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**TC400D
Four Channel
TBC Controller

Operator's Manual**

**Version 2.4 or later
Revised September 2003**

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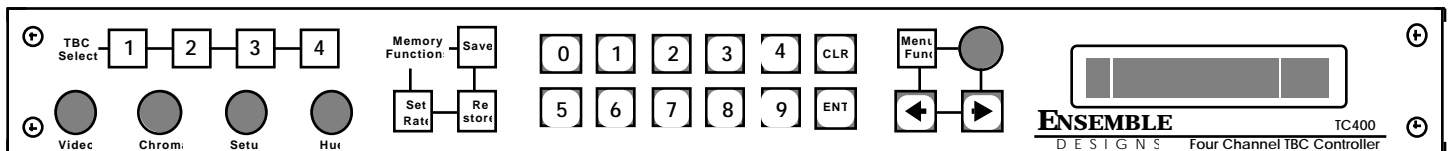
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TC400D Four Channel TBC Controller Operational Description

Overview

The TC400D provides full, independent control of the proc-amp functions of four VTR Time Base Correctors. Control of these functions adds great versatility in post-production environments, allowing the editor to quickly and easily adjust VTR outputs as needed. A Memory Storage System permits saving many different setups of the controls. These setups can be recalled either manually or by gpi or serial command by an edit controller. In addition to the proc-amp functions, the TC400D also provides remote access to system timing and color framing adjustments in the TBC.



The TC400D is a 1 RU chassis with a depth of 12 inches. Removable ears are included for installation in a conventional 19" equipment rack. The ears can also be mounted with a 3/4" set-back which allows them to serve as mounting brackets when the TC400D is installed from behind in a wooden console. The TC400D is powered by a small, modular transformer.

The four TBC control connectors on the rear of the TC400D are connected to each TBC or VTR by a multi-conductor cable. Additional connectors on the TC400D can be used to access serial or gpi control of the unit. TC400Ds have built in RJ11 connectors with AppleTalk protocol. This Apple Macintosh-compatible Local Area Network port can be used to interconnect multiple TC400Ds and CP10s. Desktop computers can also be interconnected in the same manner. The TC400D network protocol also supports Ethernet for using AppleTalk to Ethernet bridges.

Getting Started

Adjusting Contrast of the Menu Display

Prior to operating the TC400D it may be necessary to adjust the contrast of the Liquid Crystal Display (LCD). This contrast adjustment sets the optimum angle for viewing the display. It is adjusted as follows:

1. Press and hold the Menu Func button.
2. After the button has been held down for 1 second the Menu control knob will be assigned to the display contrast function.
3. Continue to hold down the Menu Func button while adjusting the display contrast to suit the angle from which the display will be read.
4. Once the contrast has been set, release the Menu Func button. If performing this adjustment caused the Menu Func button to light, press it momentarily to turn it off.

General Panel Control Info

The Left and Right Arrow buttons are used to step through the individual portions of functions which involve more than one data element. Not all functions require multiple entries. A left pointing arrow appears on the lefthand side of the display whenever the Left Arrow button can be used to step left through the selections, a right pointing arrow on the righthand side of the display indicates that the Right Arrow button is useful.

When the Menu Func button is first pressed, the name of the first function (Special Functions) will be displayed. The Menu Knob is then used to move forward and backward through the list of functions. When the desired function is displayed, press ENT to select the function.

The actual numeric values of the TBC control settings can be displayed in place of the register number and transition rate. Press either the Left or Right Arrow buttons to alternate between these two displays.

In the case that the TC400D needs to be reset, press and hold TBC Select buttons 1 and 2 and the Menu Function button for approximately 3 seconds. This will restart the unit without losing the 100 TBC settings per TBC/VTR.

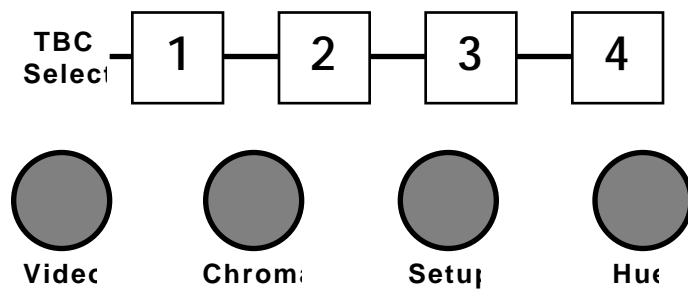
The following functions will be directed toward the TBC which is currently delegated on the TBC Select button group: Spec Functions, Network Access, Adjust Sync, Adj Subcarrier, Adj ColorFrame, Adj Y/C Delay (or Vid Phase), Register Copy, Set Default, Program GPIs, Machine Name, Machine Type, Panel Name, Capture Enable.

The remaining functions: Periph Enables, Pgm Edit Port and AppleTalk Initialize are not affected by the TBC Select.

Simple TBC Control

The four parameters of Video Level, Setup, Chroma and Hue have dedicated front panel controls which are delegated between the four different TBC's. TBC's are selected by pressing one of the four delegation switches above the control knobs. An indication of the currently selected TBC is provided by illumination (by a green LED) of the selection button.

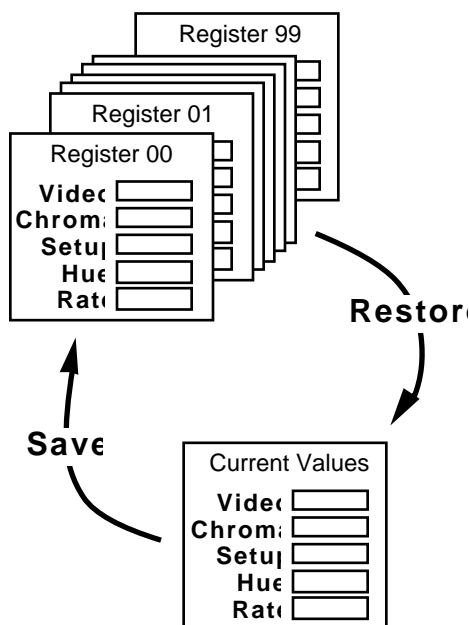
When the control delegation is changed the control knobs are re-directed to the newly selected TBC, leaving the values for the previously selected TBC unchanged. The knobs have no endstops and are able to rotate continuously, thus allowing the knob to properly control the TBC, regardless of the value of the function at the time the control was delegated to it. The knobs are scaled so that it takes approximately four complete revolutions of the knob to take the control from one limit of its range to the other. This provides extremely fine control, making it easy to adjust to the desired value.



For each of the four controllable values there is a nominal, or detent value which can be programmed through a menu function. This value is in the middle of the range of each control. Pressing and holding a TBC Select button for at least one second will reset all four of the control values for that machine to those nominal values.

Memory Functions

Each TBC control channel has its own set of 100 memory registers. Each register contains the values for Video, Setup, Chroma, and Hue which are to be sent to the TBC. The values which are currently being sent to the TBC are stored into a register when a Save command is issued. A Restore command will bring the values back from the register and they will once again be sent to the TBC.



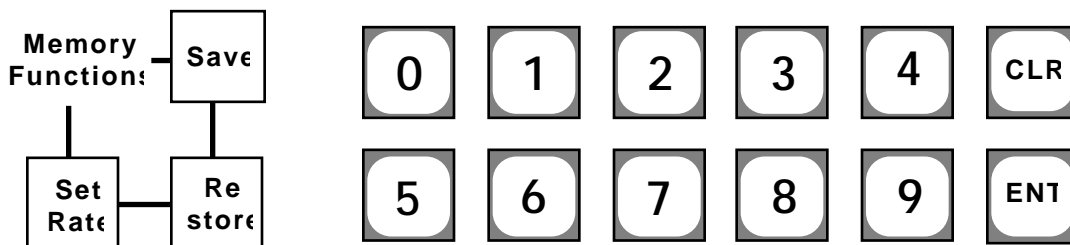
This memory organization is illustrated at left. This same organization is repeated four times over for each of the four TBC channels.

Each register also contains a transition rate value which determines the speed at which

the control values in that register will be brought to bear on the TBC. A zero frame transition will produce an immediate, hard cut to the restored values. If the transition value in the register is 30 frames then restoring that register to air will cause a 1 second smooth transition between the current control values and the values in the register. Transitions can be as long as 999 frames.

Note that Register 0 is a special register which contains the current values. It can be used in conjunction with some editors to transfer current values, but cannot be used like the other 99 registers as a storage location.

Memory functions are accomplished using the Save, Restore, and Set Rate buttons. Pressing one of these three function keys causes it to illuminate (in Red), indicating that the numeric keypad is now directed toward that particular function. The keypad is then used to provide the desired numeric value, either a register number or a transition rate. During numeric entry the LCD display on the righthand side of the panel shows the numbers as they are pressed. Once the number has been keyed in the value is confirmed by pressing ENT (Enter). This terminates the operation and the function lamp then goes off. During numeric entry CLR (Clear) is used to backspace unwanted keystrokes. A Memory operation can be cancelled by pressing the function button a second time. This will extinguish the lamp and no operation will take place.



A Save to register 62, for example, is obtained by pressing Save, 6, 2, ENT. During this operation a message will appear on the LCD display. This Save operation will copy the current TBC control values and the current transition rate into register 62. Save operations have no effect on the values being sent to the TBC and hence no effect on the on screen video.

If a transition rate different than the current value is desired it must be entered before performing the Save. A transition rate of 120 frames (4 seconds) would be programmed by pressing Set Rate, 1, 2, 0, ENT. Save operations performed subsequently would then place this 120 frame transition rate in the affected registers.

Bringing the contents of a memory register back into current values is a Restore operation. To bring back register 37, for example, you would press Restore, 3, 7, ENT. If register 37 had been saved with a non-zero transition rate then the control values

being sent to the TBC will smoothly transition from the current value to the value stored in the memory register. These transitions will be proportional. If, for example, the difference between the current Video value and the restored Video value is large, whereas the difference between the Hue values is small, then the Video control to the TBC will change more rapidly than the Hue control since it has more distance to cover. However, the transition in both cases will take the same amount of time.

The simple memory operations described above will be directed toward a single TBC, the TBC which is currently delegated (and illuminated in green). This allows different registers to be restored to different TBC's, even restored with different transition rates. The TBC delegation can be changed at any time during one of the three memory operations, Save, Restore, or Set Rate. The function will be directed toward the delegation that is in effect when ENT is pressed.

The actual numeric values of the TBC control settings can be displayed in place of the register number and transition rate. Press either the Left or Right Arrow buttons to alternate between these two displays.

The Battery Backup option (MEM-OPT1) for TC400D offers nonvolatile storage for the 100 memories per TBC. Additionally, there are five timing registers per TBC accessed and stored in the **Set Default** portion of the TC400D Menu.

LAN Connection

Multiple TC400D Controllers (and CP10 Remote Panels) may be interconnected over a Local Area Network (LAN). This LAN allows you to control any VTR/TBC from any TC400D or CP10 panel in your facility. Use the Network Access function from the front panel of the TC400D or CP10 to control VTR/TBCs over the network.

The LAN runs from one device to the next in daisy-chain fashion. The LAN port on the TC400D is a dual modular phone connector on the rear of the unit. Connect the TC400Ds (and CP10s) with standard twisted pair phone cable and RJ11s connectors.

Both ends of the network need to be terminated with a LAN Termination. A LAN termination is an RJ-11 modular phone connector with a 100 ohm resistor that is crimped across the outer two contacts, which correspond to the yellow / black pair in a phone cable.

The network protocol also supports Ethernet for using AppleTalk to Ethernet bridges.

Menu Functions

TBC control and memory operations are the most commonly used functions of the TC400D. It has additional, less frequently used functions which are accessed through a function menu which is displayed on the alpha-numeric display at the right of the control panel.

Menu Functions are enabled by pressing the Menu Func button. It will illuminate (in Red) to indicate that a menu function is active. These functions can be turned off by pressing Menu Func a second time.



In a menu function, data or information is entered by using the numeric keypad or the control knob to the immediate left of the display window.

Menu Functions are:

- Spec Functions**
- Network Access**
- Adj Sync**
- Adj Subcarrier**
- Adj ColorFrame**
- Adj Y/C Delay (or Vid Phase)**
- Register Copy**
- Set Default**
- Program GPIs**
- Machine Name**
- Machine Type**
- Panel Name**
- Capture Enable**
- Periph Enables**
- Prgm Edit Port**
- AppleTalk**

Once selected by pressing ENT, the functions are used as follows:

Menu Functions Detail

Spec Functions

Special machine specific functions are accessed through this menu. These functions are available only as allowed by the VTR or TBC. The functions are:

Frz Frame Cntl: The Freeze Frame (if available) feature is turned on and off by pressing ENT.

Frz Field Cntl: Freeze Field (if available) is turned on and off by pressing ENT.

Bypass Cntl: The Bypass/Normal control (if available) is controlled by pressing ENT.

Note: These special functions are all turned off when the TBC Select button is held down for more than one second.

Network Access

Control of machines connected to other TC400Ds is obtained through this menu. Different machines can be assigned to any or all of the four TBC Select buttons. See Appletalk Menu to set Node Addresses.

Upon entering this menu, the current machine selection will be displayed on the top line of the display. If it shows **Local Cntl**, then the current TBC Select button has local control of the TBC or VTR that is physically connected to the corresponding TBC control output. If the display shows **Rem Cntl**, the TBC Select is assigned to a machine connected to a different TC400D.

To change from Local to Remote control, select **Network Access** and press ENT. The TC400D will search the network and, if there are other TC400Ds on the net, will go to a display similar to the one below:

Lcl Cntl: VTR 1
ENT = Local Cntl

Use the menu knob to scroll through an alphabetical list of all available machines. The first entry in the list is always **Local Cntl**, which allows returning the TC400D channel to the local machine control.

Network Access (con't)

The list of machine names is sorted alpha-numerically. To help search for a machine whose name contains a number, you can press one of the number buttons. This will forward the selected entry in the list to the next one whose name contains the digit that was pressed. This number button, or any other, may be repeatedly pressed to search for all occurrences of names containing the desired digit. If no machine name on the network contains the selected digit, nothing will happen. At any time, turning the knob will scroll through the list from the current position.

Once the desired machine is selected, press the ENT button to acquire it. If the machine isn't in use by another panel, the message **Remote Acquisition Successful** will be displayed. However if the machine is in use, you will see the message **Channel In Use by <Panel Name>** where <Panel Name> is the name of the panel that currently has access of this TBC Channel. At this point, the display will either return back to the machine list or go on to ask whether you want to capture this channel. If the **Capture Enable** for your panel is **Enabled**, then you are given the opportunity to capture the TBC channel away from the other panel that currently has control. Pressing ENT will release control from the other panel and capture control for this panel. However, this option is not available if **Capture Enable** for your panel is **Disabled**.

To return the TC400D back to local control of the machine physically connected to that port of the TC400D, go to the **Network Access** menu and select **Local Cntl**.

Adj Sync

The Sync Timing (sometimes referred to as Horizontal Phase) of the selected VTR output is adjusted using this function. The adjustment is made with the Menu Knob. The relative position of the control within the total range of adjustment is displayed by a vertical bar on the lower line of the menu display. The actual range of horizontal adjustment that is available is dependent upon the type of machine being used.

Extremely fine adjustment of Sync Timing can be made with the Right and Left Arrow Buttons.

Adj Sync (con't)

They will move Sync Timing in the smallest possible increment. (See note below).

Once the Sync Timing of the machine has been set it can be stored in non-volatile memory in one of the five default memories. This is done in the **Set Default** portion of the menu.

Note: There are differences between different TBCs and VTRs in the way the sync timing adjustment will appear. With some machines the control will be smoothly adjustable, allowing you to set the horizontal phase to any value you wish. On other machines the sync timing will change in small increments. This is perfectly normal and in all cases the TC400D will provide the same type of adjustment that is found on the machine's own control panel. However, the continuous rotation controls on the TC400D may provide a smoother, or more exact feel to the control.

Adj Subcarrier

This function is used to adjust the Subcarrier Phase or system timing of the selected TBC or VTR. The adjustment is made with the menu knob. It is used, in conjunction with the Sync Timing adjustment, to properly time the VTR into a production switcher. The relative value of the Subcarrier Phase adjustment will be displayed on the lower row of the menu display.

Extremely fine adjustment of Subcarrier Phase can be made with the Right and Left Arrow Buttons, just as with Sync Timing.

Subcarrier Phase is saved to non-volatile memory using the **Set Default** function.

Note: Like Sync Timing, the Subcarrier timing adjustment is dependent on the method in which this adjustment is made on the machine itself. On some VTRs and TBCs, subcarrier timing is adjusted by a combination of a switch, which determines a coarse setting of the parameter, and a rotary control which provides a fine adjustment. The TC400D combines these two adjustments into a single rotary control which will appear to have several overlapping ranges. It may be possible to find two settings of the control which both produce the desired subcarrier phase. In this case the adjustment which is farthest from a discontinuity should be used.

Adj ColorFrame

The playback color framing of certain 1" Type C VTRs can be adjusted using the **Adj ColorFrame** menu. This also corresponds to the 'Edit Ready Cal' adjustment on Ampex VTRs. The adjustment of the selected machine is made using the Menu Knob.

While adjusting color framing the top line of the menu display will show **OK** when the VTR is returning an indication of proper color frame to the TC400D. This indication corresponds to the PB Colorframe OK indicator on Sony VTRs and the Edit Ready indicator on Ampex VTRs. In addition, the display will show 'INV' when the Invert condition exists on Ampex VTRs.

This adjustment is saved to non-volatile memory with the **Save Default** menu function.

**Adj Y/C Delay
or
Video Phase**

The Luminance/Chrominance Delay (**Y/C Delay**) can be adjusted on certain Sony Betacam models and some other VTRs and TBCs. The adjustment of the selected machine is made using the Menu Knob.

Video Phase can be adjusted on some D2 and D3 VTRs using the Menu Knob.

Either **Video Phase** or **Y/C Delay** will be available in the menu choices, depending on what **Machine Type** has been selected for that channel.

This adjustment is saved to non-volatile memory with the **Set Default** menu function.

Register Copy

The **Register Copy** feature allows an individual register or range of registers to be copied from a source channel to the currently selected (destination) channel. In addition, by selecting the special Register 0, the current settings may also be copied.

To copy registers, first select the channel you wish to copy registers to. The current TBC Channel is always the destination for **Register Copy**. Then, choose the **Register Copy** menu and press ENT.

Register Copy (con't)

Assuming channel 1 is the selected channel, you will see the following display:

Copy to Ch 1 Reg ??

Using either the menu knob or the number buttons, select the first destination register you wish to copy to. Valid registers range from 1 to 99. A special register number, 0, may also be used, which will copy data to the current channel settings. Press ENT to continue. At any time, you can quit the Register Copy selection menu by either pressing the MENU FUNC button or selecting another channel or function. In this example, we've entered register 62 to be the first register to copy to. After pressing ENT, the display goes on to the next step:

Copy to Ch 1 Reg 62
from Ch ?

Now enter the source channel, from 1 to 4. Press ENT to continue and the display will then look like below (here we are using channel 2 for the source channel):

Copy to Ch 1 Reg 62
from Ch 2 Reg ??

Then we enter the first source register number. Once again, register 0 can be used to use the current settings of the source channel. For this example, use register 50 and, after pressing ENT, we see the next display:

Copy to Ch 1 Reg 62
from Ch 2 Reg 50-??

Finally we select the ending source register. Note that this register must be larger than, or the same as the first source register. In addition, a range of only 38 registers can be copied in this example because the destination starts at 62, so the highest number that can be entered in this case is 87, as a larger number would exceed the 99th register of the destination channel.

Register Copy (con't)

For this example, we want to copy 10 registers, so we enter 59 and then press ENT.

ENT=Copy Ch 1 Reg 62
from Ch 2 Reg 50-59

This displays a final confirmation before the registers are copied. Pressing ENT at this point will start the register copy, which can take up to a few seconds if copying all registers to or from a remote channel. When the **Register Copy** is done, the menu function is dropped and the display returns to normal. If there is a problem, such as loss of the network connection, an error message will be displayed.

All destination registers (62 to 71 in the example above) will be copied with the registers from the source (50 to 59), even if the source register is empty. If the range of destination registers included register 0, then the current setting will be updated immediately with whatever source register was chosen as the first register.

Set Default

There are five default settings for each TBC channel in the TC400D. They must be saved, as described in this section, in order to be stored in nonvolatile memory.

The current default settings are automatically recalled when the unit is turned on and can also be recalled when any of the four TBC Select buttons are pressed and held for 2 seconds. The default settings affect Video, Chroma, Setup, Hue, Transition Rate, and all the timing adjustments.

Set Default allows for changing the current default setting number and saving new setting values. Selecting the **Set Default** menu results in the display as shown below:

Default Settings = 1
ENT = Setting 1 >

There are five **Default Settings** to choose from. To change to a different setting, either push button 1 through 5 or turn the Menu Func knob, then push ENT to activate the new setting, which will also recall that setting.

Set Default (con't)

Pressing the right arrow from this menu will bring up the menu as shown below:

Press ENT to save
< Default Setting 1

To save a new **Default Setting**, select a setting number and press ENT. The current Video, Chroma, Setup, Hue, Transition Rate, and timing parameters will be saved in that Default Setting and that setting number will become current.

All five **Default Settings** and the current setting number for each of the four TBC channels are automatically saved in non-volatile backup memory, no extra steps are required.

Program GPIs

The TC400D is equipped with 8 GPI inputs. GPIs 1 through 4 are dedicated to providing remote control of the TBC Select function. GPIs 5 through 8 are programmed using this function.

After entering the **Program GPI** function, the display prompts for the GPI you wish to program. Press 5, 6, 7, or 8 to select the GPI input.

Next the display prompts for the TBC control channel you wish to control with this GPI. Press 1, 2, 3, or 4.

The desired function for the selected GPI input is chosen by scrolling through the list of functions with the Left and Right Arrow keys, followed by ENT. The choices are:

Restore Reg: This will assign the GPI to perform a Restore Register operation on the chosen TBC. Following selection of this function the display will prompt for the register number. Key in the register number and then press ENT.

Frz Frame Tgl: This will cause the Freeze Frame control of the TBC (if available) to toggle between on and off each time the GPI is activated.

Program GPIs (con't)

Frz Frame On: This will force Freeze Frame on regardless of its current state.

Frz Frame Off: This will force Freeze Frame off regardless of its current state.

Frz Field Tgl, Frz Field On, Frz Field Off: These are identical to the corresponding freeze frame functions.

When the programming is complete, press Menu Func to return to normal operation.

Machine Name

Each VTR/TBC connected to the TC400D must have a unique Machine Name of up to 10 characters. These names may include letters, numbers, and other special characters. The only restriction is that the name must be unique from any other machine on the network. Initially, the names are set to VTR 1, VTR 2, VTR 3, and VTR 4. One use for these names is for identification when acquiring remote channels via Network Access. Refer to Network Access for more information.

Each VTR or TBC must be assigned a unique name in order for the LAN access feature to work properly. When the Machine Name is changed the TC400D will check on the network to ensure that it does not duplicate a name used elsewhere. If there is a conflict a message will be presented requesting that a different name be used. If no duplicate is found, the new name will take effect immediately. An unused TBC control port of a TC400D can be given a Machine Name of VTR 0 which will caused the port to be shown as "No Machine Assigned". The name VTR 0 can be used repeatedly in a facility.

To change a name, choose the Machine Name menu and press ENT. The current machine name is shown on the top line and the new name, which is initially the same, is shown on the bottom line. Use the menu knob and the left/right arrow buttons to change the name. The knob selects the letter for the current character indicated by the cursor and the arrow buttons select the current character by moving the cursor to the left or right.

Machine Name (con't)

In addition, the number buttons may be used as a short cut to enter a digit for the current character and the CLR button may be used to enter a space character.

Name = VTR 1
ENT = DigBeta 12

After the new name has been entered, press the ENT button. The name will be registered on the network and, if the new name doesn't already exist, it will be stored for that channel. If the name does exist, a warning message will appear and you'll need to choose another name.

Once the name is set, it is saved in non-volatile memory. The next time the TC400D is turned on, this name will be checked on the network. If at that time a second machine with the same name exists, the name will not be displayed for that channel, but instead dashes will be shown where the name should be. If this happens, the channel is still active, but not available on the network - be sure to rename it as soon as possible with a unique name.

Machine Type

The TC400D is capable of controlling the proc amp functions of many different VTRs and TBCs. In order to properly control machines from different manufacturers, each control channel of the TC400D must be programmed with the name of the manufacturer.

This function allows selection of the manufacturer or type of TBC/VTR connected to the selected channel. The top line of the menu shows the current machine type assigned to that channel. Turn the Menu Knob to scroll through the choices of machine types. Press ENT to confirm your selection.

Panel Name

Each TC400D panel (and CP10 panel) has a name of up to 14 characters. Initially, the name is set to **TC400 Panel**. One use for this name is for identification when acquiring remote channels via **Network Access**. If another panel, or even the same one, attempts to acquire a channel that's already in use, a message is

Panel Name (con't)

displayed showing the panel that currently controls that channel. Refer to **Network Access** for more information.

To view and set the **Panel Name**, select the **Panel Name** menu. The current panel name is shown on the top line and the new name, which is initially the same, is shown on the bottom line. Use the menu knob and the left/right arrow buttons to change the name. The knob selects the letter for the current character as indicated by the cursor and the arrow buttons select the current character by moving the cursor left or right.

In addition, the number buttons may be used as a short cut to enter a digit for the current character and the CLR button may be used to enter a space character.

Name = TC400 Panel
ENT = Edit Suite 4

When the new name is set as desired, press the ENT button. The name will be checked for any duplicate panel names on the network and if one is found, a warning message will appear and the name change will not take place. If the new name is unique, then it is saved in non-volatile memory and will be used to identify that panel.

When the panel is turned on, it checks the network for duplicate panel names. If one is found at that time, the name is temporarily changed by adding a number after then name to insure its uniqueness. Be sure to name all panels when they're initially installed on the network (after the network connections have been made).

Capture Enable

When attempting to acquire a channel in Network Access, a panel may override existing control from another panel by capturing the requested channel. Refer to Network Access for more information.

This ability to capture a channel is set for the panel in the Capture Enable menu. The Capture can be either enabled or disabled by selecting the menu and turning the menu knob to the desired setting (or pressing 0 Disable or 1 for Enable) and pressing ENT. This setting is saved in non-volatile memory.

Periph Enables

The TC400D can be connected as a peripheral device to the E-MEM[®] system of a GVG Model 200 Production Switcher. This connection is made using the 9pin D-sub Editor port on the rear of the TC400D.

Two functions are available. The first is E-MEM Learn on the Model 200 in which a TC400D register is learned to the same Model 200 register number. The other function is E-MEM Recall in which a previously learned E-MEM register is Recalled and the TC400D Recalls the same register number.

Note: The Editor port must be programmed for GVG 200 Peripheral operation in the Pgm Edit Port function.

The Periph Enables menu function is used to program the peripheral address and to enable/disable peripheral operation for the selected channel.

Use the Left and Right Arrow buttons to move between the two selections listed below.

Periph Address: This address is used to determine if the peripheral message from the GVG 200 is intended for this channel. There are 24 different addresses, numbered 0 through 23. Use the menu knob to select the desired address.

Peripheral operation of each of the four TBC channels in the TC400D is completely independent. Each channel can be given a different address if desired.

Periph Enables (con't)

Periph Enable: In order for the TC400D channel to respond to the peripheral message, it must have peripheral operation enabled. While in this selection, rotate the Menu Knob to display either 'On' or 'Off' as desired.

Pgm Edit Port

Operation of the Editor port located on the rear of the TC400D is programmed using this function. This programming consists of three parameters: Edit Port Mode, Edit Port Baud Rate, and Edit Port Parity. Use the Left and Right Arrow keys to move between these parameters.

Edit Port Mode: The TC400D can currently be programmed to respond to protocols: GVG 200 Peripheral, GVG Editor ESP-1, Sony BVE-9100, and LINC Peripheral. The Edit Port can also be set to "off". Selection of the desired protocol is made using the Menu Knob.

The GVG 200 Peripheral protocol is used exclusively with Grass Valley Group Model 200 series production switchers.

Edit Port

The GVG Editor ESP-1 protocol supports operation with Grass Valley Group editing systems which are equipped with Version 5.0 (or later) software. ESP-1 is also used with Axial, Ampex, CMX Omni, Calaway and Paltex. Other editor manufacturers support this protocol which allows the TC400D and CP10 to work with their editing systems.

The Sony BVE-9100 protocol supports operation with Sony editors that are equipped with the BKE-9013 color corrector card.

LINC protocol enables control of the TC400D through the front panel of an Abekas switcher.

New editor interfaces are in development. Please contact Ensemble Designs for up to date information for your specific editor.

Pgm Edit Port (con't)

Edit Port Baud Rate: Baud rates of 9600, 19,200 and 38,400 are selected using the Menu Knob. The selected baud rate must agree with that of the device connected to the Editor port.

Edit Port Parity: Parity can be chosen to be Odd, Even, or None via the Menu Knob. Like Baud rate, the parity must agree with the connected device.

Note: Baud rate and parity on the GVG Model 200 Peripheral interface is set using the diagnostic pod. Refer to the documentation with your switcher for details.

Note: For most edit controllers the correct settings will be 38.4K Baud and Odd Parity.

AppleTalk

When TC400Ds are networked together each TC400D must be assigned a unique Node Address. Use the Menu knob to select a Node Address, then press Enter to set it.

When you have finished with a menu function, press Menu Func a second time to return to normal operation. If you select a different TBC while a menu function is active, the menu function will terminate automatically to avoid adjusting a machine by mistake.

How to get additional assistance

If you need additional assistance, please contact the factory at (530) 478-1830, FAX (530) 478-1832, info@endes.com.

Appendix A

Interface Cable Wiring

The TC400D can control a wide variety of video tape recorders and time base correctors. Both analog and digital machines can be accommodated. In addition to the Machine Type menu function used to select the type of machine that a particular channel is to control, a specific cable is also needed to connect the machine to the TC400D.

Ensemble Designs can supply any interface cables that you will require. You can also make your own cables using the following information.

Listed below are details of the most commonly used interface cables. If you require an interface which is not listed below, contact Ensemble Designs. We are constantly adding new interfaces to the capabilities of the TC400D.

Sony Analog and Digital Beta VTRs

All Sony analog VTRs, VCRs, and TBCs are interfaced with basically the same cable. Digital Beta decks use this cable as well. The BVU and EVO series VTRs are an exception and need a completely different cable.

For Sony analog and digital beta VTRs the cable is wired as a pin-to-pin, extension-type (i.e. one end has a male connector, the other has a female connector), using 15 pin D-sub connectors.

Note: Pins 7 and 15 do not need to be included in the cable. These pins are used by Sony to supply +/- 12 volt power to manual remote panels. Cables supplied by Ensemble Designs do not have a connection to these pins to eliminate the possibility of shorting out the +/- 12 volt power supply in the VTR during cabling. This possibility exists because the connector on the rear of the Sony VTR is a male with exposed pins.

The signal assignments are as follows:

1	Horizontal Phase (also referred to as Sync Phase)
2	Hue
3	Subcarrier Phase
4	Video Level
5	Setup
6	Chroma Level
7	-12 Volts (not used)
8	Ground
9	Spare
10	Color Frame Status (1" Type C only) (For BVU, EVO, and BVT series, don't connect pin 10 on VTR end)
11	Spare
12	Color Frame Adjust Enable
13	Y/C Delay on BVW / Color Frame Adjust on 1" Type C
14	Spare
15	+12 Volts (not used)

Sony D2 and Panasonic D3

Sony D2 VTRs, such as the DVR-10, 18, 20 and 28, are controlled through the 'V/A Control' port on the rear of the DVTR. The same is true for Panasonic D3 VTRs. The required cable has a 15 pin male D connector at each end. As the ends of the cable will be mechanically identical, care must be taken that the proper end of the cable is connected to the TC400D.

This cable will allow the TC400D to control the DVTR through a serial data protocol. The 'Machine Type' of the control channel of the TC400 must be programmed for 'Sony D2'. Since D2 and D3 machines are controlled similarly, use the "Sony D2" setting for D3 machines also.

The signal assignments are as follows:

TC400D End (15 pin D Male)	D2/D3 End (15 pin D Male)	Signal Name
1	7	Positive Data to DVTR
2	14	Negative Data to DVTR
9	8	Positive Data to TC400D
10	15	Negative Data to TC400D
8	1, 4	Ground

FOR.A

The FOR.A FA-300 & FA-420 TBCs and the FA-740 Parallel Effects TBC use the same interface cable. Because the FA-740 contains two input paths, it requires two cables and will occupy two control positions on the TC400D. Please call the factory for information on your specific FOR.A TBC.

TC400D (15 pin D Male)	FOR.A TBC (25 pin D Male)	Signal Name
4	1	Video Level
6	2	Chroma Level
2	3	Hue (Chroma Phase)
5	4	Setup
1	5	Freeze Frame
3	6	Freeze Field
13	8	Bypass/Operate
8	7	Ground

Panasonic

The Panasonic MII series and AJ-7750 VTRs are interfaced using a 15 pin D-sub cable with non-standard wiring (i.e. not pin-to-pin). This cable requires a Male connector at each end. It is important to properly label each end of the cable because it will not function correctly if installed backward.

Note: At the Panasonic end of the cable, pins 11, 1, and 12 must be connected to ground (pin 4). This will set the Sync and Burst Amplitude controls (which are not controllable by the TC400D) to their nominal settings.

TC400D End (15 pin D Male)	Panasonic End (15 pin D Male)	Signal Name
1	6	Sync Phase
2	9	Hue
3	14	Subcarrier Phase
4	10	Video Level
5	2	Setup
6	3	Chroma Level
7	(not used)	
8	4	Ground
also to:	11	Ret Ground
also to:	1	Sync Amplitude
also to:	12	Burst Amplitude
9	(not used)	
10	(not used)	
11	7	SC Coarse (2)
12	15	SC Coarse (1)
13	(not used)	
14	(not used)	
15	(not used)	

Ampex

Ampex TBC-3, TBC-6 and TBC-7 Time Base Correctors are controlled using a standard pin-to-pin cable (the same as used with Sony machines), and a small interface adaptor which fastens to the 25 pin D-sub connector on the rear of the Ampex TBC. This adaptor, which contains level shifting and amplifying circuitry, is available from Ensemble Designs.

Edit Controller Interface

Most edit controllers connect to the serial port of the TC400D (or CP10) with a standard machine control cable, 9 pin D connector, pin to pin, male connectors on both ends. Be sure to set the **Prgm Edit Port** function on the TC400D appropriately for your edit controller, as mentioned previously in this manual.

GPI Input Wiring Instructions

The GPI Inputs to the TC400D appear on a 9 pin Male connector on the rear of the unit. This connector provides access to 8 independent GPI inputs. The pinout of this connector is as follows:

1	GPI # 1
2	GPI # 2
.	.
.	.
8	GPI # 8
9	Common (internally grounded in the TC400D)

Using a mating female connector and shell, GPI Inputs may be connected to other equipment in your facility.

Inputs 1 through 4 are assigned to the TBC Select function and can be used in conjunction with the tally output of a production switcher to automatically delegate the TBC control as a function of the crosspoint selection made on the switcher.

Assuming that your production switcher's tally system provides closure to ground or common (this is the most common type of tally system), connect as follows:

TC400D GPI Common (pin 9)	Switcher Tally Common
TC400D GPI Input #1 (pin 1)	Switcher Tally output for the crosspoint corresponding to the VTR or TBC controlled by the first TC400D Channel
TC400D GPI Inputs 2-4	Connect to corresponding crosspoint tally.

GPI inputs 5 through 8 can be programmed to perform a register Restore on a particular TBC channel. In addition, freeze frame features of certain TBCs can be also controlled by GPI.

All GPI inputs are active low.