98 operations, provided that you have not made any manual monitor settings using the **INPUT MONITOR** keys, and that confidence mode is off.

5.2.6 Monitoring tables

Table 1: DA-88 and DA-38

			PLAY	REC	STOP, FF. REW	JOG/ SHUTTLE
ALL INPUT on			Source			
ALL INPUT off	AUTO MON off	REC FUNCTION on	Source			
		REC FUNCTION off	Tape	Tape	Mute	Tape
	AUTO MON on	REC FUNCTION on	Tape	Source	Source	See below
		REC FUNCTION off	Tape	Tape	Mute	

Table 2: DA-88 and DA-38 shuttle modes (ALL INPUT off, AUTO MON on)

		SHUTTLE
JOG/ SHTL MON off		Tape
JOG/SHTL MON on	REC FUNCTION on	Source
	REC FUNCTION off	Mute

Table 3: DA-98

			PLAY	REC	STOP, FF. REW	JOG/ SHUTTLE
ALL INPUT on			Source			
ALL INPUT off	AUTO MON off	REC FUNCTION on	Selectable ^a	Source	Selectable	Selectable ^b
		REC FUNCTION off	Selectable ^b			
	AUTO MON on	REC FUNCTION on	Tape	Source	Source	See below ^{bc}
		REC FUNCTION off	Selectable ^b			

a. "Selectable" means that when confidence mode is in operation, the **INPUT MONITOR** keys can be used to switch between source and off-tape monitoring.

b. When the shuttle mute function is active (see 8.6.2 in the DA-98 manual), output is muted in these modes

c. When shuttle monitoring is turned off here, monitoring is off-tape, and when it is turned on, the input source is monitored

6 – Location functions

The RC-898 can store and recall up to 100 location memory positions, allowing you to find key points in a recording project easily.

The contents of location memories (timecode values) are displayed on the **LOCATE TIME/VALUE** LED display [15], and the number of the current location memory is displayed on the **MEMORY NO.** 2-digit LED display [14].

6.1 Reference modes

Before proceeding with an explanation of the way in which location operations are carried out, it is necessary to examine the way in which times are displayed on the RC-898.

The RC-898 can use one of three time reference modes to show the tape times of the DTRS units connected to it, as shown on the timecode indicators [12]: **ABS**, **REL** and **TC**.

ABS refers to the absolute time, as determined from the servo track of the DTRS tape.

TC refers to timecode read from the timecode track of the DTRS unit. However, since the RC-898 does not accept timecode directly, this need not be actual timecode, but in the case of a DA-98 or DA-88, may be pseudo-timecode, “synthesized” from the ABS values (see 8.1.2, “Synthesizing timecode from ABS times”).

REL refers to the time value, relative to a user-defined reference point (see 6.3, “Setting a relative time reference”).

Cue points may be set “on-the-fly” or entered manually, and copied from a cue list. All cue points may be edited and “trimmed” to frame accuracy.

For faster entry and editing, cue points may optionally be displayed and edited to second accuracy, ignoring the “frames” field.

6.2 Setting the precision

The RC-898 typically displays to frame-based precision (although in fact, the location and synchronization is to sample precision).

However, it is not always necessary to work to this degree of accuracy, and you may want to save a

little time by ignoring the “frames” field when entering and locating to location memories.

NOTE

The location and synchronization accuracy is not affected by this function.

Accordingly, the RC-898 provides you with a way to do this:

- 1) **From the F menu group, move the cursor to `FrameDisF` and press **SELECT**:**

```

Frame Display
                on
  
```

- 2) **Use the UP or DOWN key to change from `on` to `off`.**

When frame display is set `on`, the last two digits of the display will be used for the frames field of location memories, and the RC-898 expects frames to be entered as part of time values. When set to `off`, the frames field is ignored (i.e. always assumed to be zero).

6.3 Setting a relative time reference

This operation is equivalent to pressing the “reset” button on a numerical tape counter to set the value to “0000”. When the RC-898 is in relative mode, the time shown on the **TAPE TIME** display [13] becomes relative to a zero point which you set. This zero point is referenced to the first DTRS unit in the chain.

- 1) **From the F menu group, move the cursor to `DisTime` and press **SELECT**:**

```

Display Time
                Absolute
  
```

- 2) **Use the UP or DOWN key to change `Absolute` to `Relative`.**

The **REL** indicator [12] will light to show that the RC-898 is now displaying times in relative mode.

Section 6.4 - ABS setting

- 3) When the tape is at the time you want to make the “zero” point, press the **CAPTURE** key [29].

The current time value from the first DTRS unit will be displayed on the **LOCATE TIME/VALUE** display [15].

- 4) Press the **STR** key [17].

The **MEMORY NO.** display [14] will start to flash.

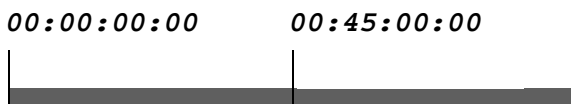
- 5) Press the numeric keypad’s **0** key, and then press the **ENTER/LOAD** key [20] to enter the current time into the **00** location memory.

The **TAPE TIME** display will now show **00:00:00:00**, showing that it is now at zero, relative to the time you have just captured.

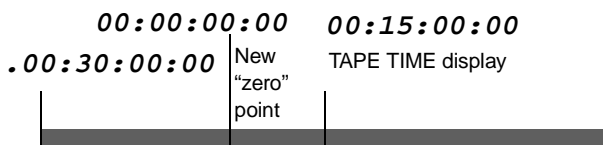
If the display shows something other than **00:00:00:00**, this means that the tape is now at a position other than the point where you captured the time (i.e. the tape was playing or recording).

All times now are relative to this time. Any locations will now be shown on the **TAPE TIME** display relative to the new **00** memory. For example, if the relative “zero point” is set to **00:30:00:00**, when the tape is at the absolute location of **00:45:00:00**, the value shown on the **TAPE TIME** display will be **00:15:00:00** (45 – 30). However, even though the value shown on the **TAPE TIME** display changes, neither the actual tape position nor values shown on the **LOCATE TIME/VALUE** display are affected.

Absolute settings



Relative settings



A minus value is shown on the displays either with a leading minus sign (–) on the **TAPE TIME** display, or with a leading period (.) on the **LOCATE TIME/VALUE** display.

6.3.1 “Return-to-zero”

Since the RC-898 works on time-based, rather than counter-based, references, there is no dedicated “RTZ” control. However, you can return to the zero point using the following procedure:

- 1) Press the **RCL** key [18].

The **MEMORY NO.** indicator will start to flash.

- 2) Press the **0** key on the numeric keypad, followed by **ENTER/LOAD**.

The **LOCATE TIME/VALUE** display will now show the actual time value of the “zero point”.

- 3) Press the **LOC** key [41].

The tape will return to the nominal “zero point” and the **TAPE TIME** display will show **00:00:00:00**.

6.4 ABS setting

The ABS setting allows you to use the subcode on the servo track of the DTRS unit as the time reference of the RC-898. Usually, this starts at **00:00:00:00**, and continues for the length of the tape.

However, there are some options available with the ABS mode, which increase the flexibility of the system. These are described in 8.1.2, “Synthesizing timecode from ABS times”, and allow you to start with an offset, etc. when synthesizing timecode.

6.4.1 A note on ABS frame rate

When ABS is selected, the number of frames per second is different from that in any timecode mode. For details of setting SMPTE/EBU frame rates, see 8.1.3, “Selecting a timecode type”.

Timecode (whether SMPTE or EBU) contains a fixed number of frames per second. However, the ABS method of timing works in a slightly different way.

In three seconds of time, there are 100 frames. These frames are allocated as follows:

Second	Number of frames	Maximum frame value displayed
00 – 01	33	32
01 – 02	33	32
02 – 03	34	33

This pattern is repeated every three seconds, as you will notice when you set frame values using the menu system in ABS mode. When multiple DTRS units are connected together in DTRS sync mode, the master unit always outputs ABS timings to the slave unit(s).

6.4.2 Selecting Time Mode

ⓄⓄ Each DTRS unit in the chain capable of using timecode (i.e. DA-98 and DA-88/SY-88 units) can be changed to use either timecode or ABS timing.

The time mode selected here is the reference time mode for punch operations, location operations, etc.

- 1) From menu group 3, move the cursor to TimeMode and press **SELECT**:

```

Time Mode
      TC
      ABS
Machine 1 2 3 4 5 6
    
```

In the above screen, all machines are referenced to the ABS time.

- 2) Use the **UP** and **DOWN** keys to select between ABS and TC settings.

NOTES

Note that these settings show the way in which the position on the DTRS unit is shown on the **TAPE TIME** display and may also be used to control the chase mode of the DTRS units as described in 8.1.8, "Chasing to external timecode".

6.5 Location operations

Location transport operations on the RC-898 are mainly controlled using the **LOC** key [41]. This key, which has no equivalent on the DTRS units, allows the instant location of the tape to the value shown in the **LOCATE TIME/VALUE** display.

However, it is also possible to set a locate pre-roll time, and if this is set to a non-zero value, locating to a position will move the tape to the time shown in the display, minus the pre-roll value.

For example, if the pre-roll time is set to 5 seconds, and the time shown in the **LOCATE TIME/VALUE** display is **01:23:03:02**, when the **LOC** key is pressed, the tape will locate to **01:22:58:02**. This allows time for cueing, slave unit lock-up, etc.

NOTE

In the following explanations, in the interests of clarity and brevity, we will refer to the units locating to the location time. This should always be assumed to be the location time minus the location offset, unless specifically mentioned otherwise.

6.5.1 Setting the location pre-roll value

To set the pre-roll value which will be used by location operations:

- 1) From menu group 0, move the cursor to **Loc Pre**, and press **SELECT**:

```

Locate Pre-roll
                00min00sec
    
```

- 2) Use the **LEFT** and **RIGHT** keys to move between the min and sec fields, and set the values using the **UP** and **DOWN** keys.

It is also possible to use the numeric keypad here. The "hours" and "frames" digits of the value shown in the **LOCATE TIME/VALUE** display will be ignored, and only the "minutes" and "seconds" used.

The maximum value that may be set here is **59min59sec**, and the minimum value is **00min00sec**. It is not possible to have a negative pre-roll time.

NOTES

The values set here apply to the RC-898 location functions, and are not affect settings made on the DTRS units connected to the RC-898.

The values set here do not apply to the auto-punch operation pre-roll time, which is set using a separate menu (see 6.7.5, "Setting pre-roll and post-roll times").

6.5.2 Auto play

When the DTRS unit reaches the location point, it will normally go into stop mode.

However, if the **AUTO PLAY** indicator [33] is on, the unit will automatically start playing when the location point is reached.

6.5.3 "Instant" location

If you are playing back or recording, and you wish to mark a point for later one-time location:

- 1) Press the **CAPTURE** key [29] at the point where you wish to return.
- 2) At any point following the capture, press the **LOC** key to return to the location point that has just been captured.

It is not necessary to stop the tape before pressing **LOC**. Location can be performed while the unit's transport is in any mode, including fast forward and rewind.

You can now "fine-tune" this time value (see 6.5.5, "Editing a location"). This location point may also be stored in a location memory (see 6.5.6, "Storing

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the location in a memory”) and recalled for later use.

6.5.4 Manual entry of a location point

You can also use the numeric keypad to enter a time value manually from a cue list, etc. to which you can locate.

Time values are entered from the right of the display, which is cleared as soon as a number key is pressed. For instance, to enter a value of **01:25:34:12**, the following keys should be pressed:

1	00:00:00:01 (display is cleared and starts flashing)
2	00:00:00:12
5	00:00:01:25
3	00:00:12:53
4	00:01:25:34
1	00:12:53:41
2	01:25:34:12
ENTER/LOAD	(stops display flashing and enters the value)

Note that the **ENTER/LOAD** key [20] is used to confirm the entry.

If you make a mistake entering the value, you can stop the entry procedure with the **CANCEL** key [19]. The display will stop flashing.

This time value can now be used for “instant” location (simply press the **LOC** key [41]) or stored in a location memory for further use (see 6.5.6, “Storing the location in a memory”).

6.5.5 Editing a location

When a location has been captured or entered as described above, it can be edited using the jog dial [28].

- 1) **Ensure that the DATA INC/DEC indicator [27] is lit.**
If this indicator is not lit, the **JOG** dial will control the tape transport.
- 2) **Use the JOG dial to adjust the value of the location point.**
- 3) **To confirm this edited value, either locate to the position that you have just edited, or store the edited value into the location memory.**
- 4) **To use the JOG dial as a transport control again, press the DATA INC/DEC key so that the indicator goes out.**

6.5.6 Storing the location in a memory

There are 100 memories into which location time values may be stored, numbered from **00** to **99**.

The location memory which is currently in used is shown in the 2-digit **MEMORY NO.** display [14].

As mentioned above (6.3, “Setting a relative time reference”), location **00** is used for special purposes, such as storing the “zero” reference point in relative time mode. We therefore suggest that you do not use location memory **00** as a general location point.

NOTE

Location memories stored on the RC-898 are completely independent of either the MEMO 1 and MEMO 2 points stored in the DTRS units, or of the 10 extra memory locations which may be stored in a DA-98 unit.

- 1) **Enter or capture a location time (you do not need to press ENTER in this case).**
- 2) **Press the STR key [17].**
The **LOCATE TIME/VALUE** display will stop flashing, and the **MEMORY NO.** display [14] will start to flash.
- 3) **Use the numeric keypad [16] to enter the number of the location memory into which you want to store the value.**

The number will “fill up” from the right. If you want to store the time value in memory **03**, for example, you only need to press the **3** key, but if you want to store it in memory **13**, press the **1** key, followed by the **3** key.

You can also use the **JOG** dial as a data dial (when the **DATA INC/DEC** indicator [27] is lit) to select the location memory.

- 4) **Press the ENTER/LOAD key [20].**
The **MEMORY NO.** display will stop flashing, and the value is stored in the location memory.

If you enter the wrong location memory, press the **CANCEL** [19] key. The **MEMORY NO.** display will stop flashing and will return to its previous value.

6.5.7 Recalling a location memory

To recall and locate to a time value stored in a location memory:

- 1) **Press the RCL key [18].**
The **MEMORY NO.** display [14] will start to flash.

- 2) **Use the numeric keypad [16] to enter the number of the location memory you want to recall.**

The number will “fill up” from the right. If you want to recall memory 03, for example, you only need to press the 3 key, but if you want to recall memory 13, press the 1 key, followed by the 3 key.

- 3) **Press the ENTER/LOAD key [20].**

The **MEMORY NO.** display will stop flashing, and the time value stored in that memory will appear on the **LOCATE TIME/VALUE** display.

- 4) **Press the LOC key [41].**

The tape will locate to the location point that has just been recalled.

If you enter a location memory in which nothing has been stored, this is not an error, but the **LOCATE TIME/VALUE** display will show 00:00:00:00.

If you enter the wrong location memory, press the **CANCEL** [19] key. The **MEMORY NO.** display will stop flashing and return to its previous value..

6.5.8 Repeated entry of location points

You can also use the **CUE STR** key [39] to store a series of location points as a tape is played.

- 1) **Recall a location memory.**

The location memory immediately after the recalled memory will be overwritten, so make sure that it is a location you do not want to keep.

- 2) **Start playing (or recording) the tape.**

The order of steps 1) and 2) can be reversed.

- 3) **Press the CUE STR key.**

The current tape location will be stored into the location memory following the one you have just recalled. No confirmation is necessary.

The **LOCATE TIME/VALUE** display will now show the value of the time just stored in the location memory, and the **MEMORY NO.** display will show the memory number in which it has been stored.

Pressing the **CUE STR** key again will store the new tape location into the next memory location.

These location memories can be recalled and edited in the same way as location memories entered in any other way. There is also one level of undo available to replace one location memory

which may have been entered accidentally. See 6.7.4, “Undo function” for details. Note that there is no “redo” function available.

6.5.9 Editing a location memory

When a memory has been recalled, it is possible to edit it, either by replacing the contents with a value entered from the numeric keypad or using the jog/shuttle controls:

- 1) **Use the DATA INC/DEC key [27] to set the jog/shuttle controls into data editing mode.**
- 2) **Use the JOG dial [28] to “nudge” the values displayed on the LOCATE TIME/VALUE display [15].**

The value will flash.

- 3) **Confirm the entry with the STR key [17].**

The **LOCATE TIME/VALUE** display will stop flashing, and the **MEMORY NO.** display [14] will start to flash.

- 4) **Press the ENTER/LOAD key to store the edited value to the same location memory, or the numeric keypad, followed by the ENTER/LOAD key to store the edited value to a different location.**

6.6 Repeating a section

You can set two points, independently of the location memories, which allow you to repeat playback continuously between them.

NOTE

The points that are set here using the RC-898 are independent of any repeat points set on the DTRS units. When repeat times are set using the RC-898, the repeat function is not available from the DTRS front panel.

- 1) **From menu group 3, move the cursor to Repeat, and press SELECT:**

```
Repeat Start/End
      Machine 1
                                30ND
Start 00:00:00:00
```

- 2) **Use the DOWN key to select the Start parameter if it is not already visible.**

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- 3) **Move the cursor to the time fields, and use the UP and DOWN keys to set the time value.**

Alternatively, you can use the numeric keypad to set the time value.

- 4) **Move the cursor to the Start parameter, and press the UP key to select the End parameter.**
- 5) **Set the time values for the End point.**
- 6) **Press the REPEAT key (the indicator will light) to start the repeat between the two points.**

The Start and End times must be at least 5 seconds apart, otherwise repeat play cannot take place.

If the End time is set, and the Start time is set to a time after the End time, when the REPEAT key is pressed, the two time points will be swapped, so that the Start comes before the End.

When you are editing the repeat times, the DTRS unit tries to take into account the fact that the End should follow the Start, and automatically attempts to adjust the entries as they are made so that they are consistent.

6.7 Punch operations

Automatic punch recording operations are closely linked to location memory, and so are described here.

6.7.1 Setting punch points

To set the punch-in and punch-out points:

- While the tape is playing, press the **IN** and **OUT** keys as appropriate at the right time.
- Alternatively, you can use the numeric keypad to enter a time value for the in or out point.
- While the **LOCATE TIME/VALUE** display is flashing, press the **IN** or **OUT** key as appropriate. The display will stop flashing, and the **MEMORY NO.** display will show *in* or *ot*, depending on whether the value has been stored as the punch-in or punch-out point.

NOTE

Setting a punch-out time which comes before the punch-in time is meaningless, and will not be automatically corrected by the RC-898. If you try to perform a punch operation with the punch points set in this way, the tape will locate to the punch-in point (minus the punch pre-roll time) and then stop.

6.7.2 Checking punch points

The punch points can be checked and recalled in the same way as any other location memory.

- 1) **Press the RCL key.**
The **MEMORY NO.** display will start to flash.
- 2) **Press either the IN or the OUT key, as appropriate.**

The time value of the punch-in or the punch-out point will be shown on the **LOCATE TIME/VALUE** display.

- The **LOC** key can now be used for instant location to the punch-in or punch-out point.
- The **PRRL** key [34] will also locate to the pre-roll time minus the punch pre-roll time (see 6.7.5, “Setting pre-roll and post-roll times” for details of setting this value). This is independent of the location pre-roll time (see 6.5.1, “Setting the location pre-roll value”).

In addition to checking the actual punch positions, you can also check the length of the punch time:

- 1) **Press the RCL key.**
The **MEMORY NO.** display will start to flash.
- 2) **Press and hold down the IN key.**
- 3) **While holding down the IN key, press the OUT key.**

The time between the two punch points will be shown on the **LOCATE TIME/VALUE** display.

6.7.3 Editing punch points

- 1) **Press the RCL key, followed by the IN or OUT key.**
The punch-in or punch-out value (as appropriate) will be shown on the **LOCATE TIME/VALUE** display.
- 2) **If the DATA INC/DEC indicator [27] is not lit, press the DATA INC/DEC key so that the indicator is lit.**
- 3) **Use the JOG dial to adjust the value of the punch-in or punch-out point.**
- 4) **After adjusting the value, press the IN or the OUT key as appropriate to store the new value into the punch memory.**

6.7.4 Undo function

If you have stored a punch in or out value and overwritten it in error, there is an “undo” function,

which allows you to restore the previous version. Only one level of undo is allowed, and if no value has been stored in the in or out memory prior to the wrong value being entered, no undo is possible. To undo the wrong entry:

- 1) **Press and hold down the CANCEL key, and press either the IN or the OUT key, depending on the memory store operation that you want to undo.**

The previously-stored memory value will be shown on the **LOCATE TIME/VALUE** display.

This undo function can also be used with the “on-the-fly” location memory store function (see 6.5.8, “Repeated entry of location points”) to delete a cue point entered in error. In this case, the **CUE STR** key, rather than the **IN** or **OUT** key, should be pressed while the **CANCEL** key is held down.

Please note that there is no “redo” function.

6.7.5 Setting pre-roll and post-roll times

These times used for punch operations only, and are independent of the pre-roll time described in 6.5.1, “Setting the location pre-roll value”.

The PRRL key can be used to locate to the punch-in time, minus the punch pre-roll time set here.

- 1) **From menu group 1, move the cursor to Pre/Post, and press SELECT:**

```

Preroll  Postroll
      Machine  1
Pre           Post
00m05s     00m03s
    
```

- 2) **The times may be set up to a maximum of 59 minutes, 59 seconds, using the cursor keys or the numerical keypad.**

The values shown above (5 seconds and 3 seconds) are the factory default values for pre-roll and post-roll, respectively.

These values are also the minimum values. Any attempt to set a value less than these will cause the setting to revert to the minimum value.

6.7.6 Crossfade times

Crossfading is used in digital recording to provide a “seamless” punch operation.

- 1) **From menu group 1, move the cursor to X-fade and press SELECT:**

```

Crossfade Time
      Machine  1
      060 ms
    
```

- 2) **On DA-98 units, the time can be set from 10ms to 200ms in 10ms increments. On DA-38 and DA-88 units, the increments are still 10ms, but the time can be set from 10ms to 90ms.**

Use the **UP** and **DOWN** keys to change the value, or the last digits of a value entered with the numeric keypad.

6.7.7 Rehearsing the punch recording

- 1) **Arm the track(s) which will be used for recording.**

The **REC FUNCTION** indicators [1] of these tracks will flash, and the **INPUT MONITOR** indicators [2] will light.

- 2) **Press the AUTO MON key [5].**

This corresponds to pressing the **AUTO MON** key of a DA-98 unit or the **INSERT** key of a DA-38, or pressing the **AUTO INPUT** and **INSERT** keys together on a DA-88 unit.

- 3) **Press the RHSL key [35].**

- The tape will locate to the punch pre-roll point and start playing. The **INPUT MONITOR** indicators of the armed tracks will go out, showing that monitoring is off-tape.
- When the tape reaches the punch-in point, the **RECORD** key [40] will start to flash. The **INPUT MONITOR** indicators will light, showing that source monitoring is now enabled.
- When the tape reaches the punch-out point, the **RECORD** key will go out. The **INPUT MONITOR** indicators will also go out .
- When the tape reaches the post-roll point, it will stop.
- To repeat the rehearsal, press the **RHSL** key again.
- The rehearsal can be interrupted at any time by pressing the **STOP** key.

6.7.8 Performing the punch recording

- 1) **With the tracks armed, and the AUTO MON indicator lit, press the AUTO PUNCH key [36].**

Section 6.7 - Punch operations

- The tape will locate to the punch pre-roll point and start playing. The **INPUT MONITOR** indicators of the armed tracks will go out, showing that monitoring is off-tape.
- When the tape reaches the punch-in point, the **RECORD** key [40] will light, and the **RECORD FUNCTION** indicators of the armed tracks will also light steadily.
- The **INPUT MONITOR** indicators will light, showing that source monitoring is now enabled.
- When the tape reaches the punch-out point, the **RECORD** key will go out and the **RECORD FUNCTION** indicators of the armed tracks will start to flash. The **INPUT MONITOR** indicators will also go out .
- When the tape reaches the post-roll point, it will stop.
- To repeat the take, press the **AUTO PUNCH** key again.
- The take can be interrupted at any time by pressing the **STOP** key.
- Check the punched material by pressing the **PRRL** key and locating to the punch pre-roll point . If the **AUTO PLAY** indicator is lit while the pre-roll location is taking place, playback will start automatically when the pre-roll point is reached.

NOTE

When you are satisfied with the take, remember to turn off the **AUTO MON** setting and unarm the tracks.

7 – Making settings on the DTRS units

This section covers the operations which relate to the DTRS units, other than those specifically related to timecode.

7.1 Track operations

The following series of operations relate to individual tracks of the DTRS units connected to the RC-898.

7.1.1 Track delay

When recording or playing back, tracks on a DTRS unit may be delayed by up to 7200 samples, or advanced relative to other tracks up to a value of 200 samples.

This is possible due to the design of the recording and monitoring heads in the DTRS mechanism.

- 1) From menu group 0, move the cursor to `Delay` and press **SELECT**:

```
Track Delay Time
01      000 msec
```

- 2) Use either the **UP** key or the numeric keypad to change the track number by individual track.

NOTE

The track number here may be set from 01 to 48. Tracks refer only to DTRS units, not to any other equipment which may be using the **REC FUNCTION** switches of tracks 41 through 46.

- 3) When track 1 is shown, you can press the **DOWN** key to select the eight tracks of the first DTRS unit. Continue pressing the **DOWN** key to select the tracks in groups of eight for the subsequent DTRS units (i.e. 9-16, 17-24, etc.):

```
Track Delay Time
1-8      000 msec
```

Any changes to the delay time made when a group of eight tracks is shown will affect the delay time of all tracks on the unit. This allows you to set the

delay times for different DTRS units in the chain easily (to slip times, etc.).

When track 48 is shown on the display, pressing the **UP** key will select tracks 41-48. Subsequent presses of the **UP** key will select the other DTRS units in order, working towards the head of the chain.

- 4) Move the cursor to the numerical value field and use the **UP** and **DOWN** keys or the numeric keypad to enter a value.

The **+/-** key of the numeric keypad allows you to enter negative values here, as shown by the period after the last digit in the **LOCATE TIME/VALUE** display.

- 5) If you prefer to work in sample values, rather than milliseconds, move the cursor to the `msec` field and change it to `sample` with the **DOWN** key.

The delay value is now converted to samples at the current sampling frequency, and is up to 4 digits long.

7.1.2 Track copying

38 98 This operation allows the assignment of inputs (either digital or analog) on a track-by-track basis. This facility is not available on DA-88 units. This means that a patchbay is not required to reroute input signals

As well as external inputs, tracks which have already been recorded can be used as recording sources. This feature therefore allows tracks to be copied within a unit.

It does not allow routing or copying of tracks between machines, nor does it allow the combination (“ping-pong” of tracks). For these operations, an external patching or mixing system is required. For further details of this feature, consult section 8.11 of the DA-98 manual, or 4-7 of the DA-38 manual.

- 1) From menu group 0, move the cursor to `Trk Copy` and press **SELECT**:

```
Track Copy      Mch 1
Input  12345678 (Ana)
Tape
Track  12345678  off
```

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- 2) To enable track copying on the selected machine, move the cursor to `off` and use the **UP** key to change it to `on`.

In the screen above, analog inputs 1 through 8 are routed to destination tracks 1 through 8 (shown on the bottom line of the display) on a “one-to-one” basis.

- 3) To change the routing of the inputs, use the **UP** and **DOWN** keys to select the different inputs or tape tracks to be used as recording sources.

The screen below shows tracks 1 through 4 accepting digital inputs 1 through 4, while the signals previously recorded on these tracks are copied to tracks 5 through 8.

```
Track Copy      Mon 1
Input  1234      (Dig)
Tape           1234
Track  12345678  on
```

7.1.3 Rec Mute function

☞ The rec mute function allows you to prevent any input signals from reaching armed tracks, which would otherwise be recording. This may be used to record periods of silence, etc. This muting is available on a track-by-track basis.

- 1) From menu group 1, move the cursor to `Rec Mute`, and press **SELECT**:

```
Rec Mute      Mon 1
On
Off
Trk   1  2  3  4  5  6  7  8
```

- 2) Use the **LEFT** and **RIGHT** cursor keys to select a track, and the **UP** and **DOWN** keys to turn the muting on and off.

7.2 Unit-related functions

The following functions affect the settings of the whole unit, on a unit-by-unit basis.

7.2.1 Chasing to ABS sync

Units which are not the first unit in the chain will typically chase the first unit in the chain using the ABS synchronization facility.

This is different from chasing to timecode, which is described in 8.1.8, “Chasing to external timecode”. Chasing to a DTRS master requires that there is a properly-terminated sync and control

“daisy-chain” described in 3.1, “Connection to DTRS units”

To set sync chase mode on or off for a particular DTRS unit:

- 1) Press the **CHASE** key [31].

The word **CHASE** will start to flash in the **LOCATE TIME/VALUE** display.

- 2) Use the numeric keypad to enter the number of the DTRS unit that you want to set.

This will toggle the chase status of the DTRS unit between on and off.

The appropriate **LOCK STATUS** indicator [9] will now show the chase status of the DTRS unit, as will the **CHASE** indicators on the DTRS units..

- on** Chase mode is enabled, and the slave is now locked to the master.
- fast flash** Chase mode is enabled, but the slave unit is not yet locked (the slave unit is in fast forward, rewind, etc.).
- slow flash** Chase mode is enabled, but the slave unit is not yet locked (unit is in stop mode)
- off** Chase mode is disabled (or the unit is turned off or not connected).

When the master unit (ID 1) is controlled, the slave units which have their chase mode set will chase the master unit. As they lock, the **LOCK STATUS** indicators will light steadily, as will the **CHASE** indicators on the DTRS units.

NOTE

If the **CHASE** key is pressed followed by the numeric keypad **0** key, this will toggle the chase status of all slave DTRS units.

Remember that DA-88 units, although their ID numbering starts at 0, should be regarded as starting at 1. The IDs for DA-38 and DA-98 units start at 1 in any case.

7.2.2 Key Mode

Using this function, you can select either all DTRS units connected to the RC-898, or just one unit, to be controlled by the **ALL SAFE** [3], **ALL INPUT** [4] and **AUTO MON** [5] keys.

- 1) From menu group F, move the cursor to `Key Mode`, and press **SELECT**:

```

Key Mode
      All
    
```

- 2) Use the **UP** or **DOWN** key to select between `All` and `Individual`.

If you select `Individual`, only that unit currently selected for control (see 5.1.1, “Selecting the unit to which operations refer”) will be controlled by the three keys mentioned above. If you select `All`, then all DTRS units connected will respond to the commands of the **ALL SAFE**, **ALL INPUT** and **AUTO MON** keys.

7.2.3 Chasing with an offset

It is not always required that the DTRS units are in perfect synchronization with each other.

For instance, it may be that three DTRS units are being used for video post-production purposes. The dialog and Foley tracks of a project have been recorded on one DTRS tape (up to eight tracks), and the backing music has been recorded on two more tapes (16 tracks). Obviously, the units replaying the two music tapes should be synchronized to each other, but the music may need to be “slipped” relative to the dialog and Foley unit (which is, in turn, synchronized to the timecode on the video, as described in 8.1.8, “Chasing to external timecode”).

Once the dialog and Foley is synchronized to the video timecode, “slipping” the two music units is accomplished in the following way:

- 1) From menu group 3, move the cursor to `McN Offset` and press **SELECT**:

```

Machine Offset
      Machine 2
+00:00:00:00  ABS
    
```

- 2) Choose the first machine which will take the chase offset (in the illustration above, we show machine 2) by using the **SHIFT** and **UP (NEXT)** keys.

- 3) Use the numeric keypad to enter an offset value which is shown on the **LOCATE TIME/VALUE** display. The **+/-** key of the numeric keypad is used to change between positive and negative values.

The offset value may be ± 2 hours relative to the master time.

You can also use the cursor keys to enter a value directly on the display screen.

NOTE

There is an “invisible” field immediately to the right of the frames field. If you place the cursor there and increment or decrement the value, you can change the time as a whole (as the frame field passes its maximum value, the seconds field will increment).

The Auto Offset function described below can also be used to set the offset.

- 4) Transfer the value to the display screen by pressing and holding down the **SHIFT** key [23] and pressing the **ENTER/LOAD** key [20].
- 5) Use the **SHIFT** and **UP (NEXT)** keys to select any other units which will chase with an offset. When the master DTRS unit plays, the slave units should now chase at the offset value you have set up.

If an offset value is set on any unit or units, and the Time Mode is set to **ABS**, the **OFFSET** indicator [10] will light.

If you need to “fine-tune” these values, you can use the **UP** and **DOWN** keys to adjust the value of the offset while monitoring the playback of the units.

If adjustment finer than a frame is required, it is suggested that you use the Track Delay function (see 7.1.1, “Track delay”).

7.2.4 Auto Offset function

In addition to the manual offset entry, it is also possible to set an offset automatically by following the procedure below:

- 1) From menu group 3, move the cursor to `McNOffset` and press **SELECT**.

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- 2) Use the **RIGHT** key to move the cursor to a second “invisible” field to the right of the frames field. The display will appear as follows:

```
Machine Offset
      Machine  2
      AUTO OFFSET
```

- 3) Locate the two tapes (master and slave) so that they have the right offset.

You can play up the tapes and pause them once they have been lined up, or carry out the next step while either or both of the tapes is being replayed.

- 4) Press either the **UP** or **DOWN** key at the correct offset time to capture and store the offset.

NOTES

The value entered in this way can be edited later using the technique described above.

Offsets cannot be set from unformatted tapes, nor if either tape is displaying a negative ABS value.

7.2.5 Checking the offset

The offset of a slave DTRS unit relative to its master may be checked (“absolute” difference), as well as the difference (if any) between the intended offset and the actual offset (“relative” difference). In practice, usually there will be no difference between the intended and actual offset, resulting in a relative difference of zero.

As an example, consider the following:

A slave machine has its offset set to +00:10:00:00, and while chasing, the two machines’ tape counters read as follows:

```
Master   10:15:12:12
Slave    10:05:12:08
```

Here, the difference between the master and the slave times (the “absolute difference” is now 00:10:00:04, and this is what is shown if we examine the absolute difference.

However, the result of subtracting the intended offset from the absolute difference is 4 frames, and this is the “relative difference”, which may also be examined as described below:

- 1) From menu group **E**, move the cursor to either **Abs Diff** (absolute) or **Rel Diff** (relative).

There is no need to press **SELECT** here.

- 2) The appropriate difference value will be displayed on the bottom line of the display screen.

7.2.6 Clock selection

The word clock (as opposed to the timecode clock source) of a DTRS unit is usually selected using the **CLOCK** key on the front panel. However, the RC-898 can be used to select the input clock.

- In ABS time mode, the clocks of all DTRS units will be set together, following the setting of the first machine in the chain.
- However, as explained below in 8.1.11, “Independent clock settings”. they can also be set independently.

- 1) From menu group **9**, move the cursor to **Clock**, and press **SELECT**:

```
Clock
      Machine  1
      Int
```

- 2) Use the **UP** and **DOWN** keys to select between **Int** and **Word** and (in the case of SY-88-equipped DA-88s and DA-98 units) **Video**.

7.2.7 Output timing

Ⓢ On the DA-88, regardless of whether an SY-88 synchronizer board is fitted or not, there is a facility to use either Digital or Analog output mode for exact synchronization when dubbing between DTRS units, etc.

Note that while it is possible to output both digital and analog signals simultaneously, there two sets of signals will be out of sync with each other.

- 1) From menu group **9**, move the cursor to **OutputTim** (output timing) and press **SELECT**:

```
Output Timing
Digital
Analog
Machine 1 2 3 4 5 6
```

- 2) Use the **LEFT** and **RIGHT** keys to select a unit, and the **UP** and **DOWN** keys to change the setting between **Digital** and **Analog**.

See p15 and pp25-26 of the DA-88 manual for further information regarding this facility.

7.2.8 Varispeed (pitch control)

The DTRS design allows for $\pm 6.0\%$ speed control, in 0.1% increments.

- 1) From menu group 0, move the cursor to **Varispd**, and press **SELECT**:

```

Var i Speed
      Machine 1
      Fix      + 0.0%
    
```

- 2) Use the **UP** key to change **Fix** to **Varis**, or the **DOWN** key to change **Varis** to **Fix**.

The **VARI** indicator [10] will light if **Varis** is selected, even if the setting is 0.0%, and will go out if **Fix** is selected, even if the setting is not zero.

- 3) Move the cursor to the right (numeric) field, and use the **UP** and **DOWN** keys to set the value.

NOTE

The varispeed function is only available if the unit clock has been set to internal (see 7.2.6, "Clock selection") and the video resolve function (see 8.2.10, "Video resolve") is off.

7.2.9 Input selection

DTRS units can accept either digital or analog inputs. The choice of which inputs are to be used for each machine is made in the following way:

- 1) From menu group 9, move the cursor to **InputSel** and press **SELECT**:

```

Input Select
Digital
Analog
Machine 1 2 3 4 5 6
    
```

- 2) Use the **UP** and **DOWN** keys to select between the digital and analog input sources for each unit.

In the screen above, units 1 through 4 are accepting analog signals, while 5 and 6 are using TDIF - 1 digital inputs.

7.2.10 Word length

ⓑ ⓑ The DA-38 and DA-98 units are able to accept digital data at their digital I/O connectors at either 16-bit, 20-bit or 24-bit word lengths. These settings are made in the following way:

- 1) From menu group 2, move the cursor to **Word Len**, and press **SELECT**:

```

TDIF Word Length
      Machine 1
      16 bit
    
```

- 2) Use the **UP** and **DOWN** keys to select between 16, 20 and 24 bit word length of incoming data, which will be converted to 16 bits for recording purposes.

If you select a value higher than 16, you may want to experiment with the Dither settings (see 7.2.11, "Dither", below), as this may help with distortion, though a little may be lost from the signal-to-noise ratio.

7.2.11 Dither

ⓑ ⓑ Dithering, in digital audio, is the technique of adding a known noise signal to a low-level input signal, especially when converting from a word length with a higher number of bits than the destination (see 7.2.10, "Word length" above).

Paradoxically, this technique removes quantization noise and improves overall distortion figures, though at the slight expense of the signal-to-noise ratio. The DA-38 implements an "on/off" dither function, and the DA-98 allows two "shapes" of dither. See section 4-8 of the DA-38 manual or 8.13 of the DA-98 manual for further details.

- 1) From menu group 1, move the cursor to **Dither** and press **SELECT**:

```

Dither
      Machine 1
      off
    
```

- 2) Allowable values for DA-38 units are **on** and **off**. The DA-98 allows the following settings to be made: **off**, **triangular** and **rectangular**.

See the section 8.13 of the DA-98 manual for a discussion of rectangular vs. triangular dither modes.

Section 7.2 - Unit-related functions

7.2.12 Confidence mode

Ⓞ The DA-98 allows off-tape monitoring while recording (confidence mode). This can be switched on or off on a per-machine basis.

However, since there is a slight delay between the input signal and its replay in confidence mode, you should not use confidence mode in the following circumstances:

- When making punch recordings, as you will not be able to hear the exact timings for punch operations.
- When operating a mixed chain of DA-98s and other units. The delay introduced by confidence mode on the DA-98 will make these tracks appear to be out of time with the other tracks.

However, confidence mode can be very useful when making test recordings so that you can instantly hear the effects of different dither settings (see 7.2.11, “Dither”), or to monitor possible clipping at high recording levels on a test take, allowing you to “back off” the level a little before making a final recording.

- 1) From menu group 9, move the cursor to **ConfidMod** and press **SELECT**:

```
Confidence Mode
      Machine  1

      off
```

- 2) Use the **UP** and **DOWN** keys to select between the three states: **off**, **ready** and **on**.

Confidence mode is selected using this three-state switch to prevent accidental switching of the unit into confidence mode, which might otherwise cause confusion when performing monitoring operations.

7.2.13 Reference levels

Ⓞ The reference level for analog I/O on the DA-98 can be set to one of three standard values: European, TASCAM and SMPTE. These levels correspond to:

Standard	Reference level	Nominal level	Maximum level
TASCAM	-16dBFS	+4dBu	+20dBu
European	-18dBFS	+4dBu	+22dBu
SMPTE	-20dBFS	+4dBu	+24dBu

- 1) From menu group 2, move the cursor to **Ref Level** and press **SELECT**:

```
Analog In/Out
Reference Level
      Machine  1

      -16 dB
```

- 2) Use the **UP** and **DOWN** keys to select between **-16**, **-18** and **-20 dB**.

The appropriate reference level indicator(s) next to the meters on the DA-98 unit will light. See section 8-7 of the DA-98 manual for further details of reference levels.

7.2.14 Meter modes

Ⓞ On the DA-98, the peak hold time and the decay ballistics of the meters can be changed.

- 1) From menu group 2, move the cursor to **MeterMode** and press **SELECT**:

```
Level Meter Mode
      Machine  1

Peak Hold      Release
0 sec          Fast
```

- 2) Move the cursor to the **Peak Hold** setting, and choose between the following values: **0** through **9** seconds (in 1-second increments) and **continue**.

The **continue** setting sets an infinite peak hold time. The peak levels can be reset by setting the time to **0** seconds.

- 3) Move the cursor to the **Release** setting, and choose between the following release times: **Fast**, **Medium** and **Slow**.

The meter functions are described in section 8.8 of the DA-98 manual.

7.2.15 Sine oscillator

Ⓞ The DA-98 incorporates a sine oscillator for line-up purposes at either 440Hz or 1kHz. The level of the oscillator is a full bit +16dBu (but cannot be compared to transient signals, on account of the constant nature of a sine-wave oscillator).

- 1) From menu group 2, move the cursor to **Sine Osc.** and press **SELECT**.

```
Sine Oscillator
      Machine  1
                off
```

- 2) Use the **UP** and **DOWN** keys to select between **off**, **440 Hz** and **1 kHz**.
All other inputs will be overridden by the oscillator when it is turned on.

WARNING

When using the oscillator, turn down the levels of all monitoring equipment in the control room and studio to avoid possible damage to your ears (and speakers, etc.).

8 – Timecode functions

Ⓢ Ⓢ This section describes the timecode-based functions available through the RC-898. Note that while the RC-898 contains no timecode generator or reader of its own, it is able to control the timecode generators and synchronization facilities of DA-98 and DA-88/SY-88 units. Since the DA-38 does not have any timecode facilities, this section does not have any relevance if you are using a setup composed of only DA-38 units.

Note that in this section, we use the term “timecode” to refer to SMPTE/EBU timecode rather than to ABS timecode.

When using a chain of DTRS units which are to be synchronized to external timecode, you will usually need to synchronize the first unit in the chain. The other units should then chase to the first, using the DTRSABS synchronization facility. For information related to this and to other non-timecode-related synchronization features, see 9, “External control and settings”.

8.1 Primary timecode functions

These functions cover the basic timecode setup when synchronizing DTRS units to timecode.

8.1.1 Selecting the timecode source

Ⓢ When using a DA-98 unit, the timecode used for recording can be from one of three different sources: external, from the internal generator, or off-tape (“synthesized” timecode—see 8.1.2, “Synthesizing timecode from ABS times”). See section 10.5 of the DA-98 manual for further details regarding this function.

- 1) From menu group 8, move the cursor to `TcRec Src` and press **SELECT**:

```
TC Record Source
      Machine 1
External TC
```

- 2) Use the **UP** and **DOWN** keys to select between `External TC`, `Generator TC` and `Tape`.

If you select `Tape`, there will be another parameter shown which will correspond to the timecode type selected in 6.4, “ABS setting”. This shows the kind of timecode on the tape: striped timecode or

synthesized timecode (as described in 8.1.2, “Synthesizing timecode from ABS times” below).

8.1.2 Synthesizing timecode from ABS times

Ⓢ Ⓢ As mentioned earlier, linear timecode does not necessarily have to be striped on a tape for the DTRS unit to be able to use the TC setting. The subcode can be used to synthesize timecode, eliminating the need to pre-stripe the tape for timecode-based work.

Ⓢ In addition, the DA-98 can add offsets to the ABS value, so that the timecode values can start at any desired position, or can create a repeating timecode pattern for tracks of nominal 10 or 20 minutes’ duration. See also 10.2.3 and 10.2.4 of the DA-98 manual for further details.

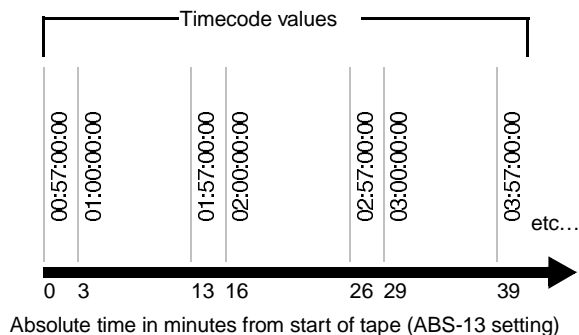
- 1) From menu group 5, move the cursor to `Tape TC`, and press **SELECT**:

```
Tape TC Mode
      Machine 1
                          Mode
                          ABS
```

- 2) Use the **SHIFT**ed **UP** and **DOWN** keys (**NEXT** and **PREVIOUS**) to select the DTRS unit whose values you will change.
- 3) Use the **UP** and **DOWN** keys to choose between the following:
 - `TC Track`: The timecode is read from the timecode track striped on the tape. Full details of these operations are given in 8.1.7, “Recording the timecode on a DTRS timecode track”.
 - `ABS`: The timecode is “synthesized” from the ABS time (i.e. the ABS values are read and used as timecode).
 - Ⓢ `ABS-Ofs`: You can add or subtract an offset from the ABS values to arrive at the final synthesized timecode value. If you select `ABS-Ofs`, use the numeric keypad [16] to enter an offset value on the **LOCATE TIME/VALUE** display [15] and enter it into the offset value on the display screen using the **SHIFT** and **ENTER/LOAD** keys [23]+[20].
 - Ⓢ `ABS-13` and `ABS-23`: provide a convenient way of dividing a tape into “sessions”. Timecode is synthesized with a pre-roll time of `xx:57:00:00`, the session is assumed to start at `xx:00:00:00`, and finishes at `xx:10:00:00` or `xx:20:00:00`, depend-

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ing on whether ABS-13 or ABS-23 has been selected. The value of **xx** varies, depending on the starting “hour” chosen.



If you select ABS-13 or ABS-23, use the **UP** and **DOWN** keys to select the starting hour. In the illustration above, the starting hour is 0.

8.1.3 Selecting a timecode type

The RC-898 can work with a number of different timecode types, as shown by the **TC** indicators [7].

The **29** on the RC-898 panel is an abbreviation for “29.97”. The **DF** indicator will light if the timecode is in drop-frame format. The supported types are therefore:

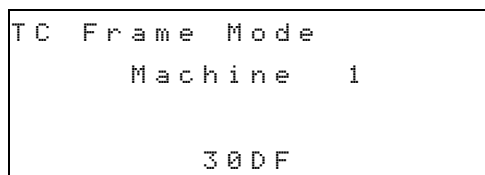
24	24fps (cine)
25	25fps (PAL/SECAM)
29	29.97 (NTSC color non-drop)
29 DF	29.97 (NTSC drop-frame)
30	30fps (NTSC mono)
30 DF	98 30fps drop-frame (NTSC color)

NOTE

30 fps drop-frame is only supported by DA-98 units.

To select or change the timecode type used by a DTRS unit:

- 1) From menu group 5, move the cursor to **TC Frame** and press **SELECT**:



- 2) Use the **SHIFTed UP** and **DOWN** keys (**NEXT** and **PREVIOUS**) to select the unit where you will make settings.
- 3) Use the **UP** and **DOWN** keys to change between the following settings:

- 30 DF
- 30 NDF **98**
- 29.97 DF
- 29.97 NDF
- 25F
- 24F

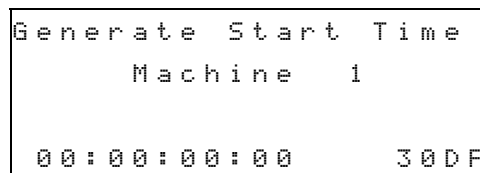
These types will not, of course, affect the type of any timecode which has already been used to stripe a tape.

They are used for the type of timecode which will be produced by the internal timecode generator of a DTRS unit (DA-98 or SY-88) or the synthesis from ABS timecode of these units.

8.1.4 Setting the generator start time

The DTRS unit’s internal generator can be set in the following way:

- 1) From menu group 8, move the cursor to **Gen Start**, and press **SELECT**:



- 2) Enter the generator start time using the numeric keypad [16].
- 3) Press and hold down **SHIFT** and press **ENTER/LOAD** to transfer the value to the display screen.

You can also use the cursor keys and the display screen to set the value here.

NOTES

The frame value at the bottom right of the screen is not set here. The procedure for setting this is described in detail in 8.1.3, “Selecting a timecode type”, and is accessed from menu group 5.

If the timecode source is synthesized ABS timecode, the timecode type may be changed by changing the timecode type of the ABS “timecode”. It is not possible to receive one type and convert it for recording, however. If timecode is being recorded from an external source, the type cannot be changed.

We suggest that you choose a value such as **00:57:00:00**, allowing a few minutes of lead-in on the tape before the program material starts.

8.1.5 Starting and stopping the generator

- 1) From menu group 8, move the cursor to **Gen Mode** and press **SELECT**:

```
Generate Mode Mch 1
00:57:00:00 30DF
Run/Stop Mode
Stop Continue
```

- 2) Use the **LEFT** and **RIGHT** cursor keys to move between the **Run/Stop** and **Mode** fields.
- 3) Use the **UP** and **DOWN** keys in the **Mode** field to determine whether the generator will **Continue** from the last point where it was stopped, or whether it will be **Reset** to the starting value as set above when restarted.
- 4) When the cursor is on the **Run/Stop** field, use the **UP** key to start the generator, and the **DOWN** key to stop it again.

8.1.6 Checking the generator progress

While the generator screen above is visible, the generator's output can be viewed in the display screen. However, there is also another way to check the generator:

- 1) From menu group E, move the cursor to **Gen TC** (there is no need to press **SELECT**):

```
Ext TC Abs Diff
Tape TC Rel Diff
>Gen TC
01:02:34:12 30DF
```

The bottom line of the display shows the current timecode value being output by the generator. If the generator is stopped, it will show the value at which it was stopped.

8.1.7 Recording the timecode on a DTRS timecode track

This procedure applies to all timecode recording, regardless of the timecode source used.

The dedicated timecode tracks of any DTRS units can be armed and safed on a per-machine basis:

- 1) From menu group 8, move the cursor to **TcTrkRec** and press **SELECT**:

```
TC Track Record
enable
disable
Machine 1 2 3 4 5 6
```

- 2) Use the **UP** and **DOWN** keys to arm the timecode track on the required DTRS unit(s). Make sure that all other units' timecode tracks are disabled.

NOTE

Remember, as mentioned earlier, that it is usually necessary to record timecode on only one unit; the other units in the chain can use the DTRS chase facility. However, it may be necessary, if dubbing audio tracks, etc. between DTRS units, to transfer timecode simultaneously with the audio tracks.

When a unit's timecode track is armed for recording, and that machine is selected, as shown by the **MACHINE** indicators [8], the **TC REC** indicator [10] on the RC-898 (as well as the **TC REC** indicator on the DTRS unit) will light.

- 3) **Rewind the tape to the beginning.**

It is possible to start recording timecode halfway through the tape, but it can make later synchronization difficult. For this reason, we advise recording timecode all the way through the tape from the start (unless you use the ABS-13 or ABS-23 preset functions to convert ABS time into synthesized timecode, as described in 8.1.2, "Synthesizing timecode from ABS times").

- 4) **Start the timecode source.**

If the timecode source is an external source (see 8.1.1, "Selecting the timecode source"), start the source so that timecode is transmitted from it.

If the timecode source is the DTRS internal generator, start the generator as described in 8.1.5, "Starting and stopping the generator".

If the timecode source is the ABS timing, used to synthesize timecode, no separate operation is necessary to start the timecode source.

- 5) **Press and hold down the RECORD key and press the PLAY key.**

The **TC REC** indicator on the RC-898 (if the DTRS unit is selected) as well as the DTRS units, will light steadily.

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- 6) To check the off-tape timecode as it is being recorded, from menu group E, move the cursor to **Tape TC** (there is no need to press **SELECT**):

```
Ext TC      Abs Diff
>Tape TC    Rel Diff
Gen TC
01:01:22:03    30DF
```

The bottom line of the display shows the current timecode value being output from the tape. If the tape is stopped, the last timecode read from tape will be shown.

External timecode, if it is being used for recording or for synchronization purposes, can be read in the same way, except that the cursor should be moved to **Ext TC** in menu group E.

8.1.8 Chasing to external timecode

When chasing to an external timecode source (remember that you cannot chase to MTC), there are two cases to be considered. The first is when the DTRS unit which will be chasing timecode is the first unit in the chain. In this case, there is no DTRS sync signal received at the **SYNC IN** connector (of course, the RC-898 provides control signals), and hence, pressing the **CHASE** key [32] will automatically synchronize the DTRS unit to the incoming timecode.

The reference to which the incoming timecode is matched, however, depends on the **Time Mode** settings of the DTRS unit with regard to ABS or timecode (see 6.4.2, “Selecting Time Mode”).

In the case of a unit which is connected to the master DTRS unit in the chain, the situation is a little more complex, as the unit must be set up to slave to incoming timecode rather than the DTRS sync signals. Here, the **Time Mode** menu is used once again (6.4.2, “Selecting Time Mode”), but here it determines the chase sync source; timecode or ABS sync.

Note that it is unlikely that you will need to synchronize a slave unit with timecode—typically, only the first unit in the chain will be a timecode slave, and this will act as a DTRS sync master for the other units in the chain.

8.1.9 Chasing with a timecode offset.

NOTE

This procedure described here should be used when chasing to timecode. When slave machines are chasing to DTRS sync from a master DTRS unit, use the procedure described in 7.2.3, “Chasing with an offset”.

If the timecode on the DTRS unit matches the timecode coming from the master unit (e.g. the DTRS tapes contain a video soundtrack and have been striped either concurrently with, or from the video tape), there is no need for an offset.

If, however, the DTRS tracks are not linked in this way with the master source, an offset is required. The offset can be ± 12 hours from the received timecode. Timecode “wraps” in a 24-hour clock format, so that 12 hours in advance of 13:00:00:00 is 01:00:00:00, and 12 hours behind 02:00:00:00 is 14:00:00:00.

- 1) From menu group 4, move the cursor to **TC Offset** and press **SELECT**:

```
Timecode Offset
      Machine 1
+00:00:00:00.00 30DF
```

Note that this setting is made to subframe accuracy. The timecode type will be shown in the bottom right of the display screen.

- 2) Use the numeric keypad to set the offset (use the **+/-** key to change values between positive and negative).

The value will be shown in the **LOCATE TIME/VALUE** display and the **OFFSET** indicator [10] will light.

If an offset value is set on any unit or units and the **Time Mode** is set to TC, the **OFFSET** indicator [10] will light.

As an alternative to using the numeric keypad, you may also use the cursor keys to enter values directly into the LCD display.

- 3) Transfer the value from the **LOCATE TIME/VALUE** display to the LCD display by holding down the **SHIFT** key and pressing the **ENTER/LOAD** key.

NOTE

Ⓢ If you are using a DA-98 with ABS timing used to synthesize timecode, the DA-98 allows you to set an ABS offset, which may be used in place of this function (see 8.1.2, “Synthesizing timecode from ABS times” and also 10.2.3 of the DA-98 manual.

If you need to “fine-tune” this value, you can use the **UP** and **DOWN** keys to adjust the value of the offset while monitoring the playback of the units.

NOTE

There is an “invisible” field immediately to the right of the frames field. If you place the cursor there and increment or decrement the value, you can change the time as a whole (as the frames field passes its maximum value, the seconds field will increment).

8.1.10 Auto Timecode Offset function

In addition to the manual offset entry, it is also possible to set a timecode offset automatically by following the procedure below:

- 1) From menu group 4, move the cursor to **TC Offset** and press **SELECT**.
- 2) Use the **RIGHT** key to move the cursor to a second “invisible” field to the right of the frames field. The display will appear as follows:

```

Timecode Offset
  Machine  2
  AUTO OFFSET
  
```

- 3) Locate the two tapes (master and slave) so that they have the right offset.

You can play up the tapes and pause them once they have been lined up, or carry out the next step while either or both of the tapes is being replayed.

- 4) Press either the **UP** or **DOWN** key at the correct offset time to capture and store the offset.

NOTE

The value entered in this way can be edited later using the technique described above.

8.1.11 Independent clock settings

Ⓢ It is sometimes useful to be able to reference different clock timings for the different DTRS units in the chain (if one unit is recording digital input from another digital source and another is referenced to video, for example).

To allow independent settings (this function is only available if the time mode is set to timecode, and the DA-98 is acting as a slave):

- 1) From menu group A, move the cursor to **ClkMode (clock mode)**, and press **SELECT**:

```

Clock Mode
  Indv
  Auto
Machine 1 2 3 4 5 6
  
```

- 2) Use the **UP** and **DOWN** keys to select between **automatic (Auto)** and **individually-selectable (Indv)** clock settings.

In the example above, the first three DTRS units have their clocks set automatically according to the first clock setting (i.e. units 2 and 3 cannot have their clocks set using the function described in 7.2.6, “Clock selection”), and the fourth unit can have its clock set independently of the other three.

NOTE

In a system with multiple digital audio devices, the same clock should be used by all units which are to perform digital audio transfer (e.g. dubbing, etc.). If units have different reference clocks, you cannot transfer digital audio between them.

8.2 Advanced timecode functions

The following functions are designed to extend the capabilities of the DTRS system under various circumstances when working with timecode-based setups. These functions are described more fully in the DTRS manuals. Refer to the appropriate sections of these manuals for further information, if required.

8.2.1 Timecode output source

Ⓢ The DA-98 is able to output timecode from a variety of sources.

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- 1) From menu group 5, move the cursor to `OutTc Src` and press **SELECT**:

```
Output TC Source
      Machine 1

Tape (TC Track)
```

- 2) Use the **UP** and **DOWN** keys to select between the four options available:

TAPE (TC Track)	Outputs the timecode as recorded on the dedicated timecode track.
TAPE (ABS)	Outputs the timecode as synthesized from the ABS subcode, with all off-sets, etc. as set up in 8.1.2, "Synthesizing timecode from ABS times".
External (reGen)	Timecode received at the timecode input is regenerated and output.
External (reshape)	Timecode received at the timecode input is filtered and retransmitted.

8.2.2 Synchronization of timecode

Ⓢ When timecode (including MTC) is output from a DTRS unit, it may be synchronized to either the analog or digital outputs, depending on which is in used at the time. This is necessary because of the nature of the digital-to-analog circuitry employed in the DTRS units.

- 1) From menu group 5, move the cursor to `OutTc Tm9`, and press **SELECT**:

```
Output TC Timing
Digital
Analog
Machine 1 2 3 4 5 6
```

- 2) Use the **UP** and **DOWN** keys to select either digital or analog synchronization for the output timecode.

8.2.3 Pull up and pull down

When using DTRS units in NTSC telecine situations, it may be necessary to adjust the sampling frequency fractionally, as the NTSC frame rate of 29.97 and the cinema frame rate of 24 do not form a neat mathematical ratio.

The sampling frequencies of 44.1kHz and 48kHz are therefore affected when the material is transferred back to film.

Accordingly, the pull up and pull down functions are provided to allow the adjustment of sampling frequencies to drop-frame environments.

- 1) From menu group 8, move the cursor to `Fs Shift` and press **SELECT**:

```
Fs Shift Mode
      Machine 1

off
```

- 2) Use the **UP** and **DOWN** keys to select one of the following settings:

```
off
Pull Down 30NDF
Pull UP 29.97NDF
Pull UP29.97DF
Ⓢ Pull Down 30DF
```

If this setting is anything other than `off` on one or more DTRS unit, the **PULL UP/DN** indicator [10] of the RC-898 will light when the appropriate machine is selected, as will the indicator on the DTRS unit(s).

NOTE

If you want to use the `Fs Shift` function, make sure that the reference clock is set to `Video` or `Int.` (see 7.2.6, "Clock selection"). If the reference clock is `Word`, although the setting can be made, the `Fs Shift` function will not be enabled.

8.2.4 Error bypass

When a DTRS unit is chasing timecode from an external source, the source timecode may drop out for a few frames or be otherwise discontinuous. To allow for this, a "flywheel" facility is provided, which allows the DTRS unit to continue for a set period until timecode is received again. The flywheel period may be set for either 10 frames or 30 frames, in the following way:

- 1) From menu group 4, move the cursor to `ErrByPass` and press **SELECT**:

```
Error Bypass
      Machine 1

10 Frame
```

- 2) Use the **UP** and **DOWN** keys to select between 10 and 30 frames for the "flywheel" period.

8.2.5 Rechase mode

Ⓢ The DA-98 provides another facility which is used when chasing to timecode.

When the DA-98 is chasing timecode, it can be set to lock to timecode once and run freely, or it can constantly monitor the timecode, and issue “speed-up” and “slow-down” messages to its transport to stay in sync. However, if an external or video clock is used as the clock source, the playback output will be muted while the DA-98 is adjusting the speed. If you select the rebase mode (which you may wish to do if there are gaps in the timecode), you can select a “window”. Only if the difference between the received timecode and the DA-98 position falls outside this window, the DA-98 will rebase. However, the DA-98’s timekeeping is almost always good enough for you not to need to rebase. See 10.7.9 of the DA-98 manual for further details of this facility.

- 1) From menu group 4, move the cursor to `RechsMode` and press **SELECT**:

```
Rebase Mode
      Machine 1
      Mode      Window
rebase      1 sec
```

- 2) Use the **UP** and **DOWN** keys to select either `rebase` or `free` as the mode, as explained above.
- 3) If you have selected `rebase`, move the cursor to the `Window` field, and select either 1 or 2 seconds and the window period.

This setting has no effect if `free` has been selected as the mode.

8.2.6 Fast LTC

Ⓢ The DA-98 allows you to select three modes in which linear timecode (LTC) will be output when the unit is in a fast transport mode (forward or rewind).

Firstly, there is a 5 frame option in which five consecutive frames are output, the tape is then read again, and five further consecutive frames are output, starting at the frame which has just been read. Secondly, you can choose a “leap” option, in which timecode is continuously output, but not consecutively (the values between frames will leap as the tape is read). The last mode is “off”, in which case, no timecode will be output in fast transport modes. See section 10.4.3 of the DA-98 manual for further details of this facility.

- 1) From menu group 5, move the cursor to `Fast LTC` and press **SELECT**:

```
Fast LTC Mode
      Machine 1
      05 Frame
```

- 2) Use the **UP** and **DOWN** keys to select between `05 Frame`, `Leap` and `off`.

8.2.7 MIDI Timecode output

Both the DA-88 and DA-98 output MIDI Timecode (MTC) from their **MIDI OUT** jacks, which echoes the linear timecode output from the timecode outputs.

Ⓢ However, the DA-98 allows you to choose under what circumstances MTC will be output. You can choose not to output MTC at all, to output while fast winding as well as during playback and recording, or to output MTC while the tape is stopped (this is possible because MTC is indirectly derived from an off-tape signal). For further details of this facility, see section 10.4.5 of the DA-98 manual.

- 1) From menu group 7, move the cursor to `MTC Out`, and press **SELECT**:

```
MTC Output
      Machine 1
      Output  Fast  Stop
      on      off  off
```

- 2) Use the **LEFT** and **RIGHT** cursor keys to select the field to be set, and select `on` or `off` using the **UP** and **DOWN** keys.

NOTE

If the `Output` field is set to `off`, neither of the other settings will have any effect.

8.2.8 Park position

Ⓢ Ⓢ The park position allows you to set a pre-roll position automatically on a DA-98 slaved to a master timecode source. This gives the master unit time to start playing timecode after starting to play, and provides optimal lock-up when locating and chasing external timecode. See sections 10.7.6 and 10.7.7 of the DA-98 manual for further details of this function.

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The park position can be viewed, and set manually in the following way:

- 1) From menu group 4, move the cursor to Park Posi, and press SELECT.

```
Park Position
      Machine  1
TEST
      off      00s00f 30DF
```

- 2) If the cursor is moved to the time field, it can be edited with the UP and DOWN keys.

Alternatively, the numeric keypad can be used to enter a numerical value directly, and entered with the **SHIFT + ENTER/LOAD** combination. Any values for hours and minutes which are entered will be discarded.

The maximum value for the park position setting is 2 seconds minus 1 frame.

As well as the manual setting described above, it is also possible to test the system and set this value automatically:

- 1) From menu group 4, move the cursor to Park Posi, and press SELECT.

```
Park Position
      Machine  1
TEST
      off      01s13f 30DF
```

- 2) Play and stop the master unit.
- 3) If chase mode is off on the slave DA-98, turn it on.
- 4) Use the UP or DOWN key to turn the TEST from off to on.

The DA-98 will now start to rewind so that the relative difference is zero. **Wait until the DA-98 tape has stopped before proceeding with the next step.**

- 5) Play the master unit.

The park position value shown in the display screen will change as the park position is calculated. **Wait until the value has stabilized before proceeding to the next step.**

- 6) Turn the TEST parameter from on to off using the UP or DOWN key.

The value which has just been calculated will be stored as the new park position. Lockups to timecode should now take place quickly and easily.

8.2.9 Individual recording status while chasing timecode

98 The default action for slave DTRS units is to follow the recording status of the master. However, if DA-98s are being used as slave units, and they are chasing using timecode rather than ABS sync, it is possible to set them so that their recording status can be turned on and off individually. For further details regarding this function, see section 10.7.11 of the DA-98 manual.

- 1) From menu group 4, move the cursor to TcChs Rec, and press SELECT:

```
TC Chase Individ. Rec
enable
disable
Machine 1 2 3 4 5 6
```

- 2) Use the cursor keys to enable (allow individual recording while chasing timecode) or disable this facility (the slave follows the master status for each machine in the chain).

8.2.10 Video resolve

98 The timecode clock of a DA-98 may be set to resolve to a video signal received at the unit's VIDEO IN terminal. This means that the timecode frame boundaries will be aligned with the frame boundaries as received in the video signal.

This is a completely different function to the synchronization of the word clock to video (see 7.2.6, "Clock selection").

In addition, if video resolve is enabled, the unit can be set to track the frame boundaries constantly and rebase if it drops out of sync (re-sync), or can be set to a "lock and forget" mode (free), in a similar way to the rebase options available for timecode (see 8.2.5, "Rebase mode"). In re-sync mode, output will be muted while the unit changes speed to match frame boundaries.

See section 10.6 of the DA-98 manual for further details regarding this function.

- 1) From menu group 5, move the cursor to `Vid Rslv` and press **SELECT**:

```
Video Resolve
      Machine  1
on/off      Mode
      off      free
```

- 2) Use the **UP** and **DOWN** keys to switch the video resolve feature on or off.
- 3) If video resolve is on, select the synchronization mode from between `free` and `re-sync`.

NOTE

The video resolve capability is also available on DA-88 fitted with the SY-88, but it is controlled by a DIP switch on the synchronizer board. It therefore cannot be controlled using the RC-898.

9 – External control and settings

This section covers the control of DTRS and other units.

9.1 Controlling the parallel port device

When a unit is connected to the **EXT 1** port [42] of the RC-898, the transport may be controlled using the RC-898 transport controls. The pinouts for these transport controls are given in 3.2.2, “Parallel control/GPI pinout”.

To select the “parallel” unit for control:

- 1) Press the **MACHINE** key [31].

The **LOCATE TIME/VALUE** display will show **SELECT**.

- 2) Press **7** on the numeric keypad.

The **E1** indicator on the machine number indicators [8] will light, showing that the parallel port unit is now selected for control.

NOTE

The RC-898 provides only transport control for a unit connected to the parallel port. Functions such as track arming, etc. are not possible when using the **EXT 1** parallel port.

9.2 Controlling GPI devices

Up to five GPI devices may be connected to the **EXT 1** port. These devices may be triggered at set times, based on the times received for display on the **TAPE TIME** display of the RC-898.

Refer to the documentation supplied with any units to be controlled by GPI to find out whether the unit requires the controlling circuit to be closed or open in order to trigger the event, and the time of the pulse needed to act as a trigger.

The wiring for the parallel port when used with GPI devices is given in 3.2.2, “Parallel control/GPI pinout”.

NOTE

Since the GPI event timings are based on the information transmitted from the DTRS recorders connected to the RC-898, the timing may “slip” by up to one frame.

9.2.1 Setting up GPI devices

The polarity of the GPI devices, and the pulse width necessary to trigger an event, may be set up individually for each GPI device.

- 1) From menu group 1, move the cursor to **GPI Setup** and press **SELECT**:

```
GPI Setup
      GPI 1
      Pol   Width
      open  010 mS
```

- 2) Holding down the **SHIFT** key, use the **NEXT (UP)** and **PREVIOUS (DOWN)** keys to select the required GPI unit.

- 3) Move the cursor to the **Pol** (polarity) field, and use the **UP** and **DOWN** keys to select either **open** or **close** for the polarity of the unit’s event trigger.

When **open** is selected, the event is triggered when the circuit is open (i.e. it is a “push-to-break”-type circuit. When **close** is selected, the event is triggered when the circuit is closed (i.e. it is a “push-to-make”-type circuit).

- 4) Move the cursor to the **Width** field and use the **UP** and **DOWN** keys to select the pulse width of the event trigger.

The minimum value for the pulse width is 0 ms, and the maximum is 990 ms, settable in 10ms increments.

Most GPI units require a trigger width of 200 ms. If you are unsure of the trigger width for a particular device, we suggest that you try this value first of all.

NOTE

Note that the polarity setting here is also used as the polarity setting for transport control signals sent to the E1 parallel port device (see 9.1, “Controlling the parallel port device”. In this case, the pulse width is fixed at 500 ms.)

9.2.2 Setting the trigger points

The location memories also serve as GPI trigger points, when GPI devices are connected to the **EXT 1** port.

Since up to 10 GPI events can be associated with location memories, we suggest the following method of working:

- Use a “block” of location memories for this purpose, starting at a number such as 80 or 90.

Section 9.3 - Controlling the serial port (9-pin)

- Enter the starting memory number of your “block” minus one in the **MEMORY NO.** display.
- While playing back the program material which will be used with the GPI events, use the **CUE STR** key [39] to add repeated cue points to the list, as described in 6.5.8, “Repeated entry of location points”.
- Alternatively, key in these cue points manually from a cue list.
- Adjust the fine timing of these trigger points using the jog dial, if necessary.

Of course, there is nothing to prevent you from using existing location memories for GPI triggers, but you may find it easier to work with a series of events dedicated to this purpose.

- 1) **From menu group 1, move the cursor to Event and press SELECT:**

```
Event
      Event 1
GPI Memo      30DF
 1   92   01:02:13:21
```

- 2) **Select which event you will be editing (from 1 through 10) using the NEXT (SHIFT+UP) and PREVIOUS (SHIFT + DOWN) keys to change the value of the Event field.**
- 3) **Move the cursor to the GPI field, and use the UP and DOWN keys to select the GPI device associated with this event (from 1 through 5).**
- 4) **Move the cursor to the Memo (location memory) field, and use the UP and DOWN keys to select the location memory for the GPI event.**

Alternatively, you can enter the number of the memory location using the numeric keypad, and hold down **SHIFT** and then press **ENTER/LOAD** to transfer the memory number to the display screen.

The time value of this location memory will be shown on the display screen. However, you cannot adjust this value from here. You must edit the location memory (see 6.5.5, “Editing a location”) to do this—the time value will automatically be updated.

You can also use the **UP** and **DOWN** keys to choose the location memory.

NOTE

Location memory 00 is a special case. If this location memory is selected, the event will be turned off.

9.3 Controlling the serial port (9-pin)

The **EXT 2** 9-pin serial connector [43] of the RC-898 is used for RS-422 control of suitably-equipped devices (Sony P2 protocol). As an example of how this may be used, if you connect the master VTR to the EXT 2 port, you can use the RC-898 to control the whole system.

The menus in menu group 7 whose titles start with “9-pin” refer to devices which are controlled through this connector.

9.3.1 Selecting the serial port device

When you want to control the device attached to the RS-422 port using the transport keys of the RC-898, follow the procedure below:

- 1) **Press the MACHINE key [31].**

The **LOCATE TIME.VALUE** display will show **SELECT**.

- 2) **Press 8 on the numeric keypad.**

The **E2** indicator on the machine number indicators [8] will light, showing that the parallel port unit is now selected for control.

NOTE

The exact level of control possible by using the RC-898 depends on the implementation of the P2 protocol by the device. Refer to the unit’s documentation for details of what control is possible through the serial connection.

When a device is selected for control in this way, the **REC FUNCTION** keys can be used to arm the two analog and four digital tracks, as defined by the P2 protocol, depending on the settings made in 9.3.4, “Split mode on the serial unit” and 9.3.5, “Controlling recording operations on the serial unit”. The mapping of these tracks to the actual tracks of the unit is determined by the implementation of the protocol by the unit.

9.3.2 Location pre-roll on the serial unit

The unit controlled by the serial port may have a pre-roll time which is set independently of the pre-roll time used by DTRS units. This allows the unit to be parked optimally for lockup when locating to cue points:

- 1) From menu group 7, move the cursor to **9PinLocPr** and press **SELECT**:

```

9Pin Locate Preroll
                                00min00sec
    
```

- 2) Use the numeric keypad to enter a time in minutes and seconds between **00:00** and **59:59**.
- 3) Press and hold down the **SHIFT** key and press the **ENTER/LOAD** key to transfer the value to the display screen.

Alternatively, you can use the **UP** and **DOWN** keys to alter the values of the minutes and seconds fields.

9.3.3 Serial unit timing source

The RS-422 device can be set to accept its timing signals from either external timecode, or from the Timer 1 internal time source (the video CTL subcode track).

- 1) From menu group 7, move the cursor to **9PinTimMod** (9-pin time mode) and press **SELECT**:

```

9Pin Time Mode
                                Timecode
    
```

- 2) Use the **UP** and **DOWN** keys to select either **Timecode** or the **Timer 1 timing source** (subcode timing).

If the timecode option is selected and the VTR does not include a timecode reader, or the tape has not been striped with timecode, the RC-898 tape counter will show all hyphens: **--:--:--.--**.

9.3.4 Split mode on the serial unit

There are two ways of operating the E2 unit with the RC-898 transport controls. Firstly, all transport controls, including the record (**REC** key and the **REC FUNCTION** keys **41** through **46**) can be used to control the VTR acting as the E2 unit connected to the RS-422 port. This is referred to as “normal” mode.

In normal mode, the following RC-898 keys perform these P2 functions:

ALL SAFE	Standby
ALL INPUT	FULL EE
AUTO MON	SEL EE
PRRL	Preroll
RHSL	Preview
AUTO PUNCH	AUTO EDIT

However, in a video post-production situation, it is quite likely that you will need to control the transport of a VTR, which acts as a timecode master for the DTRS slaves. These DTRS slaves will be used for recording, but the VTR will not (otherwise the worktape will be erased!). The RC-898 therefore provides you with a “split mode” in which all transport keys except the **RECORD** key and the **REC FUNCTION** keys control the VTR, and the recording keys control the DTRS units.

In this way, all recording operations, including auto-punch operations, can be carried out on the DTRS units without the risk of accidentally erasing the VTR tape.

However, there is one function where operation is slightly different, and this is “on-the-fly” punching. Usually, when DTRS tracks have been armed, and the tape is being played, pressing **RECORD** will drop the tracks into record mode, and pressing **PLAY** will drop them out into play mode. In split mode, this is not possible, since the **PLAY** key controls the VTR.

To punch in and out of armed tracks on the fly in split mode **only**, press **RECORD** to drop in, and **RECORD** to drop out again.

To change between normal and split mode:

- 1) From menu group 7, move the cursor to **9PinCtlMd** (9-pin control mode) and press **SELECT**:

```

9Pin Control Mode
                                Split
    
```

- 2) Use the **UP** and **DOWN** keys to select between **Split** and **Normal**.

9.3.5 Controlling recording operations on the serial unit

If split mode has been selected (see 9.3.4, “Split mode on the serial unit” above), the following

Section 9.4 - Other DTRS control functions

function allows toggling the serial unit recording capability.

- 1) From menu group 7, move the cursor to 9PinRecAc (9-pin recording acceptable) and press **SELECT**:

```
9Pin Rec Acceptable
off
```

- 2) Use the **UP** and **DOWN** keys to choose between on and off.

When this parameter is set to on, the **REC FUNCTION** keys which usually control tracks 41 through 48 (DTRS 6) will now control the E2 device logical analog and digital tracks (no matter what the tracks actually are) as marked.

The following chart explains the relationship between the serial unit, the split/normal mode, and this function:

Control mode	Rec Acceptable	Tracks 41-46 refer to:	RECORD key controls:
Normal	off	Serial unit	Serial unit
Normal	on	Serial unit	Serial unit
Split	off	DTRS (uit 6)	DTRS
Split	on	Serial unit	Serial unit

9.4 Other DTRS control functions

☞ The following functions described DTRS features which relate to control, but are not timecode-related. The RC-898 can only perform these functions on DA-98 units. Some of these functions are available on DA-88 units, but they cannot be controlled from the RC-898.

9.4.1 Choosing a control protocol

☞ The DA-98 can be controlled from a variety of external sources as well as the RC-898. These sources are: P2 protocol (9 pin), MIDI Machine Control, and a bus protocol carried over the RS-422 cable and produced by, for example, the TASCAM ES-61 editing controller. See section 11.0.1 of the DA-98 manual for further details relating to this function.

- 1) From menu group 3, move the cursor to Ctrl Prt (control protocol) and press **SELECT**:

```
Control Protocol
Machine 1
9Pin
```

- 2) Use the **UP** and **DOWN** keys to select between 9Pin, MIDI, Bus and off.

Even when a control protocol is selected, the RC-898 and DTRS sync protocol can still be used to address and control the DA-98.

9.4.2 Track mapping functions

☞ When the track arming and recording of a DA-98 unit is controlled by an external controller, you can specify which tracks on the DA-98 correspond to the tracks controlled by the controller (for arming and recording purposes). The standard video controller protocol (P2 protocol) allows for control of up to eight digital and four analog audio tracks. This function allows you to map DA-98 tracks to the “logical” tracks.

This mapping of DA-98 tracks to controller tracks does not imply any correspondence between the user interface of the controller and the DA-98 tracks. It refers, rather, to the relationship between the command signals transmitted by the controller and the DA-98 tracks.

- 1) From menu group 6, move the cursor to Trk Map and press **SELECT**:

```
Track Mapping Men 1
Ana 1 2 3 4
Dig          1 2 3 4
Trk 1 2 3 4 5 6 7 8
```

- 2) Use the **UP** and **DOWN** keys to select the track mapping, according to pre-set options as shown in the table below.

Note that while there are no user-settable track mappings, the pre-set mappings are designed to cover every set of circumstances.

DA-98 track ⇒	1	2	3	4	5	6	7	8
Analog	1	2	3	4				
Digital					1	2	3	4
Analog								
Digital	1	2	3	4	5	6	7	8
Analog	1	2	3	4	1	2	3	4
Digital								
Analog	1	1	2	2	3	3	4	4
Digital								
Analog								
Digital	1	2	3	4	1	2	3	4
Analog								
Digital	1	1	2	2	3	3	4	4

9.4.3 Timecode track mapping

Ⓢ This function is related to the track mapping function described above. Analog track 3 in the controller mapping is traditionally used as the timecode track. To map this track to the audio track selected above (see 9.4.2, “Track mapping functions”) or to the dedicated timecode track of the DA-98:

- 1) From menu group 6, move the cursor to TC Rec EN, and press **SELECT**:

```
TC Record Enable
enable
disable
Machine 1 2 3 4 5 6
```

- 2) Use the **UP** and **DOWN** keys to select the appropriate setting for each connected DTRS unit.

Selecting `disable` here means that the track referred to by the controller’s commands as “analog 3” will be the DTRS track designated as “analog 3” in the table above (9.4.2, “Track mapping functions”). Selecting `enable` means that the DA-98’s dedicated timecode track will be controlled by commands addressed by the controller to the “analog 3” track.

9.4.4 Remote track arming

Ⓢ It is sometimes useful to be able to disable track arming of a DA-98 unit from a remote controller, especially when that controller is a video editor which only allows for the arming and con-

trol of four tracks. Accordingly, you can disable the remote arming of tracks on a DA-98 unit (they can still be armed from the unit itself). See section 11.1.8 of the DA-98 manual for full details of this function.

- 1) From menu group 3, move the cursor to Trk Arm (track arming) and press **SELECT**:

```
Remote Track Arming
enable
disable
Machine 1 2 3 4 5 6
```

- 2) Use the **LEFT** and **RIGHT** cursor keys to move between machines, and the **UP** and **DOWN** keys to enable or disable track arming from remote controllers.

9.4.5 Device emulation

Ⓢ The DA-98 can emulate a variety of other devices, for example video recorders, etc., when controlled by an editor (i.e. this setting determines the way in which the DA-98 responds to a Device-ID request).

See section 11.1.2 of the DA-98 manual for full details regarding this function.

- 1) From menu group 6, move the cursor to Em1 Dev (emulation device) and press **SELECT**:

```
Emulation Device
Machine 1
PCM-7050
```

- 2) Use the **UP** and **DOWN** keys to select the device to be emulated from the following list:

- PCM-7050
- BVH-3000
- BVU-950
- BVW-75
- PCM-800
- BVH-2000
- DUR-10
- TASCAM

TASCAM is the native format of the DA-98, and should be selected if you do not need to emulate any other device from this list.

9.4.6 Recording delay

Ⓢ When a DA-98 is remotely controlled by an editor, it is sometimes useful to be able to program a delay in recording, in order to emulate a VCR,

Section 9.4 - Other DTRS control functions

which typically begins recording a few frames after the command is received from the editor (the DA-98 begins recording immediately). Many editors allow for this delay, and so the DA-98 can compensate for this.

- 1) From menu group 6, move the cursor to `Rec Dly` (recording delay), and press **SELECT**:

```
Record Delay
      Machine 1
Auto (3 Frame)
```

- 2) Use the **UP** and **DOWN** keys to select a value from between 0 and 9 frames, or `Auto`. The value of the `Auto` setting depends on the emulation selected (see 9.4.5, “Device emulation”) as shown below:

Emulation	Frames
PCM-7050	3
BVH-3000	4
BVU-950	6
BVW-75	3
PCM-800	0
BVH-2000	4
DUR-10	5
TASCAM	0

NOTE

See section 11.1.3 of the DA-98 manual for further details of this function, including the way in which frame boundaries are calculated and recognized.

9.4.7 Fast wind speed

Ⓢ When a controller locates on a slave device, there are two ways in which this is achieved: a “locate” command, and a series of fast wind and shuttle commands.

To determine which command is used by your controller, and for further details regarding this function, follow the instructions in section 11.1.5 of the DA-98 manual.

The high (100 x) wind speed of the DA-98 means that if the second method is used, the tape will almost invariably overshoot each time and never locate correctly. Accordingly, a slower (8 x) wind speed is provided which allows for location using the “wind and shuttle” mode.

- 1) From menu group 6, move the cursor to `Fast Spd` (fast speed) and press **SELECT**:

```
Fast Wind Speed
      Machine 1
x 100
```

- 2) Use the **UP** and **DOWN** keys to select between `x 100` and `x 8` speeds.

9.4.8 Cue-up tally

Ⓢ When locating in 9-pin command mode, the DA-98 will locate to the required position and then enter pause mode.

What is then returned to the controller can be either a `Stop` message, for use with controllers who will only issue their next command when a `Stop` signal is received, or a `Still` message for use with controllers which make a distinction between pause and `Stop` (e.g. LYNX II and Microlynx synchronizers).

See section 11.1.5 of the DA-98 manual for further details regarding this function.

- 1) From menu group 6, move the cursor to `Cueup Tly` (cueup tally), and press **SELECT**:

```
Cueup Tally
      Machine 1
Stop
```

- 2) Use the **UP** and **DOWN** keys to select between `Stop` and `Still`, as explained above.

9.4.9 MMC ID

Ⓢ You can set a MMC ID (which also serves as the bus ID) for each DA-98 unit. This is **not** a MIDI channel number. The value may be between 001 and 127 or may be a universal `Receive All` setting.

See section 11.2.1 of the DA-98 manual for further details regarding this function.

- 1) From menu group 7, move the cursor to MIDI ID, and press **SELECT**:

```
MIDI/Bus ID
      Machine 1

      Receive All
```

- 2) Use the **UP** and **DOWN** keys to select the required ID number, taking care that each unit has a different value.

10 – Menu and parameter reference

10.1 Menu groups

This section provides a quick guide to the menus and their functions, providing a list of menus in each menu group, the parameters available in each menu, and the values that each parameter can take (factory values are underlined). There is also, wherever appropriate, a reference to the section of the manual in which the function is described. Wherever a menu function is applicable to only a certain type or types of DTRS unit, this is indicated.

Please also note the section 10.2, “Alphabetical list of menu items”, which allows you to find menu functions from an alphabetically-sorted list.

Menu group 0

Menu item	Parameter(s)	Values	Reference
Track Delay Time	Track Delay time Unit	<u>1</u> through <u>48</u> , <u>1-8</u> , <u>9-16</u> , <u>17-24</u> , <u>25-32</u> , <u>33-40</u> , <u>41-48</u> -200 through 7200 (samples) -4 through 150 (msec)@ 48kHz -4 through 163 (msec) @ 44.1kHz default 0 <u>sample,msec</u>	7.1.1, “Track delay”
Vari Speed	Enabled Amount	<u>Fix</u> , <u>Vari</u> -6.0% through +6.0% (default is <u>0.0%</u>)	7.2.8, “Varispeed (pitch control)”
Track Copy	Track source Enabled	<u>38</u> <u>98</u> Input (digital or analog) 1 through 8 or track 1 through 8. Default is straight-through input to tracks assignment Turns track copy operations <u>on</u> or <u>off</u>	7.1.2, “Track copying”
Locate Pre-roll	Minutes and seconds	<u>00min00sec</u> through <u>59min59sec</u>	6.5.1, “Setting the location pre-roll value”

Section 10.1 - Menu groups

Menu group 1

<pre>GPI Setup X-fade Event Dither Pre/Post Rec Mute</pre>			
Menu item	Parameter(s)	Values	Reference
GPI Setup	Polarity Width	<code>open,close</code> <code>000</code> through <code>990</code> ms (in 10ms steps)	9.2.1, "Setting up GPI devices"
Event	GPI	Event Number <code>1</code> through <code>10</code> GPI "channel" <code>1</code> through <code>5</code> <code>00</code> (off) through <code>99</code>	9.2.2, "Setting the trigger points"
Pre-roll Post-roll	Minutes and seconds	Pre-roll time: <code>00min05sec</code> through <code>59min59sec</code> Post-roll time: <code>00min03sec</code> through <code>59min59sec</code>	6.7.5, "Setting pre-roll and post-roll times"
Crossfade Time	Milliseconds	<input type="radio"/> <code>10ms</code> through <code>200ms</code> in 10ms steps <input type="radio"/> <code>10ms</code> through <code>90ms</code> in 10ms steps	6.7.6, "Crossfade times"
Dither	Type of dither or on and off	<code>off,Rectangular</code> <input type="radio"/> (<input type="radio"/> =on), <code>Triangular</code> <input type="radio"/>	7.2.11, "Dither"
Rec Mute	Track muting	<input type="radio"/> on or <code>off</code> for each track	7.1.3, "Rec Mute function"

Menu group 2

<pre>Sht1 Mute MeterMode Word Len Sine Osc. Ref Level</pre>			
Menu item	Parameter(s)	Values	Reference
Shuttle Mute	Enabled	<input type="radio"/> <code>off</code> or on	5.2.4, "Shuttle muting"
TDIF Word Length	Length in bits, of incoming data	<input type="radio"/> <code>16 bit</code> , <code>20 bit</code> , <code>24 bit</code>	7.2.10, "Word length"
Analog In/Out Reference Level	Reference level, in dB	<input type="radio"/> <code>-16dB</code> , <code>-18dB</code> , <code>-20dB</code>	7.2.13, "Reference levels"
Level Meter Mode	Hold time Release rate	<input type="radio"/> <code>0</code> through <code>9</code> seconds, or <code>Continue</code> (default is <code>1</code>) <code>Slow</code> , <code>Fast</code> or <code>Medium</code>	7.2.14, "Meter modes"
Sine Oscillator	Enabled	<input type="radio"/> <code>off</code> , <code>440 Hz</code> , <code>1 k Hz</code>	7.2.15, "Sine oscillator"

Menu group 3

<pre>McNOffset Ctrl Prt TimeMode Trk Arm Repeat</pre>			
Menu item	Parameter(s)	Values	Reference
Machine Offset	Time value to frame accuracy	<u>+02:00:00:00</u>	7.2.3, "Chasing with an offset"
Time Mode	Time reference	<u>98 98 ABS</u> or TC	6.4.2, "Selecting Time Mode"
Control Protocol	Type	<u>98 9Pin, MIDI, Bus, off</u>	9.4.1, "Choosing a control protocol"
Remote Track Arming	Enabled	<u>98 enable, disable</u>	9.4.4, "Remote track arming"
Repeat Start/End	Start or end Time values to frame accuracy	Any valid time entries	6.6, "Repeating a section"

Menu group 4

<pre>TcChs Rec TC Offset RechMode Park Posi ErrByPass</pre>			
Menu item	Parameter(s)	Values	Reference
TC Chase Individ. Rec.	Enabled or disabled for each DTRS unit	<u>98 enabled, disabled</u>	8.2.9, "Individual recording status while chasing timecode"
Rechase Mode	Mode Window	<u>98 rechase, free</u> <u>1 sec, 2 sec</u>	8.2.5, "Rechase mode"
Error Bypass	Time in frames	<u>98 98 10 frame, 30 frame</u>	8.2.4, "Error bypass"
Timecode Offset	Time value to subframe accuracy	<u>98 98</u> Any valid time value in the range <u>±12:00:00:00.00</u>	8.1.9, "Chasing with a timecode offset."
Park Position	Test Manual entry to frame accuracy	<u>98 off, on</u> <u>00s00f</u> through 2 seconds minus 1 frame	8.2.8, "Park position"

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Menu group 5



<pre>TC Frame Fast LTC OutTc Tm9 Vid Rslv OutTc Src Tape TC</pre>			
Menu item	Parameter(s)	Values	Reference
TC Frame Mode	Timecode type	30 DF(98),30 NDF,29.97 DF,29.97 NDF,25F,24F	8.1.3, "Selecting a timecode type"
Output TC Timing	Output reference	98 Analog,Digital for each unit	8.2.2, "Synchronization of timecode"
Output TC Source	Timecode source	98 Tape (ABS or TC Track), External (reGen), External (reshape)	8.2.1, "Timecode output source"
Fast LTC Mode	Linear timecode in fast wind	98 05 Frame,Leap,off	8.2.6, "Fast LTC"
Video Resolve	Enabled Mode	98 on,off free,re-sync	8.2.10, "Video resolve"
Tape TC Mode	Mode	98 98 TcTrack,ABS,(98 only) ABS-Ofs ^a ,ABS-13,ABS-23	8.1.2, "Synthesizing timecode from ABS times"

a. If the ABS-Ofs (absolute timing with offset) option is selected, the bottom line of the display changes to allow direct entry of the desired offset value.











Menu group 6

<pre>Em1 Dev TC Rec En Rec Dly Fast Spd Trk Map Cueup Tly</pre>			
Menu item	Parameter(s)	Values	Reference
Emulation Device	Device name	98 PCM-7050,BVH-3000,BVU-950,BVW-75,PCM-800,BVH-2000,DUR-10,TASCAM	9.4.5, "Device emulation"
Record Delay	Time in frames	98 0 through 9 frames or Auto (in Auto, the number of frames depends on the selected emulation)	9.4.6, "Recording delay"
Track Mapping	Track maps	98 Various mappings of DA-98 tracks to analog/digital. Default is DA tracks 1 through 4 mapped to analog 1 through 4, and DA-98 tracks 5 through 8 mapped to digital tracks 1 through 4	9.4.2, "Track mapping functions"
TC Record Enable	Enabled	98 disable,enable	9.4.3, "Timecode track mapping"
Fast Wind Speed	Referenced to play speed	98 x 100,x 8	9.4.7, "Fast wind speed"
Cueup Tally	P2 tally output after locating	98 Stop,Still	9.4.8, "Cue-up tally"

Menu group 7

Menu item	Parameter(s)	Values	Reference
<pre>MTC Out MIDI ID 9PinLocPr 9PinCtlMd 9PinTimMd 9PinRecAc</pre>			
MTC Output	Output Fast wind mode Stop	(All parameters ) <u>on, off</u> <u>on, off</u> <u>on, off</u>	8.2.7, "MIDI Timecode output"
MIDI/Bus ID	ID for MMC and bus control	 <u>001 through 127 or Receive</u> <u>All</u>	9.4.9, "MMC ID"
9pin Locate Pre-roll	Preroll time for P2 device	<u>00min00sec through 59min59sec</u> in 1 second increments	9.3.2, "Location preroll on the serial unit"
9pin Control Mode	Recording status when using P2 device	<u>Split, Normal</u>	9.3.4, "Split mode on the serial unit"
9pin Time Mode	Time source for P2 device	<u>Timecode, Timer 1</u>	9.3.3, "Serial unit timing source"
9pin Rec Acceptable	Record enable for P2 device	<u>On, Off</u>	9.3.5, "Controlling recording operations on the serial unit"

Menu group 8

Menu item	Parameter(s)	Values	Reference
<pre>Gen Start Fs Shift Gen Mode TcRec Src TcTrkRec</pre>			
Generate Start Time	Time value	  Defaults to <u>00:00:00:00</u>	8.1.4, "Setting the generator start time"
Generate Mode	Run/Stop Mode	  <u>Stop, Run</u> <u>Reset, Continue</u>	8.1.5, "Starting and stopping the generator"
Fs Shift Mode	Pull up/down parameters	  <u>off, Pull Down 30NDF, Pull Up 29.97NDF, Pull Up 29.97 DF, Pull Down 30 DF</u> ( only)	8.2.3, "Pull up and pull down"
TC Record Source	Source to be used for recording on the timecode track	 <u>External TC, Generator TC, Tape^a</u>	8.1.1, "Selecting the timecode source"
TC Track Record	Arming the timecode track	  <u>enable, disable</u>	8.1.7, "Recording the timecode on a DTRS timecode track"

a. If Tape is selected, another parameter will automatically be appended, depending on the setting made in the appropriate menu, as described in 8.1.1, "Selecting the timecode source"

Section 10.1 - Menu groups

Menu group 9

Menu item	Parameter(s)	Values	Reference
<pre>StlMon ConfdcMod InputSel OutputTim Clock Format</pre>			
Shuttle Monitor	Enabled or disabled for each unit	38 98 on,off	5.2.3, "Shuttle monitoring"
Input Select	Input source	Digital,Analog	7.2.9, "Input selection"
Clock	Word clock source	Int, Word,Video (88 98)	7.2.6, "Clock selection"
Confidence Mode	3-state switch	off → ready → on	7.2.12, "Confidence mode"
Output Timing	Output timing	88 Digital,Analog	7.2.7, "Output timing"
Format	3-state switch Frequency	off → ready → on 44.1k,48k	5.1.2, "Formatting tapes"

Menu group A

Menu item	Parameter(s)	Values	Reference
<pre>ClkMode</pre>			
Clock Mode	DTRS clock setting for each unit	98 Individual,Auto	8.1.11, "Independent clock settings"

Menu group E

Menu item	Parameter(s)	Values	Reference
<pre>Ext TC Abs Diff Tape TC Rel Diff Gen TC</pre>			
Ext TC	There are no user-settable values in this menu. Moving the cursor to the menu item will display the appropriate value on the bottom line of the display.		8.1, "Primary time-code functions"
Tape TC			
Gen TC			
Abs Diff			7.2.5, "Checking the offset"
Rel Diff			

Menu group F

<div style="border: 1px solid black; padding: 5px; width: fit-content; margin: 0 auto;"> Key Mode FrameDisp Setup </div>			
Menu item	Parameter(s)	Values	Reference
Key Mode	Enables control of all or one unit	All, Individual	7.2.2, "Key Mode"
Frame Display	Shows or hides the "frames" fields	on, off	6.2, "Setting the precision"
Setup	Load or save Memory bank	Load, Save 0, 1, 2, 3, 4, 5, 6, 7, 8, 9, F (factory)	4.5, "Storing and recalling user setups"
DispTime	Absolute or relative time display	Absolute, Relative	6.3, "Setting a relative time reference"

Section 10.2 - Alphabetical list of menu items

10.2 Alphabetical list of menu items

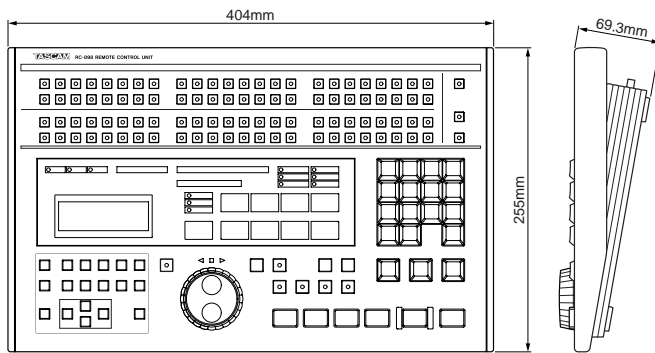
In this table, if a menu item is assigned to a function key as a factory default, the function key name is shown in following the menu time name (e.g. **F4**).

Menu Item	Menu group	Menu Item	Menu group
9Pin Control Mode	7	MTC Output	7
9Pin Locate Pre-roll	7	Output TC Source F13	5
9Pin Rec Acceptable	7	Output TC Timing	5
9Pin Time Mode	7	Output Timing	9
Abs Diff F17	E	Park Position	4
Analog In/Out F15	2	Pre-roll Post-roll	1
Clock	9	Rec Mute	1
Clock Mode	A	Rechase Mode	4
Confidence Mode F12	9	Record Delay	6
Control Protocol	3	Rel Diff F19	E
Crossfade Time F11	1	Remote Track Arming	3
Cueup Tally	6	Repeat Start/End F14	3
Dither	1	Setup	F
Emulation Device	6	Shuttle Monitor	9
Error Bypass	4	Shuttle Mute	2
Event	1	Sine Oscillator	2
Ext TC F16	E	Tape TC F18	E
Fast LTC Mode	5	Tape TC Mode	5
Fast Wind Speed	6	TC Chase Individ. Rec	4
Format	9	TC Frame Mode F8	5
Frame Display	F	TC Record Enable	6
Fs Shift Mode	8	TC Record Source	8
Gen TC F20	E	TC Track Record	8
Generate Mode F10	8	TDIF Word Length	2
Generate Start Time F9	8	Time Mode F6	3
GPI Setup	1	Timecode Offset F7	4
Input Select	9	Track Copy F2	0
Key Mode	F	Track Delay Time F1	0
Level Meter Mode	2	Track Mapping	6
Locate Pre-roll F4	0	Vari Speed F3	0
Machine Offset F5	3	Video Resolve	5
MIDI/Bus ID	7		

10.3 Specifications

Connections:	
D-sub 15-pin	DTRS recorder control
D-sub 9-pin	Sony P2 control
D-sub 15-pin	Parallel control and tally, or up to 5 GPI-controlled units
Size (w x h x d)	404 x 63 x 253 (mm) 15.9 x 2.7 x 10.0 (in)
Weight	2.5 kg (5.5 lbs)
Power	Supplied from DTRS recorder
Supplied accessories	Remote cable (5m), Terminator
Optional accessories	CS-898 roll-around stand MK-8924 meter bridge mounting kit

10.4 Dimensions



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