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MODEL DEC1000R5

ADVS® COMPATIBLE COMPRESSED DIGITAL VIDEO DECODER

User Manual

Manual Part No.
DEC1000R0500MAN

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- Printing History -

DEC1000R0500MAN - September, 1996
DEC1000R0500MAN - January, 1997
DEC1000R0500MAN - April, 1997
DEC1000R0500MAN - October, 1997
DEC1000R0500MAN - December, 1997
DEC1000R0500MAN - JUNE, 1998
DEC1000R0500MAN - September, 1998
DEC1000R0500MAN - December, 2000
Revised – **DEC1000R0500MAN** – December 22, 2004

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Chapter 1 Introduction

About This Manual

This manual is a user guide for the DEC1000R5, a member of Enerdyne's family of ADVS® compatible video decoders designed for a variety of surveillance applications. The DEC1000R5 is a standard 19-inch rack mounting unit requiring 115 VAC power. See Figure 1-1.

This manual contains the information needed to install, operate, and maintain the DEC1000R5 decoder. If you have any questions or problems that cannot be resolved using this manual, feel free to call Customer Support any time at 619-438-6000 for help.

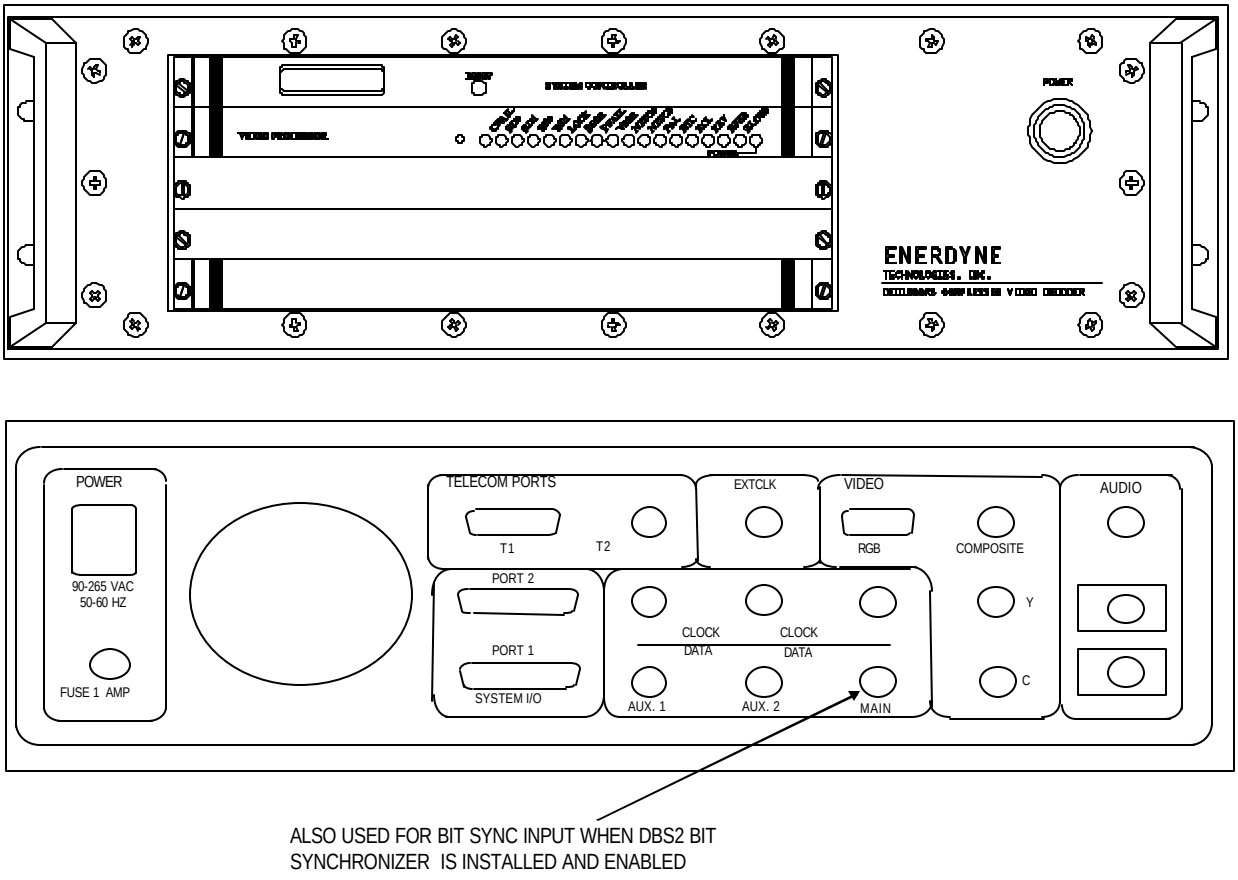


Figure 1-1 DEC1000R5 Decoder Front and Rear Panels

Theory of Operation

DEC1000R5 Decoder Functional Description

The DEC1000R5 decoder decompresses digital video data and converts the digital video into an analog signal output in any of the formats listed in Table 1-1. The input data stream is the compressed video output from an ADVS® compatible video encoder (such as the ENC1000R5). An optional multiplexer (DMUX1000) strips away asynchronous data (PCM, audio, EIA-232) that has been multiplexed into the data stream by the encoder and outputs these data separately from the video. The decoder and the optional multiplexer are controlled via the EIA-232 control port using a dumb terminal or a PC with a terminal emulation program.

Table 1-1 Analog Video Input Formats

COLOR	Monochrome
NTSC Composite	EIA170
PAL Composite	CCIR
Y/C	

Compressed video and clock signals may be connected to the decoder inputs as shown in Figure 1-2. When the DMUX option is not installed, the compressed video input and clock input is normally factory configured as TTL, and is optionally available as EIA-422. When the DMUX option is installed, the compressed video input and clock input can be software selected as either TTL or EIA-422. If the incoming data stream includes data packets other than video (PCM, audio, or EIA-232) that have been multiplexed in with the video, then the decoder must be equipped with the DMUX1000 multiplexer which separates the non-video packets from the video and outputs the different data types on separate outputs. The serial video data is then converted to parallel data and decompressed. Finally, the digital video is converted to an analog signal for display or recording. The BTC1000 Burst-To-Continuous PCM Converter is now a standard feature of the DEC1000R5. Please consult Appendix C for Operator Instructions.

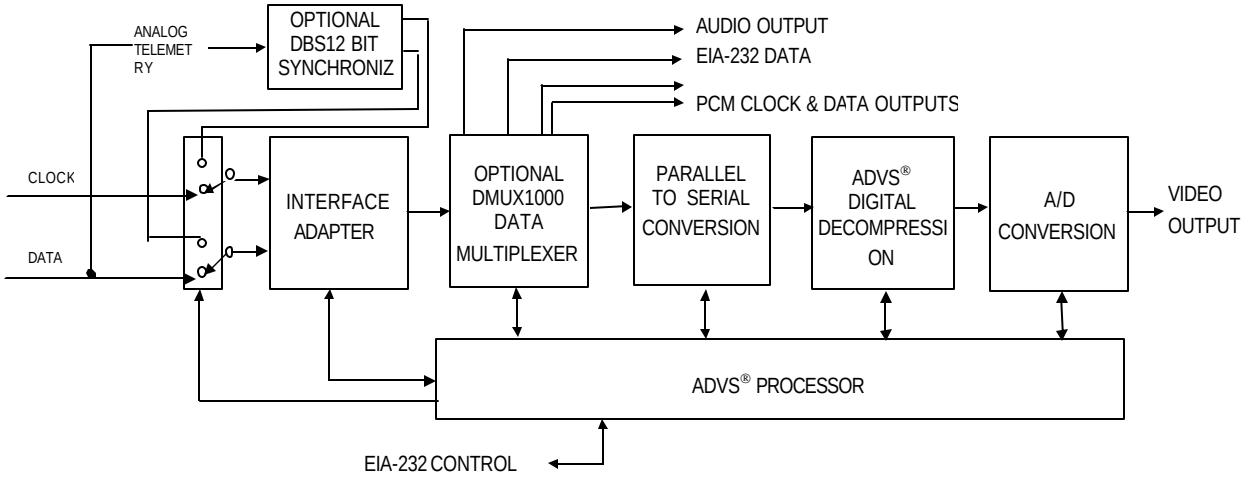


Figure 1-2 DEC1000R5 Decoder Functional Block Diagram

DMUX1000 Data Multiplexer Option

The DMUX1000 Data Multiplexer de-multiplexes the data that has been combined with the compressed video stream by the ADVS® encoder (Figure 1-3) and outputs the data on separate user accessible ports. The system can combine compressed video, audio, asynchronous digital, and synchronous digital data into one transmission over any digital transmission facility. The audio data channel output is a 1 Vp-p, 600 ohm audio signal with a frequency response of 300 Hz to 3000 Hz. The simplex asynchronous data channel is an EIA-232 interface and is user programmable from 300 baud to 9600 baud in five steps. The PCM synchronous data channel outputs PCM data and clock. PCM output level is EIA-422 or TTL. The user supplied PCM clock rate may be as high as 49% of the total transmission link frequency. Additionally, a Forward Error Correction (FEC) feature is available for systems using wireless transmission.

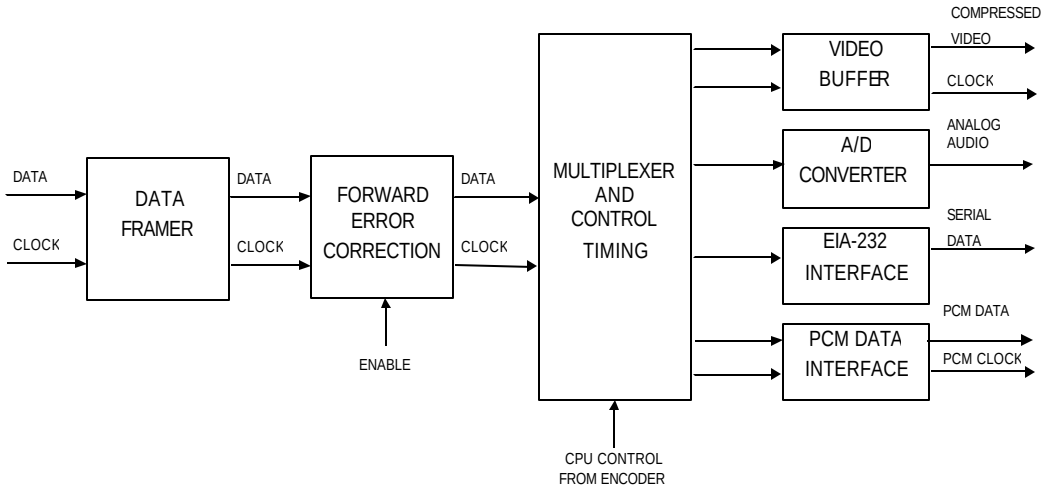


Figure 1-3 DMUX1000 Data Multiplexer Functional Block Diagram

FEC allows the user to transmit data in a noisy environment by correcting a number of bit errors received at the ground site. The scheme used by Enerdyne is a Reed-Solomon based algorithm. The encoder applies a Reed-Solomon algorithm that generates check bytes for a transmission message. The check bytes and message data form an error correcting code word that can be transmitted over noisy transmission media. The decoder at the receiving end of the line uses the check bytes to detect and correct any errors that are introduced by line noise into the transmitted code word. If used, FEC must be selected at both the encoder and decoder.

Typical Application

Figure 1-4 shows an example of a typical user installation for the DEC1000R5. Various configurations are possible and are dependent on user requirements and equipment. If you require assistance configuring your system, call Customer Support at 619-438-6000.

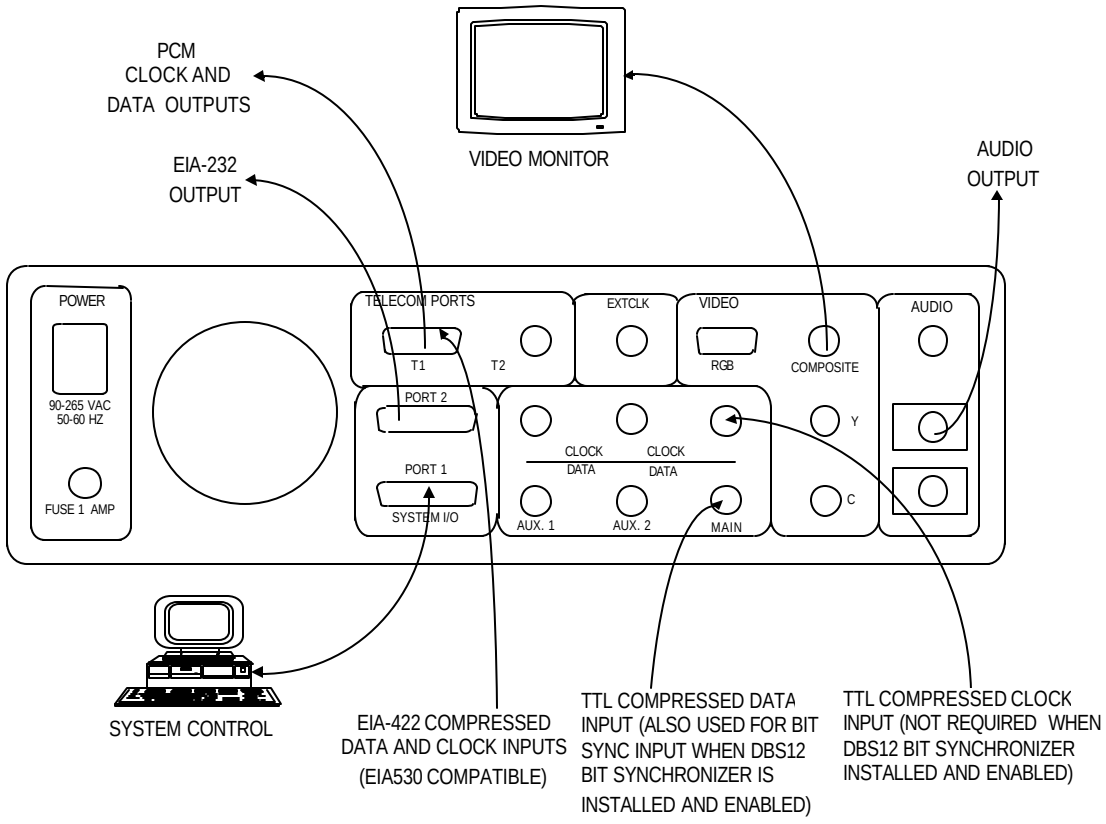


Figure 1-4. Typical Application for DEC1000R5 with DMUX1000 Option

DEC1000R5 Specifications

ELECTRICAL	
Video Outputs	NTSC Composite or Y/C, 1 Vp-p, 75 Ohm, 60 Hz PAL Composite or Y/C, 1 Vp-p, 75 Ohm, 50 Hz CCIR Monochrome, 1 Vp-p, 75 Ohm, 50 Hz EIA170 Monochrome, 1 Vp-p, 75 Ohm, 60 Hz
Video Output Connectors	BNC type isolated ground (3)
Horizontal Resolution	560, 280 or 140 pixels/line, User Selectable
Vertical Resolution	240 lines/field digitized, 480 lines/frame 60 Hz 288 lines/field digitized, 576 lines/frame 50 Hz
Data & Clock Input Rates	Internal source: 19 Kbps to 20 Mbps* External Source - any rate up to 20 Mbps*
Data & Clock Input Connections	Standard or with EMUX/DMUX option: BNC type isolated ground or optional EIA-422 (EIA530 Compatible)
Power	115 VAC
MECHANICAL	
Dimensions	19-inch rack width, 5.25 in. (3U) high, 10” deep
Weight	15 lbs.
Enclosure Materials	5052 aluminum, stainless steel hardware.
ENVIRONMENTAL	
Operational Temperature	0°C to +50°C normal range (opt. -20°C to +70°C)
Non-Operating Temperature	-55°C to +85°C
Humidity	95% maximum (non-condensing)

* 10 Mbps maximum with DMUX option installed

Chapter 2 Decoder Operation

Series 1000 Decoding Equipment

This chapter provides detailed explanations of each operating mode and option available for the DEC1000R5 ADVS® compatible Color Video Compression Decoder.

Software Interface

The decoder contains all communication software required to communicate with terminal hardware. All the user needs to provide is a 'dumb' terminal operating at 9600 baud or a PC running terminal emulation software set for half duplex (local echo) mode.

Upon power-up, the decoder-to-terminal link will print the logon message followed by power-on test messages. This will be followed by the system prompt. A typical power-on (or reset) sequence on an decoder will display the following*:

```
ADVS ®  Decoder Firmware Rev 6.7 980520-1639/Xcpu6D26Dv.3*
LCA configured from EPROM.
DCT is setup.
Formatter is setup.
We are configured as an Decoder.
 Copyright 1993-98, Enerdyne Technologies, Inc.
The firmware checksum XXXX verified as correct.
```

* This is a typical power-on message sequence. The actual message varies depending upon your software revision and installed options.

The `checksum verified` message indicates that the EPROM and EEPROM checksums are correct. If an error message occurs here, execute the DEFAULT command to reset all parameters. If it still fails, contact the factory.

Following the power-up messages, the operating prompt is displayed as follows:

```
ADVS:\DECODER>
```

The prompt can be changed through the use of the prompt command. Refer to Chapter 2 for details.

There is *no* battery in the system. All software configuration values are stored in an EEPROM, and are retained through power-off/power-on cycles.

Using the Software Interface

Software interface commands consist of either a single word followed by carriage return (<CR>) or a single word followed by a space and an argument string followed by a carriage return. Upper *or* lower case is accepted. A carriage return (<CR>) is required at the end of each line. Commands can be entered only on lines that display the system prompt. Typing ahead is not allowed. If no system prompt appears, press ENTER to display the prompt. If the prompt still fails to appear, check all connections and ensure that the terminal is set to 9600 baud.

The following commands are in alphabetical order. Some commands have alternate names and abbreviations (in parenthesis) for your convenience. A Hexadecimal to Decimal conversion table is included in Appendix B. Where applicable, the default settings are identified by the word 'default' next to the appropriate character string.

AUTO on/off

This command enables (on) or disables (off) the automatic parameter loading (from the encoder) operation. When AUTO is on (normal operation) the decoder operational parameters are updated automatically by input from the encoder bit stream when the equivalent parameter has changed on the encoder.

BAUD nn

This command selects the baud rate for the serial communications port. The baud rate will change after the next reset cycle. Baud rates supported are as follows:

nn	rate
00	300 baud
01	300 baud
02	300 baud
03	19200 baud
04	1200 baud
05	2400 baud
06	4800 baud
07	9600 baud (default)

CAUTION

Communication with the serial port will be lost if an invalid baud rate is selected.

It is recommended that the baud rate be set to the highest rate supported by the terminal.

BSF nn

This command has no effect when the bit synchronizer option is not installed or enabled. When the bit synchronizer option is installed and enabled, this command sets the bit synchronizer input frequency. Valid frequencies are from 20 Mbps to 19 Kbps. Values of 00 to

7F select a fixed frequency. 'HELP 04' displays the list of valid entries. An external clock can be selected by entering a value of 0F. The available frequencies are as follows:

	0x	1x	2x	3x	4x	5x	6x	7x
x0	02.500	01.250	00.625	00.312	00.156	00.078	00.039	00.019
x1	02.666	01.333	00.666	00.333	00.166	00.083	00.041	00.020
x2	02.857	01.428	00.714	00.357	00.178	00.089	00.044	00.022
x3	03.076	01.538	00.769	00.384	00.192	00.096	00.048	00.024
x4	03.333	01.666	00.833	00.416	00.208	00.104	00.052	00.026
x5	03.636	01.818	00.909	00.454	00.227	00.113	00.056	00.028
x6	04.000	02.000	01.000	00.500	00.250	00.125	00.062	00.031
x7	04.444	02.222	01.111	00.555	00.277	00.138	00.069	00.034
x8	05.000	02.500	01.250	00.625	00.312	00.156	00.078	00.039
x9	05.714	02.857	01.428	00.714	00.357	00.178	00.089	00.044
xA	06.666	03.333	01.666	00.833	00.416	00.208	00.104	00.052
xB	08.000	04.000	02.000	01.000	00.500	00.250	00.125	00.062
xC	10.000	05.000	02.500	01.250	00.625	00.312	00.156	00.078
xD	13.333	06.666	03.333	01.666	00.833	00.416	00.208	00.104
xE	20.000	10.000	05.000	02.500	01.250	00.625	00.312	00.156
xF	-EXT-	UCM	10.000	05.000	02.500	01.250	00.625	00.312

DATE mm/dd/yy

This command sets the default date used by the system. The date is entered in the month/day/year format and does not increment. When power is lost or a reset happens the system date is set to the last date entered.

DATEON yx

This allows the user to overlay the current date onto the output video. The position is set by the 'y' argument in the vertical direction and the 'x' argument in the horizontal direction. A value of y=0 is the top of the screen and a value of y=C is the bottom of the screen. A value of x=0 is the left of the screen and a value of x=C is the right of the screen. Any HEX value between 0 and C is valid, however, one of the two parameters must be zero (0) to keep the date display on the edge of the screen, and (0,0) is not displayed (use 0,1 or 1,0 to display the date in the top left corner). A DATEON command must be preceded by a VCLR command to clear the display buffer.

DEFAULT nn (GET nn)

This command resets all of the internal EEPROM variables to one of the two factory default settings. After this command is executed, a reset (Z or RESET command) should be performed. Default values may be set to the following:

nn	**default variables**
00	Standard NTSC decoder with 560 pixels, 5 Mbps bit rate, quantization set to 18, tint, saturation, contrast, and brightness are set to default values.
01	Standard PAL decoder with 560 pixels, 5 Mbps bit rate, quantization set to 18 , tint, saturation, contrast, and brightness are set to default values.

To execute this command, the write protect mode must be disabled. Write protect is disabled by entering the PROTECT OFF command. NOTE: WHEN WRITE PROTECT IS DISABLED, CONFIGURATION DATA CAN BE CHANGED OR INVALID DATA CONDITIONS MAY BE ENTERED.

The PROTECT ON command is automatically executed after the reset command is entered. Consultation with the factory is recommended before any other changes are made with write-protect disabled.

ERROR nn

This command enables or disables the error handling hardware. This parameter *must* be the same for both encoder and decoder. A value of 00 disables the mode, a value of 01 enables the mode. If enabled, the unit will exhibit a much greater tolerance when decoding unrecoverable errors, but requires about 10% more bandwidth from the system as compared to the disabled mode. This command must be followed by a reset.

nn	**Status**
00	OFF
01	ON

ES nn

This command displays encoder status.

HELP or ?

This command invokes the main help screen. Secondary help screens can be invoked via the HELP nn commands. *If video sync is lost and regained while viewing the help screen, video at the monitor will not be restored until you exit the help screen.*

HELP nn

These are the secondary help screens. The valid range for nn is 00 to 04 HEX.

nn	**screen**
00	Baud Rates
01	Factory Assistance
02	Demux Card Option Byte Definitions
03	Binary to Hex Conversion Table
04	Bit sync frequencies
05	RS-232 Data channel baud rates

ID nn

This command enables the decoder to process received compressed video data packets with the selected video channel(s) identification code. The normal default value is 00. Ensure that both the encoder and the decoder are programmed to the same identification code (00 to 03) when processing a single video channel.

nn	**ID code**
00	Channel 1 on current video
01	Channel 2 on current video
02	Channel 3 on current video
03	Channel 4 on current video

MINIBAR yx

This allows the user to overlay a miniature colorbar pattern onto the decoder screen. A value of 00 or FF disables this mode. A value of y=0 is the top of the screen, with a value of y=C the bottom of the screen. A value of x=0 is the left of the screen, a value of x=C the right of the screen.

PROMPT aaaaaaaa

This command changes the system prompt. Up to eight characters can be accepted. Prompts entered using the PROMPT command will be retained through reset or power cycles.

RELOAD

This command forces the decoder to reload all parameters from the encoder.

RESET (Z)

This command reinitializes all parameters from EEPROM and resets all internal timing.

RGB

This command enables the RGB color processing mode for the optional RGB output. This command is active only if the RGB output option is installed.

NOTE

YCRCB is the default color processing mode for the optional RGB output.

S (STATUS)

This command displays all of the current operating modes that are stored in EEPROM. It also displays other current status and errors, if any.

SAVESCREEN

This command copies the entire overlay text screen into EEPROM. This will make a permanent copy of all graphics and messages that are reloaded every power cycle. This command also copies the time, date, and minibar if they are enabled before the savescreen is entered.

TCOLOR rrggbb

This command is used to select the color of the overlay text. The format is in RGB mode. Each of the rrggbb bytes selects how much of each color is to be used. 00 HEX is the minimum and FF HEX is the maximum. Example colors are listed below:

rrggbb	**color***

C00000	Red
00C000	Green
0000C0	Blue
C0C0C0	White
C0C000	Yellow
C000C0	Violet
00C0C0	Cyan

* Primary colors are at 75% intensity.

TEST nn

This command puts the system into VIDEO test mode. The system will display solid colors in accordance with the following table:

100% saturation		75% saturation		50% saturation		25% saturation	
nn	**color**	**nn**	**color**	**nn**	**color**	**nn**	**color**
00	black	08	black	10	black	18	black
01	red	09	red	11	red	19	red
02	green	0A	green	12	green	1A	green
03	blue	0B	blue	13	blue	1B	blue
04	yellow	0C	yellow	14	yellow	1C	yellow
05	cyan	0D	cyan	15	cyan	1D	cyan
06	violet	0E	violet	16	violet	1E	violet
07	white	0F	white	17	white	1F	white

The decoder also provides the following test patterns.

nn	**Test**
20	color bar
21	SMPTE color bar
22	grey bars

To return to normal operation after you are done with this test, a RESET or Z command must be entered.

TIME hh:mm:ss

This command sets the current system time. The time is entered in the 24 hour military format. When a reset or power failure occurs, system time is reset to 00:00:00. System time is also reset to 00:00:00 when system setup parameters such as Quantization and Resolution are changed.

TIMER yx

This command displays the system time at the location designated. The position is set by the 'y' argument in the vertical direction and the 'x' argument in the horizontal direction. A value of y=0 is the top of the screen and a value of y=C is the bottom of the screen. A value of x=0 is the left of the screen and a value of x=C is the right of the screen. Any HEX value between 0 and C is valid, however, one of the two parameters must be zero(0) to keep the timer display on the edge of the screen, and (0,0) is not displayed (use 0,1 or 1,0 to display the timer in the top left corner). A TIMER command must be preceded by a VCLR command to clear the display buffer.

NOTE: when operating in PAL format, the range is 0 to E in HEX.

TTEST

This command displays the overlay graphics plane character set on the screen. The screen is erased by entering the VCLR command.

V nn

This is the command used to display text as an overlay on the video screen. V 0n is used for left justified text and V 1n is used for centered text. For example, entering 'V 14 Mission #1' will display the words 'Mission #1' auto-centered on text line number 4. Entering V 14 with no text will erase that line. The text is displayed in the current color selected by the TCOLOR command. All of the text on the screen can be erased with the VCLR command. Upper and lower case is allowed. The character set can be viewed with the TTEST command. Overlay messages are lost during a power or reset sequence. The valid range of text line numbers is from 0 HEX to F HEX.

VCLR

This command erases all text from the text overlay plane. No other parameters are used.

YCRCB

This command enables the YCRCB color processing mode for the optional RGB output. This command is only active if the RGB output Option is installed.

NOTE

YCRCB is the default color processing mode for the optional RGB output.

YC on/off

This command toggles output BNCs J2 and J3 to YC outputs.

Option Commands

The DMUX1000 Data Demultiplexer is configured by enabling selected bits in four eight-bit option registers. This is done using the commands OPTION1, OPTION2, OPTION3, and OPTION4, described in Appendix A. However, in order to have a clear understanding of how to select the proper configuration, it is necessary to review the following rules and information.

Demultiplexer Overview

The multiplexer frames the encoder serial data output in a series of eight recurring time slots as shown in Figure 2-1. Each time slot may be configured to contain compressed video data and PCM, EIA-232 or audio data when FEC is not enabled. If FEC is enabled, time slot 8 is reserved for FEC. When the multiplexer is disabled, (**OPTION1 08**) all available transmission bandwidth is allocated to video. When the multiplexer is enabled, framing overhead consumes ≈7.7 % of the transmission link bandwidth. The maximum PCM rate is 50% of the transmission link bandwidth when audio, EIA-232, and FEC are not enabled. When any combination of audio, EIA-232 or FEC is enabled, the maximum PCM rate is 25% of the transmission link bandwidth. Refer to Table 2-1 for multiplexer bandwidth usage. Each group of eight time slots is 130 bits long regardless of link rate. Each time slot is 16 bits long with 2 framing bits at the start of time slot 1 (130 bits = (8 x 16) + 2). The allocation of time slots on the decoder must be identical to the allocation of time slots on the encoder. This allows the demultiplexer to synchronize time slots, and to identify the type of data contained in each time slot when a time slot is allocated for data. Rules for designating time slots are described in the following paragraphs. These rules are identical for the encoder and the decoder.

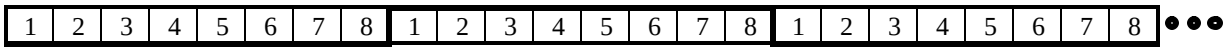


Figure 2-1 Encoder Serial Data Output Time Slot Sequencing

Audio Data Rules

Audio data will consume 64 Kbps of link bandwidth. Each time slot designated for audio will contain 8 bits of audio data if an audio packet is ready, otherwise compressed video will be inserted. If only audio data is being multiplexed with compressed video, all time slots should be designated audio slots. This will result in the highest audio quality at the decoder output. If audio and PCM or EIA-232 data are being multiplexed with compressed video, slots should be assigned on an interleaved basis (Figure 2-2) to ensure maximum audio quality.

1	2	3	4	5	6	7	8
AUDIO	PCM	EIA-232	AUDIO	PCM	EIA-232	AUDIO	PCM
PCM	AUDIO	EIA-232	PCM	AUDIO	EIA-232	PCM	FEC
AUDIO	PCM	AUDIO	PCM	AUDIO	PCM	AUDIO	PCM
PCM	AUDIO	PCM	AUDIO	PCM	EIA-232	PCM	FEC

Figure 2-2 Time Slot Interleaving Examples

Table 2-1 Multiplexer Bandwidth Usage

	Transmission Link Bandwidth Usage					
Configuration	PCM	AUDIO	RS232	FEC	VIDEO	MULTIPLEXER OVERHEAD
Video & PCM	≤50%	-	-	-	Remainder	7.7%
Video, PCM, Audio	≤25%	64Kbit	-	-	Remainder	7.7%
Video, PCM, Audio, RS232	≤25%	64Kbit	Baud Rate	-	Remainder	7.7%
Video+PCM+Audio+ RS232+FEC	≤25%	64Kbit	Baud Rate	11.5%	Remainder	7.7%
MUX Disabled (OPTION1 08)	-	-	-	-	100%	-

PCM Data Rules

Each time slot designated for PCM may contain up to 50% PCM data and the remaining bits will be compressed video. When FEC is not enabled, the PCM clock rate may be as high as 50% of the link rate, assuming the FEC, AUDIO, and EIA-232 data channels are not enabled

EIA-232 Data Rules

As with PCM and Audio data time slots, time slots designated for EIA-232 should be interleaved as shown in Figure 2-2. The baud rate (OPTION2 (bits 4-6) command) at the decoder must be set to one baud rate higher than at the encoder. The baud rate at the encoder and the decoder can be the same if there is at least one character delay between EIA-232 characters. EIA-232 data is fixed at eight bits with one start bit, one stop bit, and no parity. Each time slot designated as EIA-232 will contain one eight bit character. The remaining bits will be compressed video.

Chapter 3 Installation and Maintenance Procedures

Introduction

This chapter provides the information required to install and configure the DEC1000R5. This chapter also covers configuration information for the DEC1000R5 when equipped with the optional DMUX data mulitiplexer.

System Software Setup

Initial system software setup is performed on the bench using one of the following test and setup procedures. Refer to the equipment pinouts included in this chapter.

Test and Setup Using EIA530/422 Interface

Connect the encoder and decoder in accordance with Figure 3-1, using the desired test cable shown in Figure 3-2 and 3-3.

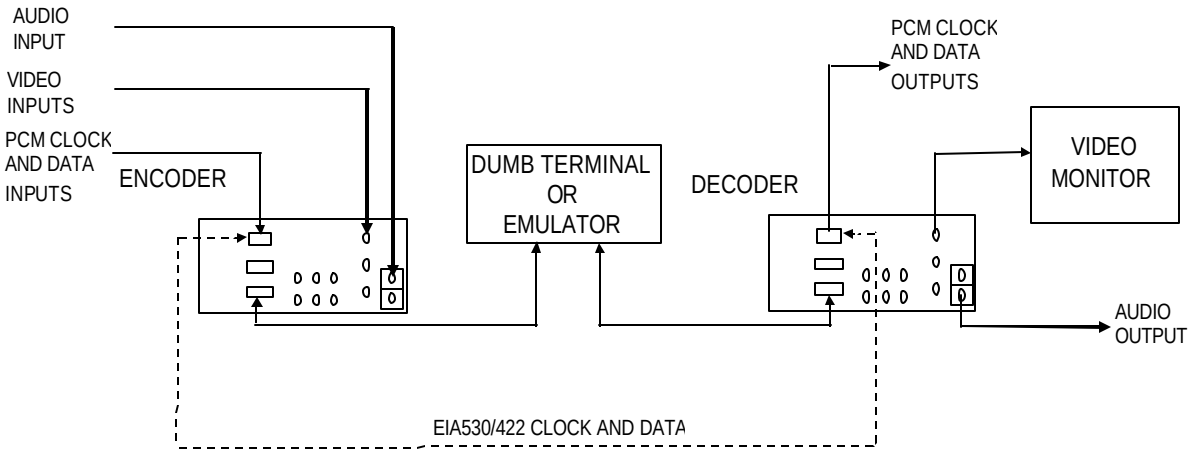


Figure 3-1. DEC1000R5 Test and Setup Configuration Using EIA530/422 Interface

The required interface test cable can be constructed as shown in Figures 3-2 and 3-3. Connector A as shown in Figure 3-2 or 3-3 must be attached to the encoder unit. An external encoder clock source may be attached as shown. If an external clock is used, the encoder must be configured for external clock by means of the CD command. Refer to encoder manual.

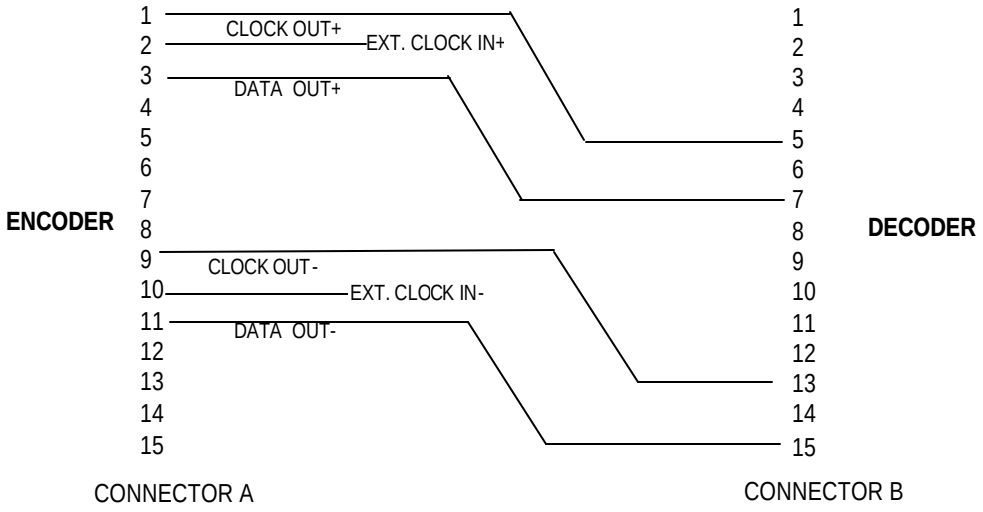


Figure 3-2: Interface Test Cable with DMUX Option

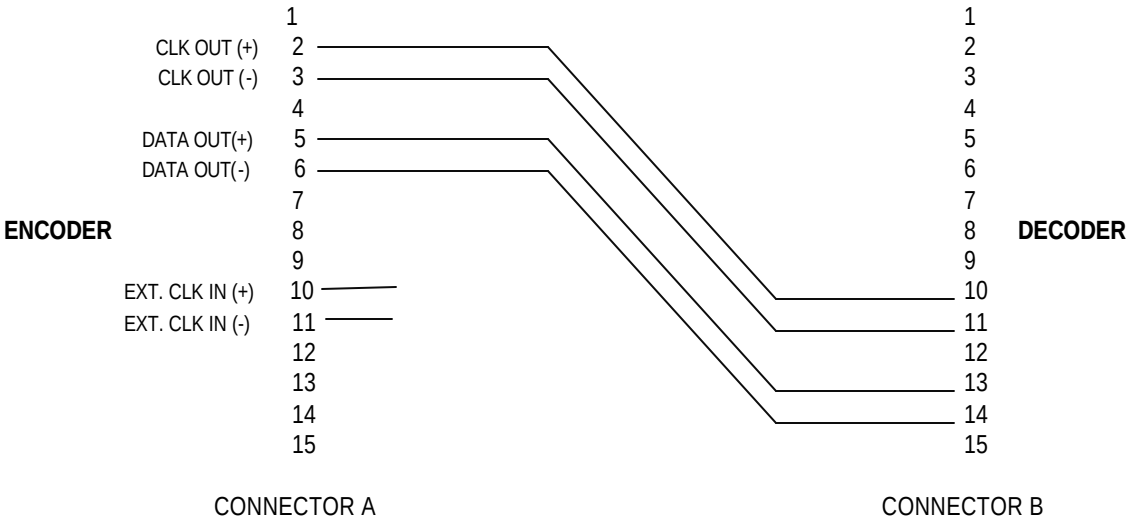


Figure 3.3: Interface Test Cable without DMUX Option.

All commands are entered on a dumb terminal or PC with terminal emulator software as described in Chapter 2. It is recommended that initial setup commands be invoked in the order in which they are presented in this section. Refer to Chapter 2 for decoder operation and commands.

Step 1- Initial power up.

Configure the test system as shown in Figure 3-1. The decoder must be supplied with 115 VAC power using the line cord provided. Power up the unit and ensure that the logon messages conform to the description in Chapter 2.

NOTE

Perform Step 2 only if DMUX1000 Data Multiplexer is installed.

Step 2 - Set DMUX option data and FEC commands.

Use the OPTION commands to configure data (audio, EIA-232 or PCM) and FEC options as described in Chapter 2 and Appendix A.

NOTE

It is recommended that the decoder be configured for data transmission using the OPTION commands before the data multiplexer is enabled via encoder OPTION1 command.

Test and Setup Using TTL Clock and Data Interface

Connect the encoder and decoder in accordance with Figure 3-4. Connect TTL clock and data using two 50-Ohm coax test cables as shown in Figure 3-4.

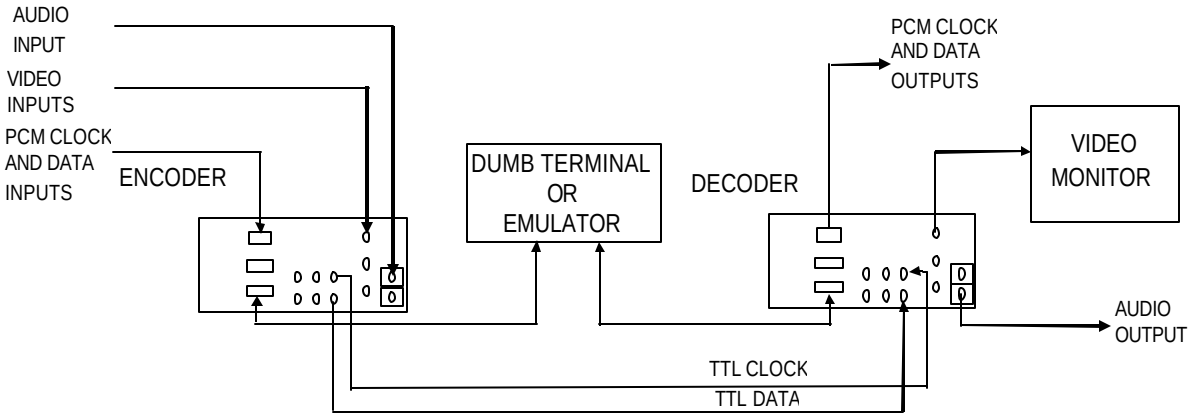


Figure 3-4 DEC1000R5 Test and Setup Configuration with TTL Clock and Data

Step 1- Initial power up.

Configure the test system as shown in Figure 3-4. The decoder must be supplied with 115 VAC power using the line cord provided. Power up the unit and ensure that the logon messages conform to the description in Chapter 2.

NOTE

Perform Step 2 only if DMUX1000 Data Multiplexer is installed.

Step 2 - Set DMUX option data and FEC commands.

Use the OPTION commands to configure data (audio, EIA-232 or PCM) and FEC options as described in Chapter 2 and Appendix A.

NOTE

It is recommended that the decoder be configured for data transmission using the OPTION commands before the data multiplexer is enabled via encoder OPTION1 command.

Test and Setup Using TTL Data and DBS12 Bit Synchronizer Interface

Connect the encoder and decoder in accordance with Figure 3-5. Connect TTL data using a 50-Ohm coax test cable as shown in Figure 3-5.

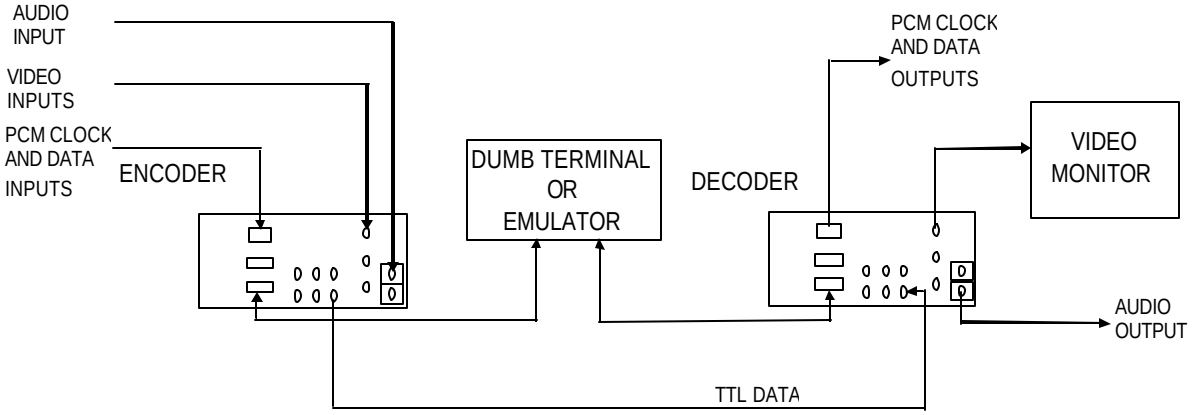


*Figure 3-5 DEC1000R5 Test and Setup Configuration with TTL Data and Bit Synchronizer**

*No Clock connection is required when Bit Sync is installed and enabled. Main Data BNC is also Bit Sync input.

Step 1- Initial power up.

Configure the test system as shown in Figure 3-5. The decoder must be supplied with 115 VAC power using the line cord provided. Power up the unit and ensure that the logon messages conform to the description in Chapter 2.

NOTE

Perform Step 2 only if DMUX1000 Data Multiplexer is installed.

Step 2 - Set DMUX option data and FEC commands.

Use the OPTION commands to configure data (audio, EIA-232 or PCM) and FEC options as described in Chapter 2 and Appendix A.

Step 3 - Use the OPTION1 command to enable the Bit Sync and Bit Sync Phase, as described in Appendix A.

Step 4 - Enable Bit Sync using the BSF command. Refer to Chapter 2.

NOTE

It is recommended that the decoder be configured for data transmission using the OPTION commands before the data multiplexer is enabled via encoder OPTION1 command.

DEC1000R5 Pinout Information

With DMUX Option

Video output:	J1, J2, J3	Connector: BNC
Data input:	MAIN	Connector: BNC*
Clock input:	MAIN	Connector: BNC
Audio output:	AUDIO	Connector: BNC

*Bit Sync input when installed and enabled

System I/O:	PORT1	Connector: DB25(S)
Pin Number	**Signal**	**Description**
1	Ground	Shield ground
2	TXD	Transmit data out
3	RXD	Receive data in
7	Ground	Signal ground
4-6, 8-25	Not used	

Aux. RS232:	PORT2	Connector: DB25(S)
Pin Number	**Signal**	**Description**
1	Ground	Shield ground
2	TXD	Transmit data in, Encoder
3	RXD	Receive data out, Decoder
7	Ground	Signal ground
23	TXD	Transmit Data In (BTC1000 Option)
24	Ground	(BTC1000 Option)
25	RXD	Receiver Data Out (BTC1000 Option)
4-6, 8-22	Not used	

Telecom Port	T-1	Connector: DB15(S)	
Pin Number	**Signal**	**Description**	
		Encoder*	**Decoder***
1	Clock out+	KG194/EIA-422 clock out+	PCM clock out+
2	Ext. clock in / TTL. clock out	External data clock in+	PCM TTL clock out**
3	Data out+	KG194/EIA-422 data out+	PCM data out+
4	ground		
5	Clock in+	PCM clock in+	KG194/EIA-422 clock in+
6	Ground		
7	Data in+	PCM data in+	KG194/EIA-422 data in+
8	TTL data out		PCM TTL data out**
9	Clock out-	KG194/EIA-422 clock out-	PCM clock out-
10	Ext. clock in-	External data clock in-	Ground
11	Data out-	KG194/EIA-422 data out-	PCM data out-
12	Ground		
13	Clock in-	PCM clock in-	KG194/EIA-422 clock in-
14	Ground		
15	Data in-	PCM data in-	KG194/EIA-422 data in-

*EIA-422 or KG194 interface pinning, electrically compatible with EIA530 and V.35
**Active only when BTC1000 option is installed.

Without DMUX Option

Video output:	J1, J2, J3	Connector: BNC
TTL video output	MAIN	Connector: BNC
TTL clock output	MAIN	Connector: BNC

System I/O:	PORT 1	Connector: DB25(S)
Pin Number	**Signal**	**Description**
1	Ground	Shield ground
2	TXD	Transmit data out
3	RXD	Receive data in
7	Ground	Signal ground
4-6, 8-25	Not used	

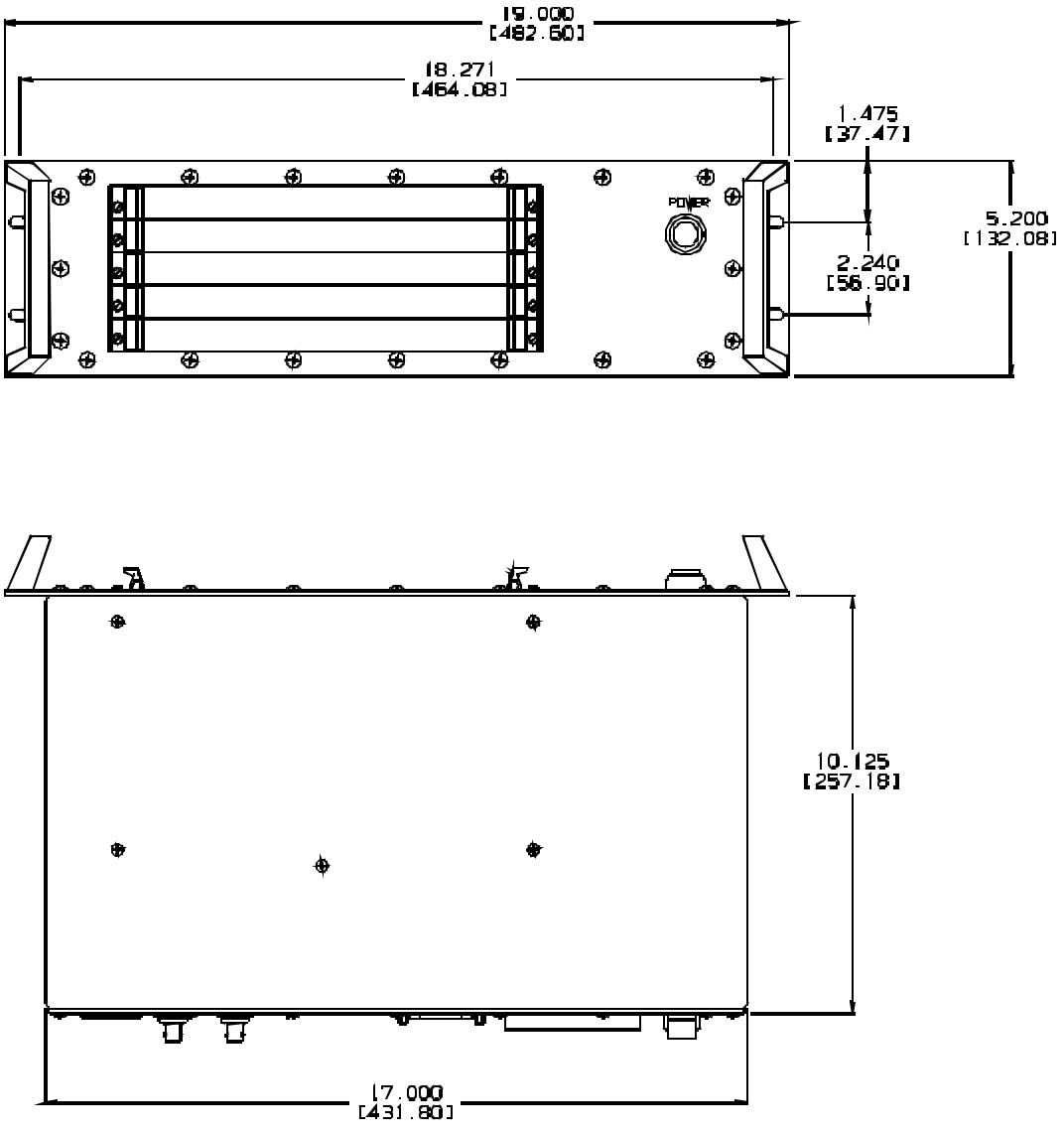
Telecom Port	T-1	Connector: DB15(S)
Pin Number	**Signal**	**Description***
2	Clock out+	Differential clock output+ (encoder)
3	Clock out-	Differential clock output - (encoder)
4	ground	
5	Data out+	Differential video output+ (encoder)
6	Data out-	Differential video output- (encoder)
7	ground	
10	Clock in+	Differential clock input+ (encoder and decoder)
11	Clock in-	Differential clock input- (encoder and decoder)
12	ground	
13	Data in+	Differential video input+ (decoder)
14	Data in-	Differential video input- (decoder)
15	ground	
1, 8-9	Not used	

* Electrically compatible with EIA530 and V.35

RGB Video Output Option		Connector: DB9(S)
Pin Number	**Signal**	**Description**
1	IOB	Blue
2	IOG	Green
3	IOE	Red
4	Ground	Signal Ground
5	VSOUT	Vertical sync. out
6	HSOUT	Horizontal sync. out
7-9	Not used	

DEC1000R5 Decoder Installation

Installation footprint for the DEC1000R5 is shown below. Special shock mounting or vibration dampening is not required. Mounting bolts should be protected from vibrating loose. Proper grounding is required. The unit is 10 inches deep. An additional 2 inches of cabinet depth is recommended for cable clearance and efficient cooling fan operation.



DEC1000R5 Decoder Mounting Dimensions

Interconnecting Cable Installation

Ensure that all BNC connectors are fully seated. DB25 and DB15 connectors must be firmly seated and the locking screws secured.

Dress and secure all cables in accordance with local safety and EMI standards.

The Enerdyne DEC1000R5 ADVS® compatible color video compression decoder requires very little maintenance. Helpful hints on maintaining the equipment are provided in the following paragraphs.

Maintenance

Cleaning

A mild non-abrasive cleanser may be used to clean the unit. Care should be taken to prevent liquid from entering the connectors. The cooling fan filter located at the rear of the unit should be inspected periodically. If required, it should be removed, cleaned with fresh water, dried, and re-installed. To remove the filter, use a small flat-blade screwdriver to gently pry the fan filter cover from the fan housing, then remove the filter by hand.

NOTE

There are no user serviceable parts located within the unit. Opening the unit or removing a circuit card will void the warranty. Units requiring service during the warranty period must be returned to the factory.

Video Processor Indicator Lights

The decoder has 18 indicator LEDs on the front of the video processor card. These indicators can be used for self test and to verify proper operation. The indicators, their names, and functions are described in the following paragraphs.

CFAIL

This RED LED is the video clock fail indicator. It is activated when there are no clock transitions over a 32 ms period. The video picture will be lost or frozen on the last frame.

RD0, RD1

These GREEN LEDs display the most significant bits of the read memory field pointer. They can be used to verify that new fields of video information are being read out of memory. These indicators should follow the WR0,WR1 indicators with RD1 being the inverse of WR1. If they do not, then it is probable that the decoder is receiving corrupted video data. The RD0 LED will transition every time a new field is read. When these lights stop flashing steadily, the video picture will be lost or frozen.

WR0,WR1

These GREEN LEDs display the most significant bits of the write memory field pointer. They are incremented every time a new field is decoded in the input data stream. The speed of the field update rate can be estimated by the flashing rate of WR0. If these LEDs flash very erratically, there is a problem with the data stream integrity. The video picture will be lost or frozen on the last frame.

LOCK

If this RED LED ever lights, it indicates that the system has experienced a semi-fatal lock-up state and is recovering. The Lock LED will only light under extreme conditions (very bad data). The video picture will be lost or frozen on the last frame.

BERR

This RED LED is active only when the Forward Error Correction (FEC) option is installed and active. The BERR LED will light when a block error has occurred

PFAIL

This RED LED indicates that the system has detected a parity failure in the encoder parameter passing data packet. The video picture will be lost or frozen on the last frame.

VERR

This RED LED indicates a video timing error. A system reset may be required to restore system operation. The video picture will be lost or frozen on the last frame.

NTSC4

This YELLOW LED indicates that the video output is currently set to NTSC 525 line operation with a 4.43 MHz burst. This is not a common mode for NTSC.

NTSC

This YELLOW LED indicates that the video output is currently set to NTSC 525 line operation with a 3.58 MHz burst. This is the standard NTSC setting.

PAL

This YELLOW LED indicates that the video output is currently set to PAL 625 line operation with 4.43 MHz burst. This is the standard PAL setting.

RTC

This GREEN LED is the real time clock indicator. It flashes at a one Hertz rate and is used to verify that the internal processor is functioning properly. If it stops flashing, the system must be reset. The video picture will be lost or frozen on the last frame.

RCL

This YELLOW LED is used to display the received clock status. This LED is active only when the T1 mode option is installed.

RBV

This YELLOW LED is used to indicate a receive bipolar violation. This will light in AMI mode when receiving B8ZS coding. This LED is active only when the T1 mode option is installed.

ER

This RED LED indicates that a framing error has occurred. This LED is active only when the T1 mode option is installed.

RLOSS

This RED LED indicates a receiver loss of signal. This light usually lights when no T1 carrier is present. This LED is active only when the T1 mode option is installed.

POWER

This RED LED must always be on when power is applied.

APPENDIX A

OPTION Commands

The four OPTION commands provide control of the demultiplexer through the setting of control bits that define demultiplexer function. The bandwidth available for multiplexed data is divided into eight equal segments, or time slots. All eight time slots can be individually allocated to PCM, audio or EIA-232. When FEC is enabled, the eighth time slot of every frame is reserved for FEC, The remaining seven are still available for audio, PCM or EIA-232. A slot cannot be allocated to more than one data type. Slots may not be allocated through successive uses of an OPTION command; that is, the user cannot invoke OPTION3 to reserve slot #6 for EIA-232 data, and then use OPTION3 again to reserve bit #3. There are other specific conditions governing the transmission of each of the data types which are covered in Chapter 2, Option Commands.

The four OPTION commands all accept input arguments in the same format (see Figure A-1). Each of the two digits nn is a HEXADECIMAL number in the range 0-F. The right digit corresponds to the low order four bits, the left digit corresponds to the upper four bits.

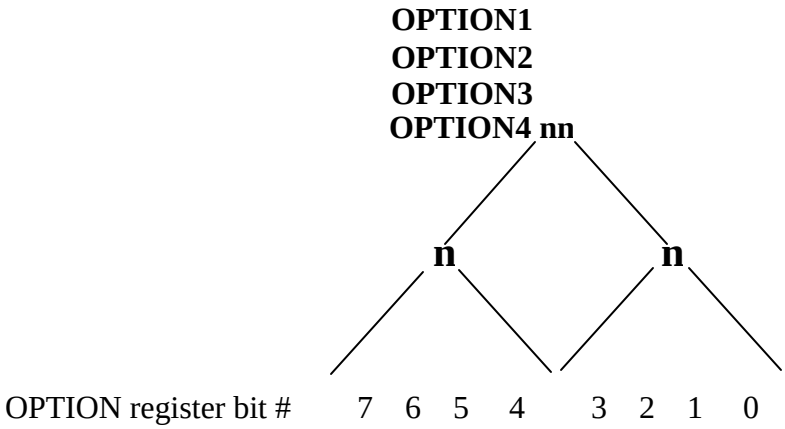


Figure A-1 OPTION Command Output Arguments

In other words, each argument **n** is a HEXADECIMAL representation of a 4 bit binary number. Table A-1 provides an easy way to select the appropriate digit. For example, if the proper configuration required that the high order bits be set to 1011, and the low order bits to 1110, a quick look at the table shows that the left digit should be HEXADECIMAL “B” and the right digit should be HEXADECIMAL “E”. The correct argument string is BE.

Table A-1 Option Register Hexadecimal Conversion Chart

LOW REGISTER BITS	3	2	1	0
HIGH REGISTER BITS	7	6	5	4
BIT VALUE	(8)	(4)	(2)	(1)
0	0	0	0	0
1	0	0	0	1
2	0	0	1	0
3	0	0	1	1
4	0	1	0	0
5	0	1	0	1
6	0	1	1	0
7	0	1	1	1
8	1	0	0	0
9	1	0	0	1
A	1	0	1	0
B	1	0	1	1
C	1	1	0	0
D	1	1	0	1
E	1	1	1	0
F	1	1	1	1

The following describes the function of each OPTION command. The DEC1000R5 decoder can function with any ADVS® compatible encoder. It is important that the encoder and the decoder configurations match, or unpredictable transmission results will occur. Generally speaking, it is more convenient to set options on the decoder first, then proceed to the encoder. Refer to the encoder manual for encoder OPTION command settings.

CAUTION

It is important to ensure that a slot is not assigned to more than one function. For example, OPTION4 should not be used to assign slot #6 to audio after OPTION3 has been used to assign the same slot to EIA-232. Unpredictable results may occur.

NOTE

Time slots are designated to PCM unless OPTION3 and OPTION4 commands are used to designate slots as audio, EIA-232 or FEC.

OPTION1 NN

This command allows the user to enable or disable the various demultiplexer functions controlled by each bit. The software revision and check word are available on the control terminal screen at power-up. Decoder OPTION1 bit settings are as follows:

		DECODER FUNCTION WHEN BIT = 1		
Bit Number	**Default**	**Serial Number 0430 or LOWER**	**Serial Number 0431 through 0767**	**Serial Number 0683**
0	0	FEC Enable	FEC Enable	FEC Enable
1	0	Baud Rate Select 'X'	Baud Rate Select 'X'	Baud Rate Select 'X'
2	0	Baud Rate Select 'Y'	Baud Rate Select 'Y'	Baud Rate Select 'Y'
3	0	Baud Rate Select 'Z'	Baud Rate Select 'Z'	Baud Rate Select 'Z'
4	0	Must be = 0	Must be = 0	Must be = 0
5	0	Main Clock Input Invert	Main Clock Input Invert	Main Clock Input Invert
6	0	Must be = 0	Must be = 0	Enable Bit Sync
7	0	Must be = 0	Must be = 0	Must be = 0

		DECODER FUNCTION WHEN BIT = 1		
Bit Number	**Default**	**Serial Number 0843, 0844, and 0870**	**Serial Number 0850 through 0853**	**Serial Number 0994 through 0998, 1001 through 1003, and1013**
0	0	FEC Enable	FEC Enable	FEC Enable
1	0	Baud Rate Select 'X'	Baud Rate Select 'X'	Baud Rate Select 'X'
2	0	Baud Rate Select 'Y'	Baud Rate Select 'Y'	Baud Rate Select 'Y'
3	0	Baud Rate Select 'Z'	Baud Rate Select 'Z'	Baud Rate Select 'Z'
4	0	Enable Randomizer	Enable Randomizer	Enable Randomizer
5	0	Main Clock Input Invert	Main Clock Input Invert	Main Clock Input Invert
6	0	Must be = 0	Must be = 0	Must be = 0
7	0	Disable Auto Frame Detection	Disable Auto Frame Detection	Disable Auto Frame Detection

		DECODER FUNCTION WHEN BIT = 1		
Bit Number	**Default**	**Serial Number 1012, and 1028 through 1031**	**Serial Number 1055 and HIGHER**	**not used**
0	0	FEC Enable	FEC Enable	
1	0	Baud Rate Select 'X'	Baud Rate Select 'X'	
2	0	Baud Rate Select 'Y'	Baud Rate Select 'Y'	
3	0	Baud Rate Select 'Z'	Baud Rate Select 'Z'	
4	0	Enable Randomizer	Enable Randomizer	
5	0	Main Clock Input Invert	Main Clock Input Invert	
6	0	Must be = 0	Bit Sync Phase 1=(-), 0=(+)	
7	0	Disable Auto Frame Detection	Enable Bit Sync	

Note that bits 1, 2 and 3 determine baud rate on the decoder EIA-232 data output in accordance with the following table:

Baud Rate	BIT X	BIT Y	BIT Z
38400	0	0	0
19200	1	0	0
9600	0	1	0
4800	1	1	0
2400	0	0	1
1200	1	0	1
600	0	1	1
300	1	1	1

RANDOMIZER BIT 4-The Randomizer limits the number of consecutive 1's or 0's in the encoder output data stream to 15. The Randomizer should be used when digital transmission equipment or bit synchronizers between the encoder and DEC1000R5 or DEC1000R10 decoder require randomized data to prevent long strings of 1's or 0's. When the encoder Randomizer bit (OPTION1 command) is set to *1* the decoder Randomizer bit (OPTION1 command) must be set to *1* to derandomize the data for decoding and proper display.

Errors introduced after the data is randomized are multiplied during the derandomization process. The decoder derandomizer has an error multiplication factor of 3 for isolated bit errors (separated from adjacent bit errors by at least 15 bits). An isolated bit error will produce 3 errors in the output data; the original bit error and 2 additional errors 14 and 15 bits later. In addition, a burst of errors occurring after the data has been randomized will produce a burst of errors in the derandomized output. The number of errors in the output depends on the distribution of errors in the burst and can be greater than, equal to or less than the number of errors in the input to the derandomizer. However, the derandomizer always increases the number of bits between the first and last error in the burst by 15.

OPTION2 NN

This command allows the user to enable or disable the various demultiplexer functions controlled by each bit. Decoder OPTION2 bit settings are as follows:

		DECODER FUNCTION WHEN BIT = 1		
Bit Number	**Default**	**Serial Number 0430 or LOWER**	**Serial Number 0431 through 0767**	**Serial Number 0683**
0	0	PCM Clock Output Invert	PCM Clock Output Invert	PCM Clock Output Invert
1	0	PCM Data Output Invert	PCM Data Output Invert	PCM Data Output Invert
2	0	Main Data Input Invert	Main Data Input Invert	Main Data Input Invert
3	0	Use RS422 for Main Interface	Decoder Source Select 'A'	Decoder Source Select 'A'
4	0	Must be = 0	Decoder Source Select 'B'	Decoder Source Select 'B'
5	0	Must be = 0	Multiplexer Source, 0=TTL, 1=422	Enable 3 MHZ Bit Sync
6	0	Must be = 0	Must be = 0	Must be = 0
7	0	Must be = 0	Must be = 0	Must be = 0

		DECODER FUNCTION WHEN BIT = 1		
Bit Number	**Default**	**Serial Number 0843, 0844, and 0870**	**Serial Number 0850 through 0853**	**Serial Number 0994 through 0998, 1001 through 1003, and 1013**
0	0	PCM Clock Output Invert	PCM Clock Output Invert	PCM Clock Output Invert
1	0	PCM Data Output Invert	PCM Data Output Invert	PCM Data Output Invert
2	0	Main Data Input Invert	Main Data Input Invert	Main Data Input Invert
3	0	Decoder Source Select 'A'	Decoder Source Select 'A'	Decoder Source Select 'A'
4	0	Decoder Source Select 'B'	Decoder Source Select 'B'	Decoder Source Select 'B'
5	0	Multiplexer Source, 0=TTL,1=422	Multiplexer Source, 0=TTL,1=422	Multiplexer Source, 0=TTL,1=422
6	0	Must be = 0	Must be = 0	Must be = 0
7	0	Must be = 0	Must be = 0	Must be = 0

		DECODER FUNCTION WHEN BIT = 1		
Bit Number	**Default**	**Serial Number 1012, and 1028 through 1031**	**Serial Number 1055 and HIGHER**	**not used**
0	0	PCM Clock Output Invert	PCM Clock Output Invert	
1	0	PCM Data Output Invert	PCM Data Output Invert	
2	0	Main Data Input Invert	Main Data Input Invert	
3	0	Decoder Source Select 'A'	Decoder Source Select 'A'	
4	0	Decoder Source Select 'B'	Decoder Source Select 'B'	
5	0	Multiplexer Source, 0=TTL,1=422	Multiplexer Source, 0=TTL,1=422	
6	0	Must be = 0	Must be = 0	
7	0	Must be = 0	Must be = 0	

DECODER SOURCE SELECT					
Serial Number 0431 through 0767	**Serial Number 0683**	**Serial Number 0843, 0844, and 0870**	**Serial Number 0850 through 0853**	**BIT A**	**BIT B**
TTL	TTL	TTL	NOT USED	0	0
422	422	422	NOT USED	1	0
TTL	MUX CARD	TTL	NOT USED	0	1
422	NOT USED	422	TTL/422	1	1

DECODER SOURCE SELECT					
Serial Number 0994 through 0998, and 1001 through 1003	**Serial Number 1012, and 1028 through 1031**	**Serial Number 1055 and HIGHER**	**not used**	**BIT A**	**BIT B**
NOT USED	TTL/422	TTL/422		0	0
NOT USED	NOT USED	NOT USED		1	0
NOT USED	NOT USED	NOT USED		0	1
TTL/422	NOT USED	NOT USED		1	1

OPTION3 NN

This command allows the user to enable or disable time slots 1-8 for EIA-232 data. Encoder and decoder settings must be the same. Decoder OPTION3 bit settings are as follows:

Bit Number	Default	DECODER FUNCTION WHEN BIT = 1 All Serial Numbers
0	0	Enable Time Slot #1 for EIA 232
1	0	Enable Time Slot #2 for EIA 232
2	0	Enable Time Slot #3 for EIA 232
3	0	Enable Time Slot #4 for EIA 232
4	0	Enable Time Slot #5 for EIA 232
5	0	Enable Time Slot #6 for EIA 232
6	0	Enable Time Slot #7 for EIA 232
7*	0	Enable Time Slot #8 for EIA 232

* Set this bit to '1' if FEC is enabled by OPTION1.
This slot will be used for the FEC check word.

OPTION4 NN

This command allows the user to enable or disable time slots 1-8 for Audio data. Encoder and decoder settings must be the same. Decoder OPTION4 bit settings are as follows:

Bit Number	Default	DECODER FUNCTION WHEN BIT = 1 All Serial Numbers
0	0	Enable Time Slot #1 for Audio
1	0	Enable Time Slot #2 for Audio
2	0	Enable Time Slot #3 for Audio
3	0	Enable Time Slot #4 for Audio
4	0	Enable Time Slot #5 for Audio
5	0	Enable Time Slot #6 for Audio
6	0	Enable Time Slot #7 for Audio
7*	0	Enable Time Slot #8 for Audio

* Set this bit to '1' if FEC is enabled by OPTION1.
This slot will be used for the FEC check word

OPTION Command Examples

Table A-2 lists 16 sets of encoder and decoder option command settings and the resulting multiplexer configuration.

Table A-2 Option Register Settings

SETTING	ENCODER REGISTERS				DECODER REGISTERS			
	OPTION1	OPTION 2	OPTION 3	OPTION 4	OPTION1	OPTION 2	OPTION 3	OPTION 4
1	08	XX	XX	XX	XX	XX	XX	XX
2	00	20	00	00	00	10	00	00
3	04	20	80	80	01	10	80	80
4	00	20	00	FF	00	10	00	FF
5	04	20	80	FF	01	10	80	FF
6	00	20	FF	00	04	10	FF	00
7	04	20	FF	80	05	10	FF	80
8	00	20	AA	00	04	10	AA	00
9	04	20	AA	80	05	10	AA	80
10	00	20	00	AA	00	10	00	AA
11	04	20	80	AA	01	10	80	AA
12	00	20	AA	55	04	10	AA	55
13	04	20	AA	05	05	10	AA	05
14	00	20	A4	09	04	10	A4	09
15	04	20	A4	89	05	10	A4	89
16	04	20	82	88	05	10	82	88

SETTING	MULTIPLEXER CONFIGURATION
1	Disable multiplexer
2	all slots PCM, FEC disabled
3	all slots PCM, FEC enabled
4	all slots Audio, FEC disabled
5	all slots Audio, FEC enabled
6	all slots EIA-232, FEC disabled
7	all slots EIA-232, FEC enabled
8	four slots PCM, four slots EIA-232, FEC disabled
9	four slots PCM, three slots EIA-232, FEC enabled
10	four slots PCM, four slots audio, FEC disabled
11	four slots PCM, three slots audio, FEC enabled
12	four slots EIA-232, four slots audio, FEC disabled
13	four slots EIA-232, three slots audio, FEC enabled
14	three slots PCM, three slots EIA-232, two slots audio, FEC disabled
15	three slots PCM, two slots EIA-232, two slots audio, FEC enabled
16	five slots PCM, one slot EIA-232, one slot audio, FEC enabled (factory setting)

APPENDIX B

Hexadecimal to Decimal Conversion

Decimal	Hex	Decimal	Hex	Decimal	Hex	Decimal	Hex
0	00	32	20	64	40	96	60
1	01	33	21	65	41	97	61
2	02	34	22	66	42	98	62
3	03	35	23	67	43	99	63
4	04	36	24	68	44	100	64
5	05	37	25	69	45	101	65
6	06	38	26	70	46	102	66
7	07	39	27	71	47	103	67
8	08	40	28	72	48	104	68
9	09	41	29	73	49	105	69
10	A	42	2A	74	4A	106	6A
11	B	43	2B	75	4B	107	6B
12	C	44	2C	76	4C	108	6C
13	D	45	2D	77	4D	109	6D
14	E	46	2E	78	4E	110	6E
15	F	47	2F	79	4F	111	6F
16	10	48	30	80	50	112	70
17	11	49	31	81	51	113	71
18	12	50	32	82	52	114	72
19	13	51	33	83	53	115	73
20	14	52	34	84	54	116	74
21	15	53	35	85	55	117	75
22	16	54	36	86	56	118	76
23	17	55	37	87	57	119	77
24	18	56	38	88	58	120	78
25	19	57	39	89	59	121	79
26	1A	58	3A	90	5A	122	7A
27	1B	59	3B	91	5B	123	7B
28	1C	60	3C	92	5C	124	7C
29	1D	61	3D	93	5D	125	7D
30	1E	62	3E	94	5E	126	7E
31	1F	63	3F	95	5F	127	7F

Hexadecimal to Decimal Conversion (Continued)

Decimal	Hex	Decimal	Hex	Decimal	Hex	Decimal	Hex
128	80	160	A0	192	C0	224	E0
129	81	161	A1	193	C1	225	E1
130	82	162	A2	194	C2	226	E2
131	83	163	A3	195	C3	227	E3
132	84	164	A4	196	C4	228	E4
133	85	165	A5	197	C5	229	E5
134	86	166	A6	198	C6	230	E6
135	87	167	A7	199	C7	231	E7
136	88	168	A8	200	C8	232	E8
137	89	169	A9	201	C9	233	E9
138	8A	170	AA	202	CA	234	EA
139	8B	171	AB	203	CB	235	EB
140	8C	172	AC	204	CC	236	EC
141	8D	173	AD	205	CD	237	ED
142	8E	174	AE	206	CE	238	EE
143	8F	175	AF	207	CF	239	EF
144	90	176	B0	208	D0	240	F0
145	91	177	B1	209	D1	241	F1
146	92	178	B2	210	D2	242	F2
147	93	179	B3	211	D3	243	F3
148	94	180	B4	212	D4	244	F4
149	95	181	B5	213	D5	245	F5
150	96	182	B6	214	D6	246	F6
151	97	183	B7	215	D7	247	F7
152	98	184	B8	216	D8	248	F8
153	99	185	B9	217	D9	249	F9
154	9A	186	BA	218	DA	250	FA
155	9B	187	BB	219	DB	251	FB
156	9C	188	BC	220	DC	252	FC
157	9D	189	BD	221	DD	253	FD
158	9E	190	BE	222	DE	254	FE
159	9F	191	BF	223	DF	255	FF

APPENDIX C

TECHNICAL SUPPLEMENT

MODEL BTC1000

BURST TO CONTINUOUS PCM CONVERTER FOR ADVS® COMPATIBLE COMPRESSED DIGITAL VIDEO DECODERS

BTC1000 Burst-To-Continuous PCM Converter

SPECIFICATIONS

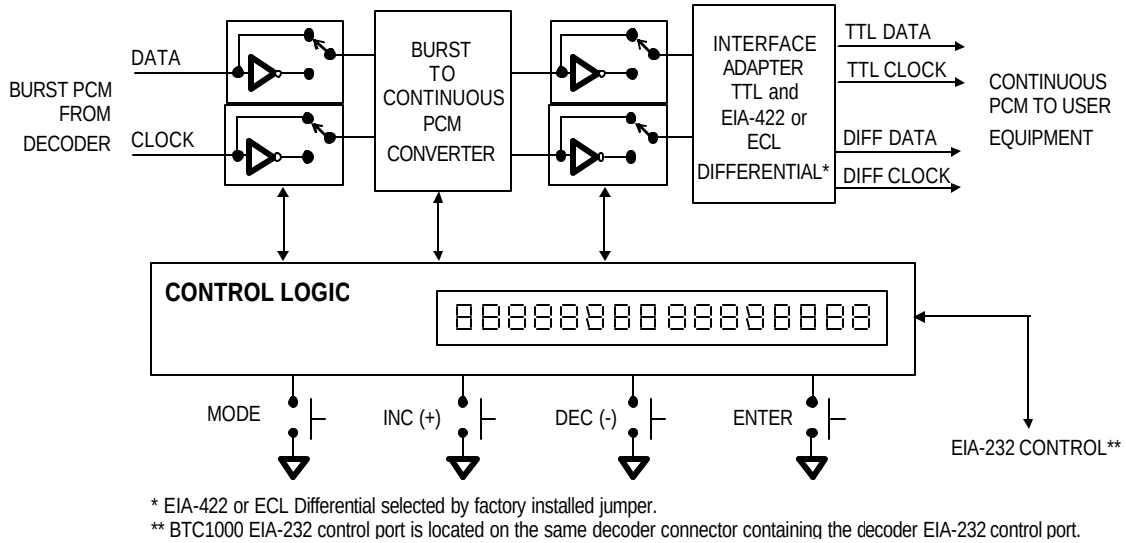
- Works with all Rack Mount Enerdyne Video Decoders
- Converts Burst PCM at Link Rate to Continuous PCM at Input PCM Rate
- Automatic PCM Frequency Tracking and Display
- PCM Frequencies from 9.77 KHz to 4.9 MHz
- TTL and EIA-422 Clock and Data Outputs
- Optional ECL Clock and Data Outputs
- User-Selectable Clock and Data Inverters

In a typical application, as in Fig.1, 300 KHz PCM clock and data may be input into a video encoder operating at a 5 MHz rate. At the decoder PCM output, the PCM clock and data would appear in bursts at the transmission rate, in this example 5 MHz. Most PCM decoders can decode burst PCM data supplied by Enerdyne decoders. However, some PCM decoders require continuous (50% duty cycle clock) PCM. The BTC1000 Burst-to-Continuous PCM Converter will restore a burst PCM output to a continuous clock (50% duty cycle) and data output equal to the PCM rate into the video encoder. In the above example, the 5 MHz burst PCM output would be converted to 300 KHz continuous PCM clock and data.

The required clock and data relationships are user-selected via an EIA-232 control port or via four push buttons and a 16-character display.

The BTC1000 automatically senses, tracks, and displays the incoming PCM frequency. The BTC1000 will indicate an increase (UNDERFLOW) or decrease (OVERFLOW) in PCM frequency prior to synchronizing to the new PCM frequency. Depending on the PCM frequency, several seconds may be required to synchronize to the new PCM frequency.

TTL and differential continuous PCM outputs are available at the decoder back panel. The BTC1000 must be factory configured to provide differential outputs.



* EIA-422 or ECL Differential selected by factory installed jumper.
** BTC1000 EIA-232 control port is located on the same decoder connector containing the decoder EIA-232 control port.

Figure 1 Functional Block Diagram

BTC1000 Programming

The BTC1000 may be programmed by means of the front panel pushbuttons (see Fig. 2), or the EIA-232 serial control port located on the back panel of the decoder. Refer to the decoder control port connector pin list for pin assignments of decoder and BTC1000 control ports.

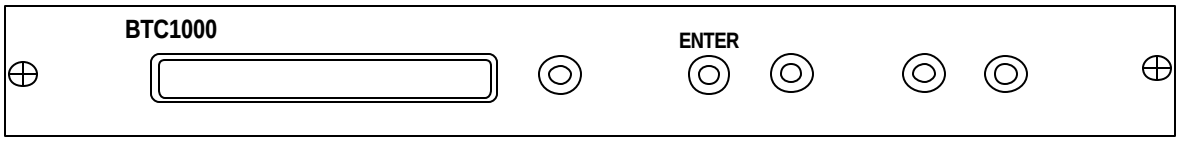


Figure 2 BTC1000 Front Panel

BTC1000 Software Commands

Software commands may be entered via the BTC1000 Serial Control Port using any dumb terminal or computer equipped with a terminal emulator program.

DEFAULT, GET, GT

Set unit to factory defaults, input/output clock are rising edge, input/output data normal.

FPANEL nn, FP nn

Set the front panel brightness. 00 = off, 03 = max.

HELP, HE, ?

Display help screen.

```
DEFAULT          DF  Load default settings, input/output clock are rising edge,
                     input/output data are normal.
FPANEL nn        FP  Change front panel brightness. 00=OFF - 03=MAX
INDATA n         ID  Sets the input clock edge and data level. N = Normal data;
                     I = Inverted data; R = Clock data on rising edge of clock;
                     F = Clock data on falling edge of clock.
OUTDATA n        OD  Sets the output clock edge and data level. N = Normal data;
                     I = Inverted data; R = Clock data on rising edge of clock;
                     F = Clock data on falling edge of clock.
RESET            RS  Reset
RESTORE nn       RE  Load a saved system setting. nn = 01 - 03
SAVE nn          SA  Save current settings. nn = 01 - 03.
STATUS           ST  Show current settings.
```

INDATA n

Sets the input clock edge and data level.

n	Setting
N	Normal data
I	Inverted data
R	Clock data on rising edge of clock
F	Clock data on falling edge of clock

OUTDATA n

Sets the output clock edge and data level.

n	Setting
N	Normal data
I	Inverted data
R	Clock data on rising edge of clock
F	Clock data on falling edge of clock

RESET, RS

System reset.

RESTORE nn, RE nn

Restore a saved setting 01 - 03.

SAVE nn, SA nn

Save the current settings for input/output clock and data to memory; 01- 03

STATUS, ST

Show the current settings for input/output clock and data.

BTC1000 Manual Programming

The manual programming interface consists of a sixteen-character alphanumeric display and four momentary action push buttons. All BTC1000 display messages are listed in Table 1.

Table 1 BTC1000 Display Messages

MODE DISPLAY Select Using MODE Button	PARAMETER DISPLAY Select Using INC./DEC. Buttons	REMARKS Program Mode and Parameter Using ENTER Button
INPUT CLOCK	RISING EDGE*	Data is clocked on the rising edge of the clock
INPUT CLOCK	FALLING EDGE	Data is clocked on the falling edge of the clock
INPUT DATA	NORMAL*	Data is normal
INPUT DATA	INVERTED	Data is inverted
OUTPUT CLOCK	RISING EDGE*	Data is clocked on the rising edge of the clock
OUTPUT CLOCK	FALLING EDGE	Data is clocked on the falling edge of the clock
OUTPUT DATA	NORMAL*	Data is normal
OUTPUT DATA	INVERTED	Data is inverted
X.X.X.X	N/A	The current PCM frequency
FIFO OVERFLOW	N/A	Indicates a decrease in PCM frequency just prior to synchronizing to new frequency.
FIFO UNDERFLOW	N/A	Indicates an increase in PCM frequency just prior to synchronizing to new frequency.
SYSTEM RESET		This message is displayed when the RESET button is pressed. After about one second, the display will indicate the current PCM frequency

* Factory default settings.

Program the BTC1000 as follows:

1. Momentarily depress the MODE button. A programmable parameter will appear on the display.
2. Each depression of the MODE button will sequence through the parameters. The "INC." and "DEC." buttons will sequence through the available values for the parameter selected.
3. Once the parameter and value have been selected, depress the ENTER button to store the setting in the EEPROM. Pressing the MODE button again will move to the next parameter.

NOTE

If the MODE button is pressed before the ENTER button and the parameter has been changed, the changed value will not be saved.

4. Repeat steps 2 and 3 to make the desired settings.

NOTE

The BTC1000 will display the last Mode message until the MODE button is pressed while the OUTPUT DATA parameter is displayed, the BTC1000 will then display current PCM clock frequency.