



TBC & Matrix Switcher

TBC-5000



Instruction Manual

www.datavideo-tek.com

Rev 230709

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Warnings and Precautions

1. Read all of these warnings and save them for later reference.
2. Follow all warnings and instructions marked on this unit.
3. Unplug this unit from the wall outlet before cleaning. Do not use liquid or aerosol cleaners. Use a slightly damp cloth for cleaning.
4. Do not use this unit in or near water.
5. Do not place this unit on an unstable surface, cart, stand, or table. The unit may fall, causing serious damage.
6. Any slots and openings on the case top, back, and bottom are provided for ventilation. To ensure safe and reliable operation of this unit, and to protect it from overheating, do not block or cover these openings. Do not place this unit on a bed, sofa, rug, or similar surface, as the ventilation openings may become blocked. This unit should never be placed near or over a heat source or radiator. This unit should not be placed in a built-in installation unless proper ventilation is provided.
7. This product should only be operated from the type of power source indicated on the marking label of the AC adapter. If you are not sure of the type of power available, consult your Datavideo dealer or your local power company.
8. Do not allow anything to rest on the power cord. Do not locate this unit where the power cord will be walked on, rolled over, damaged or otherwise stressed.
9. If an extension cord must be used with this unit, make sure that the total of the ampere ratings on the products plugged into the extension cord do not exceed the extension cord's rating.
10. Make sure that the total amperes of all the units that are plugged into a single wall outlet do not exceed 15 amperes.
11. Never push objects of any kind into this unit through the case ventilation slots, as they may touch dangerous voltage points or short out parts that could result in risk of fire or electric shock. Never spill liquid of any kind onto or into this unit.
12. Except as specifically explained elsewhere in this manual, do not attempt to service this product yourself. Opening or removing covers that are marked "Do Not Remove" may expose you to dangerous voltage points or other risks, and will void your warranty. Refer all service issues to qualified service personnel.
13. Unplug this product from the wall outlet and refer to qualified service personnel under the following conditions:
 - a. When the power cord is damaged or frayed;
 - b. When liquid has spilled into the unit;
 - c. When the product has been exposed to rain or water;
 - d. When the product does not operate normally under normal operating conditions. Adjust only those controls that are covered by the operating instructions in this manual; improper adjustment of other controls may result in damage to the unit and may often require extensive work by a qualified technician to restore the unit to normal operation;
 - e. When the product has been dropped or the case has been damaged;
 - f. When the product exhibits a distinct change in performance, indicating a need for service.

Warranty

Datavideo warrants that the equipment it manufactures shall be free from defects in material and workmanship for a period of 12 months from the date of product purchase. If this equipment fails due to such defects, Datavideo will, at its option, repair or provide a replacement for the defective part or product. Equipment that fails after the warranty period, has been operated or installed in a manner other than that specified by Datavideo, or has been subjected to abuse or modification, will be repaired for time and material charges at the Buyer's expense.

This warranty does not affect your statutory rights within the Country of purchase.

Disposal



For EU Customers only - WEEE Marking

This symbol on the product indicates that it should not be treated as household waste. It must be handed over to the applicable take-back scheme for the recycling of Waste Electrical and Electronic Equipment. For more detailed information about the recycling of this product, please contact your local Datavideo office.

Packing List

Item No.	Description	Quantity
1	TBC-5000 Instruction Manual	1
2	TBC-5000 TBC & Matrix Switcher	1
3	Switching Adaptor DC 12V/1.5A	1

TBC-5000 Features

- 4 Channel TBC & 4:2:2 Frame Synchroniser.
- Selectable Video Matrix output settings of 4 in 4 out (4/4), 4 in 2 out (4/2) and 4 in 1 out (4/1).
- Accepts Studio/Genlock Sync input on BNC and can pass that sync on via BNC to other equipment.
- A choice of up to 4 Composite (CV on BNC) or S-Video (Y/C on 4pin mini din) inputs and outputs.
- Dip switch channel selections for Automatic Gain Control and VTR signal revision.
- 4 Back lit Front Panel Source Selection buttons for switching sources in 4/1 or 4/2 modes.
- Can be set as Master or Slave to another TBC-5000 via 3.5mm Jack to Jack GPI control cable.
- Unit can be set to operate in PAL or NTSC environments (see dip switches 1 & 2).

Please note: the TBC-5000 cannot convert from PAL to NTSC or vice versa.

Product Overview

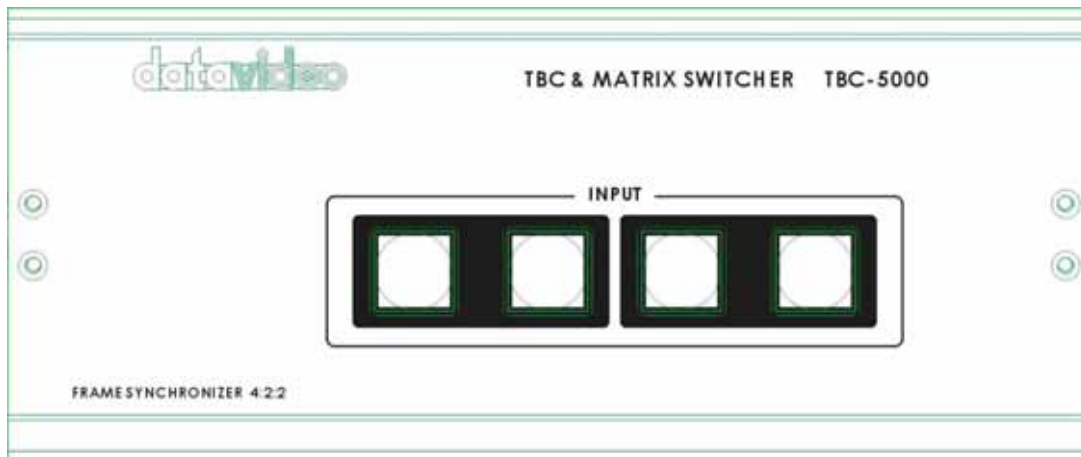
The Datavideo TBC-5000 is a compact and flexible 4 channel Time Base Corrector and Matrix Switcher. It is perfect for small studio set ups and simple switching applications where video signals may need to be stabilised and or synchronised.

The Datavideo TBC-5000 is designed to accept either composite (BNC) or S-Video (Y/C) inputs and replace poor Time Base signals or Sync Track errors in videotape playback. It can also be used to allow synchronisation of up to four asynchronous video signals when used with a House Sync, Genlock or Black Burst Signal Generator.

The TBC-5000 is ideal for use in set ups with other products such as the Datavideo DVK-100 stand alone Chromakey solution or with an Analogue to Digital converter or an Analogue Video capture card.

Functions

TBC-5000 Front Panel

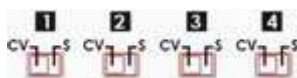
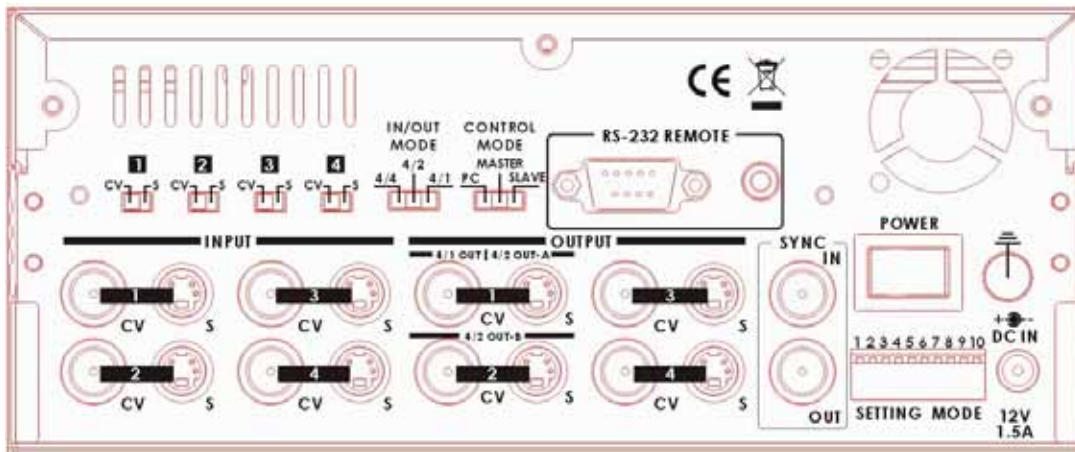


Input Selection Buttons.

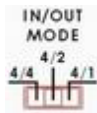
The selected Input will be illuminated red.

Select between 1~4 Input source.

TBC-5000 Rear Panel



The input select switches can be set to CV (Composite Video) or S (S-Video (Y/C)).



Use this switch to set input/output mode: 4/4, 4/2 and 4/1 for matrix switcher application.

4/4 Mode: Ch1~4 input straight pass through to Ch1~4 output.

4/2 Mode: Ch1 input to Ch1 output (when front panel set Ch1)

Ch2 input to Ch1 output (when front panel set Ch2)

Ch3 input to Ch2 output (when front panel set Ch1)

Ch4 input to Ch2 output (when front panel set Ch2)

4/1 Mode: Ch1~4 input to Ch1 output.



PC Mode

Select PC mode to update Firmware via RS-232 9pin Sub D serial port.

MASTER / SLAVE

Assign TBC-5000 as Master or Slave when linked to a second TBC-5000 the Slave unit will follow the actions of the Master unit.

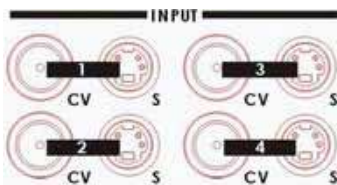
RS-232 (Select PC mode)

9-pin Sub D serial port standard RS-232 interface. Connect PC to update firmware.



3.5mm GPI jack (Select Master or Slave)

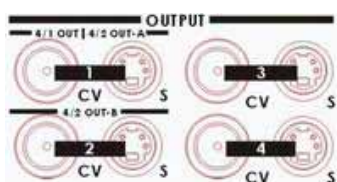
Using a 3.5mm GPI jack to jack cable you can have limited control of two TBC-5000 units from the Master units Front Panel.



Composite (BNC) and S-Video (Y/C) IN

Composite and S-Video inputs for connecting Analogue Video devices / loop through confidence monitors such as the TLM-702 to the TBC-5000.


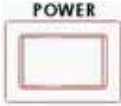



Both Composite and S-Video can be connected without any conflict.



Composite (BNC) and S-Video (Y/C) OUT

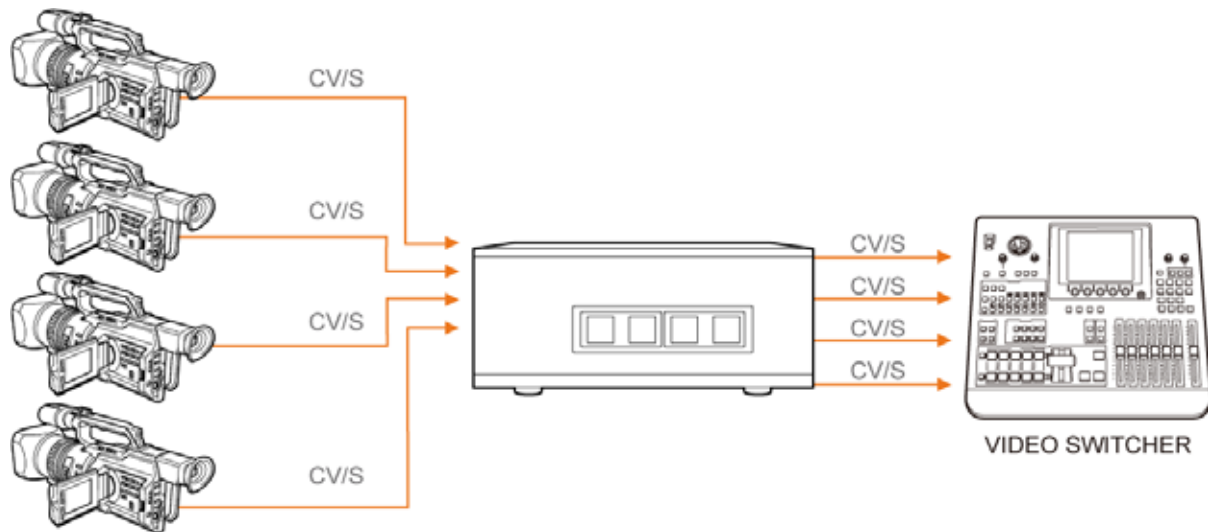
Composite and S-Video outputs for connecting Analogue Video devices / monitors to the TBC-5000.

Both Composite and S-Video can be connected without any conflict.

 <p>Diagram showing two circular ports. The top port is labeled 'SYNC IN' and the bottom port is labeled 'OUT'.</p>	<p>External Gen-Lock Sync Input & Output (BNC loop through)</p> <p>The TBC-5000 will lock on to the input sync signal supplied and use this for synchronization of the connected inputs.</p> <p>The TBC-5000 will also output the supplied sync signal for connection to other equipment.</p>																				
 <p>Diagram of a rectangular power switch with the word 'POWER' above it.</p>	<p>Power On/Off Switch</p> <p>Switches power to the unit On / Off</p>																				
 <p>Diagram of a row of 10 DIP switches, numbered 1 through 10. Below the switches is the text 'SETTING MODE'.</p>	<p>Dip Switches / Mode Select</p> <p>AGC: Automatic Gain Control (channel 1~4)</p> <p>VTR: Revision picture quality when VHS source in (channel 1~4).</p> <table border="1" data-bbox="600 730 1461 864"> <tr> <th>1</th> <th>2</th> <th>3</th> <th>4</th> <th>5</th> </tr> <tr> <td>PAL/NTSC</td> <td>PAL 50/60Hz</td> <td>AGC1</td> <td>VTR1</td> <td>AGC2</td> </tr> <tr> <th>6</th> <th>7</th> <th>8</th> <th>9</th> <th>10</th> </tr> <tr> <td>VTR2</td> <td>AGC3</td> <td>VTR3</td> <td>AGC4</td> <td>VTR4</td> </tr> </table> <p>Note: Reboot the TBC-5000 if you have changed a DIP Switch position</p>	1	2	3	4	5	PAL/NTSC	PAL 50/60Hz	AGC1	VTR1	AGC2	6	7	8	9	10	VTR2	AGC3	VTR3	AGC4	VTR4
1	2	3	4	5																	
PAL/NTSC	PAL 50/60Hz	AGC1	VTR1	AGC2																	
6	7	8	9	10																	
VTR2	AGC3	VTR3	AGC4	VTR4																	
 <p>Diagram of a grounding terminal symbol, consisting of a circle with a vertical line and a horizontal bar at the top.</p>	<p>Grounding Terminal</p> <p>When connecting this unit to any other component, make sure that it is properly grounded by connecting this terminal to an appropriate point. When connecting, use the socket and be sure to use wire with a cross-sectional area of at least 1.0 mm.</p>																				
 <p>Diagram of a DC IN socket with a circular plug. Above the plug is a '+' sign and below it is a '-' sign. Below the plug is the text '12V 1.5A'.</p>	<p>DC In Socket</p> <p>Connect the supplied 12V 1.5A PSU to this socket. The connection can be secured by screwing the outer fastening ring of the DC In plug to the socket.</p>																				

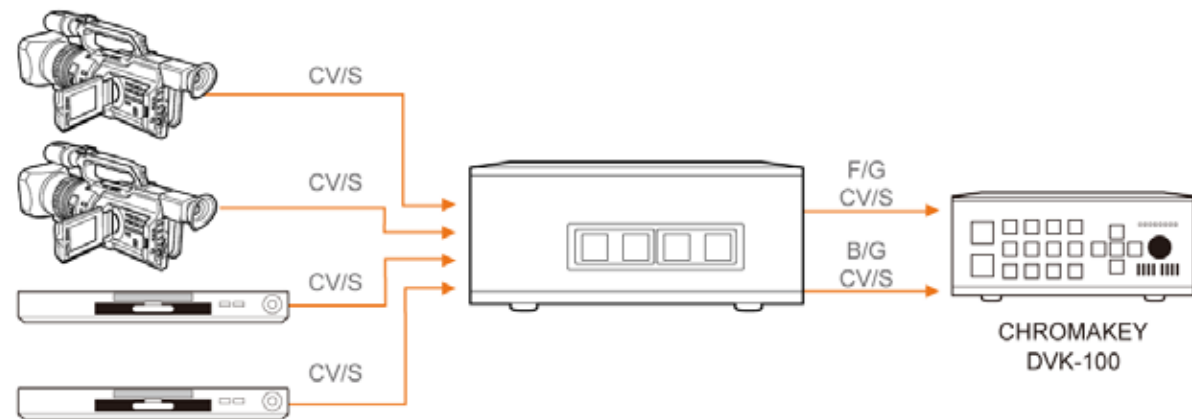
TBC-5000 Example Set Ups

4/4 mode – 4 in 4 out



4/4 mode fully utilises all 4 of the TBC-5000's inputs and outputs. All 4 front panel keys will be illuminated red. If 4 video signals are fed into the unit they are stabilised and synchronised but they cannot be switched within the unit. Input 1 is passed to output 1 only, input 2 is passed to output 2 only, 3 to 3...etc. Ideal if taking several VHS or tape based sources to an analogue video switcher or 4 independent pieces of AV equipment such as 4 separate DVD recorders.

4/2 mode – 4 in 2 out



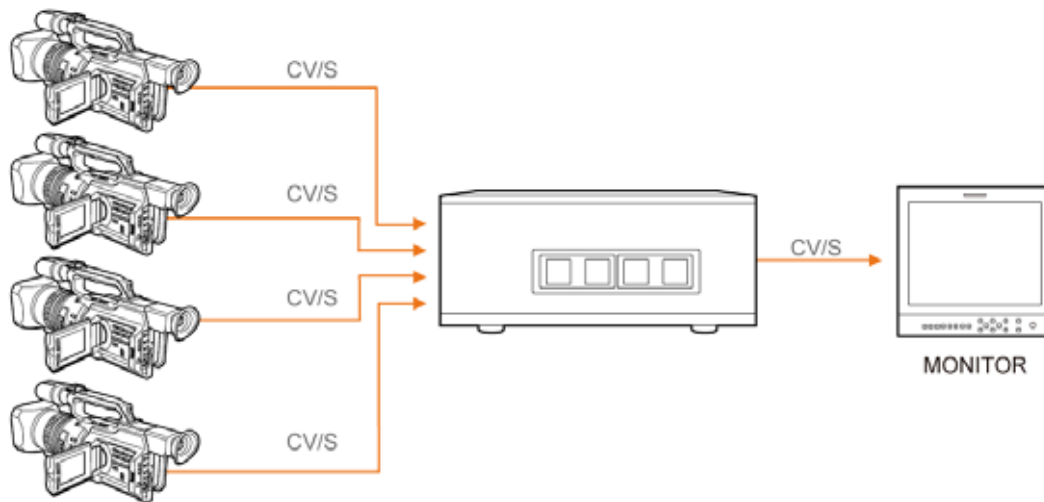
4/2 mode enables 4 analogue input sources to be stabilised and synchronised whilst also being paired for switching across 2 outputs. Only front panel keys 1 and 2 can be used to switch sources. The active key will be illuminated red.

When front panel button 1 is illuminated red, channel 1 input is sent to output channel 1 and, at the same time, channel 3 input is sent to output 2.

When front panel button 2 is illuminated red, channel 2 input is sent to output channel 1 and, at the same time, channel 4 input is sent to output 2.

Ideal for switching B-roll sources going into a vision mixer or changing live camera sources and B-roll backgrounds going into a DVK-100 Chromakey set up.

4/1 mode – 4 in 1 out



4/1 mode enables 4 analogue input sources to be stabilised and synchronised whilst selecting only one input to be distributed across all 8 video outputs.

Example : When button 1 is red, channel 1 input is sent to all 8 video outputs both Composite (CV) and S-Video (S).

Master / Slave – Dual Operation



PC Mode

Select PC mode to update Firmware via RS-232 9pin Sub D serial port.

MASTER / SLAVE

Assign TBC-5000 as Master or Slave when linked to a second TBC-5000 the Slave unit will follow the actions of the Master unit.

RS-232 (Select PC mode)

9-pin Sub D serial port standard RS-232 interface.
Connect PC to update firmware.

3.5mm GPI jack (Select Master or Slave)

Using a 3.5mm GPI jack to jack cable you can have limited control of two TBC-5000 units from the Master units Front Panel.

Please note: Master / Slave or dual operation is only possible when you have two TBC-5000 units and an appropriate 3.5mm Jack to Jack GPI cable connected between both units.

A TBC-5000 unit set as Master can only control one TBC-5000 unit set as Slave. Only the front panel on the Master unit controls the switching on both Master and Slave unit.

Both Master and Slave units have to be in the same mode and video standard at start up, either 4/1 mode or 4/2 mode and both units set to PAL or both units set to NTSC.

These modes will perform as described in the previous 4/1 and 4/2 mode example set ups only more sources can be connected and more outputs supplied.

TBC-5000 Master Jack / GPI

Tip = RX
Ring = TX
Sleeve = Earth

TBC-5000 Slave Jack / GPI

Tip = TX
Ring = RX
Sleeve = Earth

Specifications

Video inputs	Y/C & Composite compliant to CCIR601 NTSC & PAL
Video Outputs	Y/C & Composite
Video Spec	<p>Composite Video: 75Ω 1.0 V p-p S-Video (Y/C): 4 Pin Mini Din 75Ω Y: 1.0 V p-p, C: 0.627 mV p-p Bandwidth: > 5.0MHz Differential of Gain (DG) < 3% Differential of Phase (DP) < 3°</p>
Others	<p>Matrix switcher for 4/4, 4/2, 4/1 input/output Matrix switcher for PC / master / slave mode select RS-232 protocol for Connect PC Gen-Lock input & output (External Gen-Lock pass through) 3.5mm phone jack for cascade AGC / VTR function include</p>
Dimension	211mm (W) x 219mm (H) x 88mm (D)
Weight	3 Kg
Power	DC 12V / 1.5A

Appendix A : TBC-5000 RS-232 Protocol

TBC-5000 input channel to output channel switching control

The PC communicates to the TBC-5000 device via a COM port with the following parameters:

38,400 Baud
1 stop bit
No parity control

The input channels are switched to the output channels by means of 2 instruction strings from the PC. The TBC-5000 device must answer both instruction strings.

1st Instruction String from the PC will be :

0xE2, 0xE4, 0x00, 0x03, 0x16, 0x00, 0xFF, 0x10

The TBC-5000 device MUST answer to the 1st Instruction String with :

0xE2, 0xE4, 0x00, 0x00, 0xFC

2nd Instruction String from the PC will be one of 256 possible strings:

You do not need to use all 256 just identify and use the one you require.

The 5th byte in the 2nd instruction string (i.e. the byte changing 0x00 thru 0xFF sequentially on the following 2 pages) sets the switching mode and is interpreted by the device the following way:

bit[7,6] – input channel number switched to the output 3
bit[5,4] – input channel number switched to the output 2
bit[3,2] – input channel number switched to the output 1
bit[1,0] – input channel number switched to the output 0

For example: 0xE2, 0xE4, 0x07, 0x01, 0xE4, 0xE1

The 5th byte 0xE4 (11100100 binary) would mean output 0 connected to the input channel 0, output 1 to the input channel 1, output 2 to the input channel 2, output 3 to the input channel 3.

Another example: 0xE2, 0xE4, 0x07, 0x01, 0x1B, 0xD4

The 5th byte 0x1B (00011011 binary) would mean output 0 connected to the input channel 3, output 1 to the input channel 2, output 2 to the input channel 1, output 3 to the input channel 0.

The TBC-5000 device MUST answer to the 2nd Instruction String with :

0xE2, 0xE4, 0x07, 0x00, 0x92

NOTE: If any of the TBC-5000 device answers do not match the above example device answers then the PC should repeat the two Instruction Strings again.

If the switching state needs to be changed then another two corresponding Instruction Strings must be sent by the PC to the TBC-5000 device.

Possible 2nd Strings sent from PC to the TBC-5000 device

- 1) 0xE2, 0xE4, 0x07, 0x01, 0x00, 0x69
- 2) 0xE2, 0xE4, 0x07, 0x01, 0x01, 0x37
- 3) 0xE2, 0xE4, 0x07, 0x01, 0x02, 0xD5
- 4) 0xE2, 0xE4, 0x07, 0x01, 0x03, 0x8B
- 5) 0xE2, 0xE4, 0x07, 0x01, 0x04, 0x08
- 6) 0xE2, 0xE4, 0x07, 0x01, 0x05, 0x56
- 7) 0xE2, 0xE4, 0x07, 0x01, 0x06, 0xB4
- 8) 0xE2, 0xE4, 0x07, 0x01, 0x07, 0xEA
- 9) 0xE2, 0xE4, 0x07, 0x01, 0x08, 0xAB
- 10) 0xE2, 0xE4, 0x07, 0x01, 0x09, 0xF5
- 11) 0xE2, 0xE4, 0x07, 0x01, 0x0A, 0x17
- 12) 0xE2, 0xE4, 0x07, 0x01, 0x0B, 0x49
- 13) 0xE2, 0xE4, 0x07, 0x01, 0x0C, 0xCA
- 14) 0xE2, 0xE4, 0x07, 0x01, 0x0D, 0x94
- 15) 0xE2, 0xE4, 0x07, 0x01, 0x0E, 0x76
- 16) 0xE2, 0xE4, 0x07, 0x01, 0x0F, 0x28
- 17) 0xE2, 0xE4, 0x07, 0x01, 0x10, 0xF4
- 18) 0xE2, 0xE4, 0x07, 0x01, 0x11, 0xAA
- 19) 0xE2, 0xE4, 0x07, 0x01, 0x12, 0x48
- 20) 0xE2, 0xE4, 0x07, 0x01, 0x13, 0x16
- 21) 0xE2, 0xE4, 0x07, 0x01, 0x14, 0x95
- 22) 0xE2, 0xE4, 0x07, 0x01, 0x15, 0xCB
- 23) 0xE2, 0xE4, 0x07, 0x01, 0x16, 0x29
- 24) 0xE2, 0xE4, 0x07, 0x01, 0x17, 0x77
- 25) 0xE2, 0xE4, 0x07, 0x01, 0x18, 0x36
- 26) 0xE2, 0xE4, 0x07, 0x01, 0x19, 0x68
- 27) 0xE2, 0xE4, 0x07, 0x01, 0x1A, 0x8A
- 28) 0xE2, 0xE4, 0x07, 0x01, 0x1B, 0xD4
- 29) 0xE2, 0xE4, 0x07, 0x01, 0x1C, 0x57
- 30) 0xE2, 0xE4, 0x07, 0x01, 0x1D, 0x09
- 31) 0xE2, 0xE4, 0x07, 0x01, 0x1E, 0xEB
- 32) 0xE2, 0xE4, 0x07, 0x01, 0x1F, 0xB5
- 33) 0xE2, 0xE4, 0x07, 0x01, 0x20, 0x4A
- 34) 0xE2, 0xE4, 0x07, 0x01, 0x21, 0x14
- 35) 0xE2, 0xE4, 0x07, 0x01, 0x22, 0xF6
- 36) 0xE2, 0xE4, 0x07, 0x01, 0x23, 0xA8
- 37) 0xE2, 0xE4, 0x07, 0x01, 0x24, 0x2B
- 38) 0xE2, 0xE4, 0x07, 0x01, 0x25, 0x75
- 39) 0xE2, 0xE4, 0x07, 0x01, 0x26, 0x97
- 40) 0xE2, 0xE4, 0x07, 0x01, 0x27, 0xC9
- 41) 0xE2, 0xE4, 0x07, 0x01, 0x28, 0x88
- 42) 0xE2, 0xE4, 0x07, 0x01, 0x29, 0xD6
- 43) 0xE2, 0xE4, 0x07, 0x01, 0x2A, 0x34
- 44) 0xE2, 0xE4, 0x07, 0x01, 0x2B, 0x6A
- 45) 0xE2, 0xE4, 0x07, 0x01, 0x2C, 0xE9
- 46) 0xE2, 0xE4, 0x07, 0x01, 0x2D, 0xB7
- 47) 0xE2, 0xE4, 0x07, 0x01, 0x2E, 0x55
- 48) 0xE2, 0xE4, 0x07, 0x01, 0x2F, 0x0B
- 49) 0xE2, 0xE4, 0x07, 0x01, 0x30, 0xD7
- 50) 0xE2, 0xE4, 0x07, 0x01, 0x31, 0x89
- 51) 0xE2, 0xE4, 0x07, 0x01, 0x32, 0x6B
- 52) 0xE2, 0xE4, 0x07, 0x01, 0x33, 0x35
- 53) 0xE2, 0xE4, 0x07, 0x01, 0x34, 0xB6
- 54) 0xE2, 0xE4, 0x07, 0x01, 0x35, 0xE8
- 55) 0xE2, 0xE4, 0x07, 0x01, 0x36, 0x0A
- 56) 0xE2, 0xE4, 0x07, 0x01, 0x37, 0x54
- 57) 0xE2, 0xE4, 0x07, 0x01, 0x38, 0x15
- 58) 0xE2, 0xE4, 0x07, 0x01, 0x39, 0x4B
- 59) 0xE2, 0xE4, 0x07, 0x01, 0x3A, 0xA9
- 60) 0xE2, 0xE4, 0x07, 0x01, 0x3B, 0xF7
- 61) 0xE2, 0xE4, 0x07, 0x01, 0x3C, 0x74
- 62) 0xE2, 0xE4, 0x07, 0x01, 0x3D, 0x2A
- 63) 0xE2, 0xE4, 0x07, 0x01, 0x3E, 0xC8
- 64) 0xE2, 0xE4, 0x07, 0x01, 0x3F, 0x96
- 65) 0xE2, 0xE4, 0x07, 0x01, 0x40, 0x2F
- 66) 0xE2, 0xE4, 0x07, 0x01, 0x41, 0x71
- 67) 0xE2, 0xE4, 0x07, 0x01, 0x42, 0x93
- 68) 0xE2, 0xE4, 0x07, 0x01, 0x43, 0xCD
- 69) 0xE2, 0xE4, 0x07, 0x01, 0x44, 0x4E
- 70) 0xE2, 0xE4, 0x07, 0x01, 0x45, 0x10
- 71) 0xE2, 0xE4, 0x07, 0x01, 0x46, 0xF2
- 72) 0xE2, 0xE4, 0x07, 0x01, 0x47, 0xAC
- 73) 0xE2, 0xE4, 0x07, 0x01, 0x48, 0xED
- 74) 0xE2, 0xE4, 0x07, 0x01, 0x49, 0xB3
- 75) 0xE2, 0xE4, 0x07, 0x01, 0x4A, 0x51
- 76) 0xE2, 0xE4, 0x07, 0x01, 0x4B, 0x0F
- 77) 0xE2, 0xE4, 0x07, 0x01, 0x4C, 0x8C
- 78) 0xE2, 0xE4, 0x07, 0x01, 0x4D, 0xD2
- 79) 0xE2, 0xE4, 0x07, 0x01, 0x4E, 0x30
- 80) 0xE2, 0xE4, 0x07, 0x01, 0x4F, 0x6E
- 81) 0xE2, 0xE4, 0x07, 0x01, 0x50, 0xB2
- 82) 0xE2, 0xE4, 0x07, 0x01, 0x51, 0xEC
- 83) 0xE2, 0xE4, 0x07, 0x01, 0x52, 0x0E
- 84) 0xE2, 0xE4, 0x07, 0x01, 0x53, 0x50
- 85) 0xE2, 0xE4, 0x07, 0x01, 0x54, 0xD3
- 86) 0xE2, 0xE4, 0x07, 0x01, 0x55, 0x8D
- 87) 0xE2, 0xE4, 0x07, 0x01, 0x56, 0x6F
- 88) 0xE2, 0xE4, 0x07, 0x01, 0x57, 0x31
- 89) 0xE2, 0xE4, 0x07, 0x01, 0x58, 0x70
- 90) 0xE2, 0xE4, 0x07, 0x01, 0x59, 0x2E
- 91) 0xE2, 0xE4, 0x07, 0x01, 0x5A, 0xCC
- 92) 0xE2, 0xE4, 0x07, 0x01, 0x5B, 0x92
- 93) 0xE2, 0xE4, 0x07, 0x01, 0x5C, 0x11
- 94) 0xE2, 0xE4, 0x07, 0x01, 0x5D, 0x4F
- 95) 0xE2, 0xE4, 0x07, 0x01, 0x5E, 0xAD
- 96) 0xE2, 0xE4, 0x07, 0x01, 0x5F, 0xF3
- 97) 0xE2, 0xE4, 0x07, 0x01, 0x60, 0x0C
- 98) 0xE2, 0xE4, 0x07, 0x01, 0x61, 0x52
- 99) 0xE2, 0xE4, 0x07, 0x01, 0x62, 0xB0
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- 112) 0xE2, 0xE4, 0x07, 0x01, 0x6F, 0x4D
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- 119) 0xE2, 0xE4, 0x07, 0x01, 0x76, 0x4C
- 120) 0xE2, 0xE4, 0x07, 0x01, 0x77, 0x12
- 121) 0xE2, 0xE4, 0x07, 0x01, 0x78, 0x53
- 122) 0xE2, 0xE4, 0x07, 0x01, 0x79, 0x0D
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- 125) 0xE2, 0xE4, 0x07, 0x01, 0x7C, 0x32
- 126) 0xE2, 0xE4, 0x07, 0x01, 0x7D, 0x6C
- 127) 0xE2, 0xE4, 0x07, 0x01, 0x7E, 0x8E
- 128) 0xE2, 0xE4, 0x07, 0x01, 0x7F, 0xD0
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