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SYNCHRONIZER SOFTWARE UPDATE-REV. 'K'
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Oct 89

NEW FEATURES

1) Jog functions and their associated protocols have been installed in the synchronizer, providing standardized jog and shuttle control to several popular VCR's as well as biphase-driven transports.

2) An alternate method of cueing, called Jog/Shuttle cueing, has been added which allows the synchronizer to cue joggable transports via the jog routines. This method of cueing also supports unlaced cueing with certain VCRs, allowing the maximum shuttle speed to be used when cueing over a large distance.

3) Machine menus have been added to allow faster and more efficient entry of synchronizer constants. These menus correspond to the constants shown in the current transport interface drawings, and are accessible both through the synchronizer front panel controls and serial protocol.

4) Two sets of user-customized constants may now be stored in the synchronizer's non-volatile (NV) memory, and either set may be designated as the power-up default set.

5) The slow relock mode has been expanded to allow sub-audible relocking with errors up to 10 frames, instead of the 1 frame error maximum that previous synchronizer software supported.

6) The time code standard (30, 25, or 24 frame) may now be set remotely by serial protocol.

NEW CONSTANTS

CONSTANT	DEFAULT VALUE	DESCRIPTION	REMARKS
MSD	0	NV Default flag.	When set to 0 and <u>saved</u> in NV memory, the <u>first</u> set of user-customized

NV constants is loaded
into RAM on power-up.

When set to 1 and <u>saved</u>
in NV memory, the second
set of user-customized
NV constants is loaded
into RAM on power-up.

When set to F and <u>saved</u>
in NV memory, the $\overline{PROM}$
default constants for
Otari MX-5050 are loaded
into RAM on power-up.

09 MSD   0 Type-of-Cueing flag. When set to 0, standard
FF/RW cueing is invoked.

When set to 1, DC or FM
servo cueing is invoked.

When set to 2, 'wide
window' cassette type
cueing is invoked.

When set to 4, modulated
cueing is invoked.

When set to 8,
jog/shuttle type cueing
is invoked (See
JOG/SHUTTLE CUEING).

32 LSD   0 Pulse update and   When set to 2 <u>and</u> SY
fractional tach flag constant 31 ($\overline{tach}$ rate)
is set to 0, tach rate
for slave transport
defaults to system <u>field</u>
rate (60, 50 or 48 $\overline{Hz}$)
instead of system frame
rate.

When set to 3 <u>and</u> SY
constant 31 is set to 0,
same as '2' except that
tach is assigned to the
master.

The values of 0, 1, 4, 5, 8 and 9 retain their original definitions and functionality.

33 LSD	0	Slow Relock flag.	When set to 0, errors encountered during lock are handled by re-synchronizing the transport at the normal (audible) rate of capstan slewing. When set to a value N from 1 to 9, errors encountered that are N frames or less are handled by re-synchronizing the transport at a slow, sub-audible rate (approximately 0.1 frames/second). Errors that are greater than N frames are handled at the normal rate.
45 LSD	0	Lock Output flag.	When set to 0, the lock output turns ON when the transport has achieved lock, and remains OFF for all other conditions. When set to 1, the lock output turns ON while the transport is cueing or synchronizing (but NOT locked), and remains OFF for all other conditions. When set to 2, the lock output pulses once (for the duration defined by SY constant 35 LSD) when the transport has achieved lock. When set to C, the lock

output follows whatever
state the capstan output
is in.

When set to F, the lock
output remains OFF under
all conditions.

NOTE

The lock output modes described
above (with the exception the lock
output pulse function, '2') are
also implemented J.3 synchronizer
software.

46 MSD	0	DC Polarity flag.		When set to 0, control sense for DC-controlled capstans is assumed to be normal, that is, increasing the control voltage <u>increases</u> the capstan speed.
				When set to 8, control sense for DC-controlled capstans is assumed to be inverted, that is, increasing the control voltage <u>decreases</u> the capstan speed.
46 LSD	9	Out-of-phase MTC correction criterion.		When set to 0, the synchronizer's out-of-phase MTC correction routine is defeated.
				When set to a value N from 1 to F, master time code readings that are improperly phased with respect to the master frame edge signal are corrected in the synchronizer's lock routine.
				The value N is an error threshold, representing the maximum number (1-

15) of <u>contiguously</u> mis-
phased MTC readings that
will be corrected before
lock is achieved.

47 BOTH   00   Jog-type flag.

When set to 00, the syn-
chronizer ignores all
jog commands sent to it.

When set to one of the
following values, the
synchronizer will
convert jog commands
sent to it into the
nearest equivalent jog
motion that the
transport can achieve:

<u>VALUE</u>   <u>TRANSPORT</u>

01   SCO (RS-422)
02   SSO (Sony 5600/5850)
03   JVC 6650/8250
04   Panasonic 6300/8500
05   Panasonic AU-650

<u>Dubbers</u>

0A   Albrecht (50 Hz)
0B   240/250 Hz biphase

48 BOTH   43   Menu ID (Least
                Significant Digits)

This constant has no
effect on synchronizing
parameters, but serves
only to identify which
pre-programmed set of
constants has been
downloaded into RAM.

When the menu-select
mode is invoked from the
synchronizer's front
panel, the value of this
constant appears in the
frames position of the
display.

49	BOTH	00	Menu ID (Most Significant Digits)	This constant has no effect on synchronizing parameters, but serves only to identify which pre-programmed set of constants has been downloaded into RAM.

When the menu-select mode is invoked from the synchronizer's front panel, the value of this constant appears in the seconds position of the display. |

NEW PROTOCOLS

ASCII SYMBOL	HEX CODE	DESCRIPTION
'G'	47h	Jog command terminator, taking the form

     'csnG'

where 'csn' are 3 digits used to specify the type, direction and magnitude of the jog command.

Digit 'c' specifies the type of command:

       0 = jog
       1 = shuttle
       2 = step
       3 = pause

If 'c' = 0, then 'sn' is interpreted as one of the following multiples of play speed:

(All values for 'sn' in

6

parentheses denote the same
speed but in reverse.)

```
00(80) = 0.05X
01(81) = 0.075X
02(82) = 0.12X
03(83) = 0.18X
04(84) = 0.28X
05(85) = 0.43X
06(86) = 0.67X
07(87) = 1.00X
```

If 'c' = 1, then 'sn' is
interpreted as one of the
following multiples of play
speed:

```
00(80) = 1/30X
01(81) = 1/10X
02(82) = 1/5X
03(83) = 1/2X
04(84) = 1X
05(85) = 2X
06(86) = 5X
07(87) = Max
```

If 'c' = 2, then 'sn' is
specifies the number (in
hexadecimal) of fields to step
forward (or reverse):

```
00-7F(80-FF) =
0-127 fields =
0-63 frames
```

If several step commands of
the same direction are issued
contiguously before the
transport has completed the
step mode, these commands are
added to the remaining number
of fields the transport must
move.

If 'c' = 3, then the transport
is issued a still command.
The digits 'sn' are ignored.

'@X'   40h,58h

or control X (18h)

Constants menu terminator,
taking the form

        'cnnn@X'

where 'c' is the code
specifying the type of
transfer to be done:

0 = Load pre-programmed
    constants from EPROM.

1 = Load user-programmed
    constants from NV memory.

2 = Save user-programmed
    constants in NV memory.

The 3-digit decimal value
'nnn' specifies which set of
constants is to be downloaded
into (or uploaded from) RAM.

The values of 'cnnn' from
0000-0999 represent the
transport-specific sets of
constants contained in the
EPROM which are based on the
current System 2600 interface
drawings (See transport-
specific menu attached).

If 'cnnn' = 1000 or 1001, then
the first or second set,
respectively, of stored
constants is retrieved from NV
memory and downloaded into
RAM.

If 'cnnn' = 2000 or 2001, then
the constants currently in RAM
are stored in either the first
or second area, respectively,
of the NV memory.

'XR'   58h,52h

Frame rate terminator, taking
the form

        'nnXR'

8

where 'nn' specifies one of
three time code standards as
shown below:

'30XR'=30 frame TC
'25XR'=25 frame TC
'24XR'=24 frame TC

NEW FRONT PANEL MODES

Transport Menu Select Mode

Pre-programmed constants for a specific transport
may be downloaded from EPROM into RAM using the
procedure shown below:

1) Depress the OFFSET, MTC and ERROR display buttons
   simultaneously until they are locked in the
   depressed position. The digits that appear in the
   time code display are interpreted as follows:

   HRS (tens):   Type-of-transfer code.

                     0 = Load from EPROM list.
                     1 = Load from NV memory.

   HRS (units):   Transport Interface ID code
                     (Hundreds digit) to load.

   MIN (tens):   Transport Interface ID code
                     (Tens digit) to load.

   MIN (units):   Transport Interface ID code
                     (Units digit) to load.

   SEC (tens):   Not used (defaults to 0).

   SEC (units):   Transport Interface ID code
                     (Hundreds digit) in RAM.

   FRM (tens):   Transport Interface ID code
                     (Tens digit) in RAM.

   FRM (units):   Transport Interface ID code
                     (Units digit) in RAM.

F/100 (tens): Not used (defaults to 0).

F/100 (units): Current NV memory in use.

0 = 1st NV memory area.
1 = 2nd NV memory area.

2)   Press the cursor button to select the digit to
      modify (cursor moves only thru the hours and
      minutes positions).

3)   Refer to the Transport Menu, and enter the 3-digit
      code that corresponds to the desired transport
      type, using the '+' and '-' buttons .

4)   Press the cursor button until it is no longer seen
      in the hours or minutes positions (no longer
      flashes).

5)   Press the '+' and '-' buttons simultaneously to
      download the selected set of constants into RAM.
      When this is done, the requested interface ID in
      the HRS units, MIN tens and MIN units positions
      will be copied to the SEC units, FRM tens and FRM
      units positions, indicating successful downloading.

<u>NOTE</u>

If a particular transport interface
is not implemented or is undefined,
the SEC and FRM positions of the
display will show '-- --' after
downloading to indicate that NO
constants have been transferred.

6)   The downloaded set of constants may be trimmed or
      modified as needed, then saved in non-volatile (NV)
      memory using the standard save procedure for
      synchronizer constants.

     In addition, either set of user-modified constants
may be retrieved from NV memory and downloaded into RAM
by following the procedure outlined above, and entering
a value of 1000 or 1001 to read either the first or
second set, respectively, of constants that have been
stored in NV memory.

<u>NOTE</u>

The synchronizer always reads
either the first set or the second
set of NV constants into RAM on
power-up, depending on the value of
constant 00 MSD that was <u>stored</u>
(See NEW CONSTANTS).

Software Revision Display Mode

     The synchronizer's software revision and sumcheck
may be read from the front panel by depressing the
OFFSET, STC and MTC display buttons simultaneously. The
hours, minutes, seconds and frames are interpreted as
follows:

    HRS: Hexadecimal-encoded ASCII value for the
           software's revision letter.

    MIN: Software version extension (decimal).

    SEC: Most significant digits (hexadecimal) of the
           EPROM's sumcheck.

    FRM: Least significant digits (hexadecimal) of the
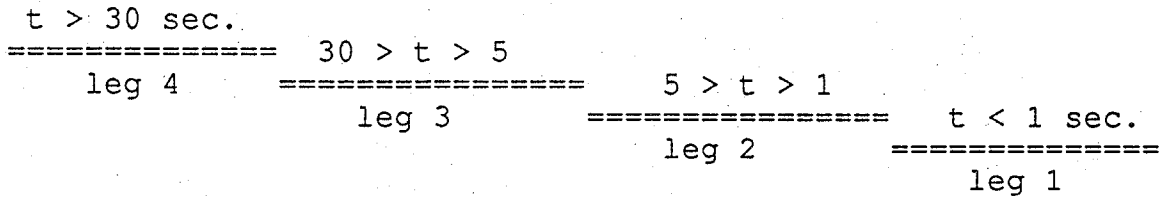   EPROM's sumcheck.

Hard Reset Command

The synchronizer may be given a power-up type reset command from the front panel using the procedure shown below:

1)   Depress the OFFSET and ERROR display buttons simultaneously until they are locked in the depressed position.

2)   Simultaneously press the cursor, '+' and '-' buttons. When this is done, the time code display will show the synchronizer's bus position for a few seconds, indicating the reset has occurred.

JOG/SHUTTLE CUEING

Transports that can be controlled with the new jog commands may also be cued by the synchronizer (equipped with 'K' level software or later) using these same jog functions. The Jog/Shuttle cueing mode utilizes the four legs, shown in the diagram below, of the servo cueing slow-down profile to define appropriate speeds for a transport as it approaches the cue point.

t = seconds from cue point.

```
t > 30 sec.
===============  30 > t > 5
   leg 4        ================   5 > t > 1
                    leg 3          ================   t < 1 sec.
                                      leg 2          ==============
                                                        leg 1
```

The diagram above represents Constant 10 MSD, the time scale expansion factor, being set to 0. The table below shows how Constant 10 MSD relates to the time scale of the slow-down profile.

<u>NOTE</u>

Constant 10 LSD has no effect on cueing characteristics when Jog/Shuttle type cueing is invoked.

Value in Constant 10 MSD	Leg 1	Leg 2	Leg 3	Leg 4
0	1	5	30	> 30
1	2	10	60	> 60
2	4	20	120	> 120
3	8	40	240	> 240

The speed values for each leg are set by entering one of the speed codes shown below into Constants 11 LSD (leg 1), 13 LSD (leg 2), 15 LSD (leg 3) and 17 LSD (leg 4).

Speed code	Multiple of Play Speed
0	1/30X
1	1/10X
2	1/5X
3	1/2X
4	1X
5	2X
6	5X
7	Max search (transport dependent)
8	Max wind (unlaced cueing, where applicable.)

Jog/Shuttle Cueing is invoked when Constant 09 MSD, the type-of-cueing flag, is set to '8'.