# The TELCOM RESEARCH *easy reader II*

The ***easy reader II*** is a serially controlled SMPTE/EBU time code reader. It can read both LTC and VITC and can translate LTC to VITC and produce a window dub or 'burn-in'. This document describes the set-up of the ***easy reader II*** and the serial communications protocols supported by the ***easy reader II***. Additional material may be found in the Windows help file included on the Time Code Hot Key disk that comes with the ***easy reader II***.
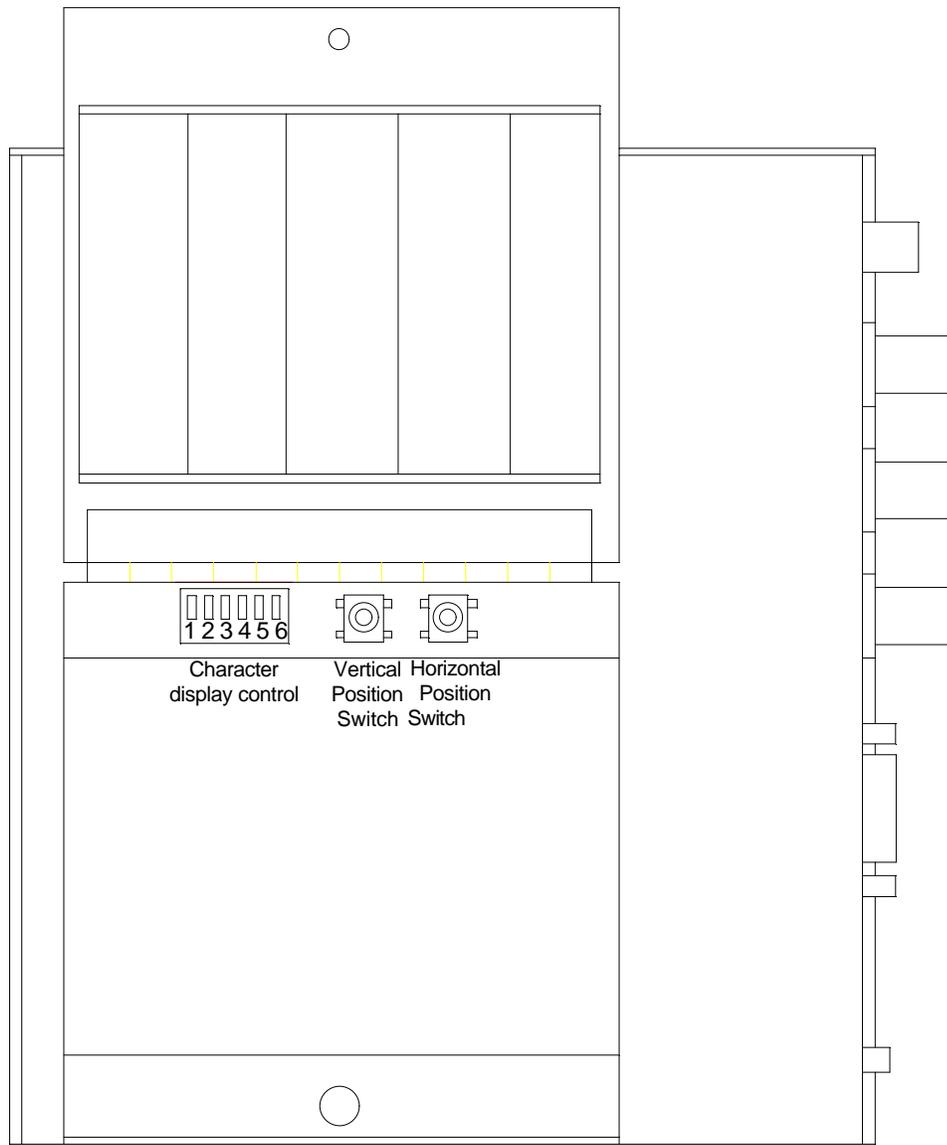
MODE SWITCH SETTING

Switches 1, 2 and 3 control the content of the on screen display. 'U' means the switch is up and 'D' means the switch is down.

1 = U, 2 = U, 3 = U:
VITC Time

1 = D, 2 = U, 3 = U:
LTC Time

1 = U, 2 = D, 3 = U:
VITC User Bits

1 = D, 2 = D, 3 = U:
LTC User Bits

1 = U, 2 = U, 3 = D:
VITC Time
VITC User Bits

1 = D, 2 = U, 3 = D:
LTC Time
LTC User Bits

1 = U, 2 = D, 3 = D:
VITC Time
LTC Time

1 = D, 2 = D, 3 = D:
VITC Time
VITC User Bits
LTC Time

Character display control

Vertical Position Switch

Horizontal Position Switch

easy reader II switch settings

The drawing shown above is the ***easy reader II*** as viewed from the bottom with the battery compartment open and the character generator control switches labelled. The vertical and horizontal position switches move the on screen character display when pressed. They move one step when pressed and if held down they move continuously. These switches serve some secondary functions as

well. Holding down the horizontal position switch when turning the power will take the *easy reader II* out of VITC translate mode. Releasing the horizontal position switch will display and a message to that effect by the on screen display. Holding down the vertical position switch while you turn the power on will place the *easy reader II* into translate mode. The on screen display will show message to that effect when you release the vertical position switch. Holding down both switches when turning the power on puts the *easy reader II* into SONY® mode if switch 6 is down or Telcom native mode if switch 6 is up. Also when you have selected SONY® as described above switch 5 selects strict SONY® protocol if it was up and VITC mode SONY® protocol if it was down. In this mode the *easy reader II* returns VITC for all LTC requests. If a controller requests any type of time code except LTC the *easy reader II* will switch to strict SONY® protocol.   The other switches are for setting the on screen display modes and they are described in the table above and the paragraphs below.

Switch 4 selects a small character size when up and a large size when down.

Switch 5 selects bordered characters when up and a black box when down.

Switch 6 disables labelling of the displayed time code items when up and labels them when it is down.

The *easy reader II* supports 2 serial protocols. The first is its native Telcom Research protocol and the second is a SONY® RS-422 protocol.

The TELCOM RESEARCH® RS-232 Protocol

How to place the *easy reader II* in the Telcom Research protocol mode:

- Switch the power off.
- Set DIP switch 6 to the UP or ON position.
- While pressing both the vertical and horizontal position switches down, turn on the power switch.
- Release the both the vertical and horizontal position switches.
- The on-screen display will show a message confirming that you are not in SONY® protocol mode.

The Telcom Research protocol consists of one and two character commands followed optionally by a numeric argument. Communication between the *easy reader II* and a computer is at 19,200 baud, 8 bits, no parity and 1 stop bit. The protocol consists of commands sent to the *easy reader II* and time code and user bit information returned from the *easy reader II*.

Commands sent to the *easy reader II*

Commands recognised by the *easy reader II* fall into two categories, commands without arguments and commands with arguments. A command without an argument consists of a single letter. A command with an argument consists of a single letter followed by one or two digits. All characters not in the command set are ignored by the *easy reader II*. No additional characters such as a carriage return are required. The commands may be upper or lower case. The effects of all commands are stored in permanent memory so that ALL settings are restored at power up.

Command 'A':

> This command is a single character command that moves the on-screen display to the left by one step.

Command 'B':

This command selects a border, black box or no background for the characters inserted in the video display. The 'B' command requires a single digit argument defined as follows:

0: No background around characters.

1: A thin black outline surrounds the characters.

2: A black box surrounds the characters.

Command 'D':

This command is a single character command that moves the on-screen display to the right by one step.

Command 'H':

This command selects the horizontal scan line on which VITC will be inserted in translate mode. The 'H' command is followed by two digits. For NTSC video they must be in the range of 10 to 20 inclusive. For EBU video they must be in the range of 06 to 22 inclusive. If the line number is below 10 a leading zero must be supplied.

Command 'I':

This command turns source identification on and off. The 'I' command is followed by a single digit defined as follows:

0: Do not display the time code source identification

1: Display the time code source identification as VT for VITC time, VU for VITC user bits, LT for LTC time, LU for LTC user bits, XT for LTC/VITC time in translate mode and XU for LTC/VITC user bits in translate mode.

Command 'L':

Enable or disable LTC in the RS-232 output stream. This command is followed by a single digit defined as follows:

0: Turn off LTC in the ASCII output stream.

1: Turn on LTC in the ASCII output stream.

Command 'M':

This is the mode command. It controls the content of the on-screen video display. It is followed by a single digit as described below:

0: Disable on-screen character display. No time code is shown on the video display.

1: Display a single line containing VITC time

2: Display a single line containing LTC time

3: Display a single line containing VITC user bits

4: Display a single line containing LTC user bits

5: Display two lines. The upper line contains VITC time and the lower line contains VITC user bits.

6: Display two lines. The upper line contains LTC time and the lower line contains LTC user bits.

7: Display two lines. The upper line contains VITC time and the lower line contains LTC time.

8: Display four lines. The first line contains VITC time, the second line contains VITC user bits, the third line contains LTC time and the fourth line contains LTC user bits.

Command 'S':

> This is the size command for the on-screen character display. It is followed by a single digit as described below:
>
> 0: Select the small character set.
>
> 1: Select the large character set.

Command 'T':

> This command enables and disables the LTC to VITC translate mode. It is followed by a single digit.
>
> 0: Disable translate mode.
>
> 1: Enable translate mode. When the translate mode is enabled the VITC (if displayed or present in the RS-232 output stream) is actually LTC.

Command 'U':

> Enable or disable user bits in the RS-232 output stream. This command is followed by a single digit defined as follows:
>
> 0: Turn off user bits in the ASCII output stream.
>
> 1: Turn on user bits in the ASCII output stream.

Command 'V':

> Enable or disable VITC in the RS-232 output stream. This command is followed by a single digit defined as follows:
>
> 0: Turn off VITC in the ASCII output stream.
>
> 1: Turn on VITC in the ASCII output stream.

Command 'W':

> This command is a single character command which moves the on-screen display up by one step.

Command 'X':

> This command is a single character command which moves the on-screen display down by one step.

Time code data returned from the *easy reader II*

Time code information coming from the *easy reader II* is controlled by the 'V', 'L' and 'U' commands described above. The format of this output is shown below where 'T' is a time digit, 'U' is a user bits digit, 'S' is a standards character and 'r' is a carriage return:

command	output	comments
L0V0U0	r	No time code output
L0V1U0	TTTTTTTTSr	VITC time and standard
L1V0U0	TTTTTTTTSr	LTC time and standard
L1V1U0	TTTTTTTTSTTTTTTTTSr	LTC time and standard, VITC, time and standard

L0V1U1   TTTTTTTTUUUUUUUUSr   VITC time, user bits and standard

L1V0U1   TTTTTTTTUUUUUUUUSr   LTC time, user bits and standard

L1V1U1   TTTTTTTTUUUUUUUUSTTTTTTTTUUUUUUUUSr

LTC time, user bits and

-------------LTC---------------   -----------VITC---------------

standard, VITC time, user bits and standard

Values of 'S' In LTC:
- A - 24 frames per second.
- B - 25 frames per second.
- C - 30 frames per second non drop-frame.
- D - 30 frames per second drop-frame.
- E - Error or no time code present.
- R - Tape is moving backwards.

Values of 'S' In VITC:
- a - 24 frames per second.
- b - 25 frames per second.
- c - 30 frames per second non drop-frame.
- d - 30 frames per second drop-frame.
- e - Error or no time code present.

Please note that you can tell if you are reading VITC or LTC by the case of the standard character, lower case is VITC, upper case is LTC. If you have VITC selected for RS-232 output and you are in TRANSLATE mode, LTC appears on the RS-232 output in place of VITC although the value of S will be in lower case. In TRANSLATE mode if both LTC and VITC are selected on the RS-232 output, two time codes will appear but the time and user bits will be the same because the VITC is really a copy of the LTC.

The *easy reader II* transmits and receives RS-232 data at 19,200 baud. It transmits 8 data bits, no parity and 1 stop bit. It can receive 8 data bits, no parity and 1 stop bit or 7 data bits, even parity and 1 stop bit or 7 data bits, odd parity and 1 stop bit or 7 data bits, no parity and 2 stop bit. It has a female DB-9 connector wired as data communications equipment (DCE).

On-screen character display position, size and border type are stored in the EEPROM whenever they change and therefore become the default positioning and display attributes at the next power up. In other words when the power is turned on the display will appear the same as it was when the *easy reader II* was last used.

The SONY® RS-422 Protocol Emulation

How to place the *easy reader II* in the SONY® RS-422 protocol emulation mode:
- Switch the power off.
- Set DIP switch 6 to the DOWN or OFF position.

- Set DIP switch 5 to the DOWN or OFF position to select VITC time when the controller requests LTC time. Set DIP switch 5 to the UP or ON position to select strict SONY® protocol mode.
- While pressing both the vertical and horizontal position switches down, turn on the power switch.
- Release the both the vertical and horizontal position switches.
- The on-screen display will show a message confirming that you are in SONY® protocol mode and whether or not VITC will be substituted for LTC.

The *easy reader II* implementation of the SONY® RS-422 protocol supports all the common commands in the protocol. Specifically all commands return an ACK except the following:

- Device Type - returns 10 00
- Time code generator data sense - returns NAK bad command 11 12 01
- Current time sense - returns time code or user bits as requested except if in substitute VITC mode. In this case VITC is returned for all LTC requests with CMD2 set to indicate LTC.
- In data sense - returns NAK bad command 11 12 01
- Out data sense - returns NAK bad command 11 12 01
- A In data sense - returns NAK bad command 11 12 01
- A Out data sense - returns NAK bad command 11 12 01
- Status sense - returns simulated status indicating play, no errors, servo locked.
- Preroll time - returns 00:00:00:00
- Timer mode sense - returns 71 36 00 (Time Code)
- Edit pre-set sense - returns NAK bad command 11 12 01

Supplied Accessories

The *easy reader II* comes with the following accessories

- 9 pin male to 9 pin female 7 foot serial extension cable compatible with PC RS-232 and RS-422 ports
- 8 inch 9 pin male to 8 pin circular mini DIN cable adapter for Macintosh computers.
- 9 pin male to 9 pin female module for RS-232 to RS-422 conversion. This is for use with equipment that connects to RS-422 machine control ports such as edit controllers.
- PC floppy disk containing Windows® Hot Key program.
- PC floppy disk containing developer information and examples.
- The *easy reader II*.
- A 9 volt D.C. power adapter.