User's Manual

The most important thing we build is trust.

Digital Data Processor Card (DDPC)

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Table of Contents

List of Figures

List of Tables

List of Appendices

1 Acronyms

This section lists and describes the various acronyms used in this document.

Name	Meaning
16QAM	16-State Quadrature Amplitude Modulation
64QAM	64-State Quadrature Amplitude Modulation
A	Amperes
A/V	Audio/Video
AES	Advanced Encryption System 32 bit
ABS	Messenger Basic Scrambling 8 bit
ASI	Asynchronous Serial Interface
BDC	Block Down Converter
COFDM	Coded Orthogonal Frequency Division Multiplexing
CVBS	Composite Video
D/C	Down-Converter
DDPC	Digital Data Processing Card
DVB-T	Digital Video Broadcasting - Terrestrial
FEC	Forward Error Correction
GUI	Graphical User Interface
I/O	Input/ Output
Kbaud	Kilobaud per second
Kbps	Kilobits per second
LO	Local Oscillator
Mbps	Megabits per second
MDL	Messenger Digital Link
MDR	Messenger Digital Receiver
MDT	Messenger Digital Transmitter
MSR	Messenger Smart Receiver
MER	Modulation Error Rate
MPEG	Moving Picture Experts Group
NTSC	National Television System Committee
PAL	Phase Alternation Line
QPSK	Quadrature Phase Shift Keying
RF	Radio Frequency
RX	Receiver
S/N	Signal-to-Noise Ratio
SPI	Parallel Transport Stream
THD	Total Harmonic Distortion
TS	DVB MPEG Transport Stream
TX	Transmitter
VAC	Volts (Alternating Current)
VDC	Volts (Direct Current)

2 Introduction

The GMS Digital Data Processor Card (DDPC) is a data processor with several powerful and unique features. Data can be received and transmitted by any combination of the following: ASI/SDI via BNC serial cable, and/or LVDS/LVTTL via 50-pin connector, computer communications through two RS-232 ports, and can be programmed for custom applications. The DDPC is designed to fit one of the slots of the GMS Messenger Smart Receiver (MSR) or stand-alone.

This manual provides information on how to operate the DDPC as well as pertinent technical information related to the overall system.

2.1 Key System Features

Applications

- High-Security Surveillance Applications
- UAV/UGV Applications
- Sports, POV and ENG

Key Processor Features

- Operates with MSR
- ASI IN/OUT
- Generic Parallel I/O
- Powerful FPGA
- UP Controlled

Firmware Applications

- High-Speed Serial Data
- AES Decryption
- User Data Extraction
- High Throughput 4K
- Custom Applications

3 System Overview

The GMS Messenger Digital Link (MDL) system utilizes a robust digital modulation system known as COFDM that provides frequency diversity and powerful Forward Error Correction (FEC) algorithms. The end result is a robust wireless link that is effective against multipath interference experienced by analog systems, and provides crisp, clear pictures in the most difficult of terrains.

The MSR receives and demodulates a DVB-T signal and recovers the DVB MPEG-2 transport stream containing the digital video, audio and ancillary data. GMS offers several special functions that modify the typical A/V Transport Stream (TS). These functions include AES encryption, User Data insertion, and High-Speed generic digital data encapsulation.

The encryption option has a 32-bit Advanced Encryption System (AES) to provide protection in sensitive applications. The recovered TS is decrypted by the DDPC and converted to Asynchronous Serial Interface (ASI) and SPI Parallel Transport Stream (SPI).

The MDT-D can encapsulate High-Speed serial data into a standard MPEG-2 format and transmit it. The DDPC receives the demodulated MPEG-2 packet and extracts the High-Speed serial data out and converts it into LVTTL and LVDS format.

User Data is applied to a normal A/V MPEG-2 stream to supply more information about the video. For example, if connected to a GPS the transmitter location could be known at any time. Without disrupting the video stream, the DDPC will extract the User Data and send it to a computer through a RS232 port. All connections to the DDPC are located on the back panel.

For certain applications like HD and multiple programs in a single TS Wireless Transmission, it is desirable to have greater throughput rates. If the user can utilize more RF bandwidth (12, 14, or 16 MHz), then the 4K Option can be used to double the throughput! Often, the 4K option can provide the same throughput that can be achieved with 2K with a lower modulation format dramatically increasing the system range (+80%). If higher picture quality is desired, the same Link robustness can be achieved by switching to 4K with double the throughput which can equate to a dramatic increase in Video quality!
On the receive side, the 4K option works by combining the outputs of two MSR-s. Each BDC output IF signal is split and presented to the corresponding Tuner/Demod of each MSR which processes ½ of the carriers. The reconstruction of the original TS occurs in the DDPC.

External Audio/Video/Data Decoders are sold separately that support SD and HD MPEG-2 4:2:0 and/or 4:2:2, H.264, AVC, raw data, and any other format or any combination of formats can be transmitted in a transport stream. LAN IP streaming interfaces are also available from GMS to support distribution of the Wireless Audio/Video/Data anywhere in the world via the Internet. This system architecture supports single or multiple programs by looping the ASI interface to multiple Decoders.

The MSR is normally used with GMS' optional Block Down-Converters (BDC-s) to provide frequency coverage from 862 MHz to 6 GHz. GMS' BDC-s can be mounted remotely, normally right at the antenna output (optimizing system performance) or within the MSR chassis. When remotely mounted, BDC power can be provided via the IF coax cable. The MSR' MS Windows Control SW provides independent control of the power to each BDC.

A single MSR with internally mounted BDC-s and DDPC can support up to 3 independent antennas. With external BDC-s, each single MSR can support up to 6 independent antennas. The system automatically configures itself for inputs from 1 to 6 per MSR. Both even and odd configurations are supported.

MSR w/TUNER/BDCC/DDPC

Figure 1 Three CH MSR w/optional BDC-s and DDPC

The DDPC can be controlled through the MSR USB or serial port (future), and it can also be controlled separately through its own USB or serial port from its back via an IBM PC using a Window's based control program. This program provides control 128 AES decryption key, bypass AES decryption, high-speed data settings, user data extraction and controls, and various Custom applications. Settings, if desired, need to be set only once, and then it will continue to operate even if power is lost. Some settings, i.e. the AES decryption key for security reasons, have the option of being lost when powered down.

Other functions and card inserts for the MSR can be down loaded from www.cobham.com/gms. This document will only describe functions for the MSR as it applies to the DDPC.

4 Getting Started

The DDPC is pre-configured by GMS prior to shipment (based on customer requirements), thus is ready to work "right out of the box".

NOTE: Additional cables may be delivered by GMS based on customer application. Contact GMS for further information.

4.1 Initial Checkout

Prior to installing a DDPC unit into the desired target environment, an initial checkout should be performed to ensure proper operation of the unit.

4.1.1 AES Decryption Setup

The AES Decryption needs two BNC cables and a USB cable. A short BNC cable and USB cable is shipped with the DDPC unit. Figure 2 shows the DDPC system configuration for AES Decryption only. The steps necessary to setup the system configuration in Figure 2 are shown below.

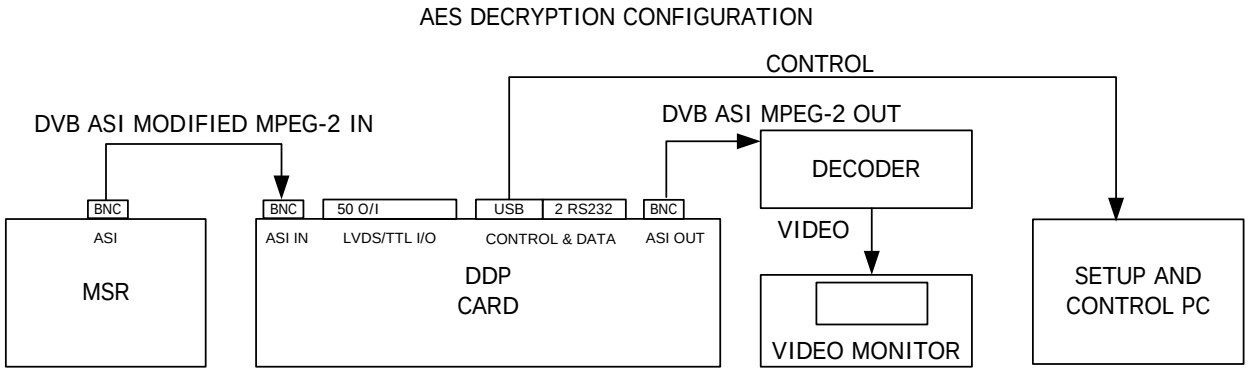

Figure 2 System Configuration for DDPC with AES Decryption only

1. Install MSR and other devices as their user manuals describe.
2. Attach the short BNC cable to the MSR closest to the DB-9.
3. Attach the other end of the short BNC cable to the ASI IN connector.
4. Attach one end of the USB cable to the DDPC and the other end to the PC.
5. Attach one end of BNC cable to the DDPC ASI OUT connector and the other to the Decoder.
6. Attach a video cable from the one video/audio output ports on the Decoder to a video monitor.
7. Turn on the MSR and open its supporting software. See the MSR manual (100-M0061) for specific directions.
8. Click on configuration/Down Converter, enter password, and make sure the CARD SLOT that the DDPC is in is on.
9. When turned on, click on the Apply box. Click on Configuration/Save Settings, to save.
10. Now that the System Active LED is on or blinking you can set up the DDPC. See section 6.3.1.
11. Power on and configure the rest of the devices and enjoy the video.

4.1.2 High Speed Data w/wo AES Decryption Setup

The High Speed Data with or without AES Decryption needs one BNC cables, one special High Speed Serial Cable, and a USB cable. All the cables are shipped with the DDPC unit. Figure 3 shows the DDPC system configuration for High Speed Data w/wo AES Decryption Setup. The steps necessary to setup the system configuration in Figure 3 are shown below.

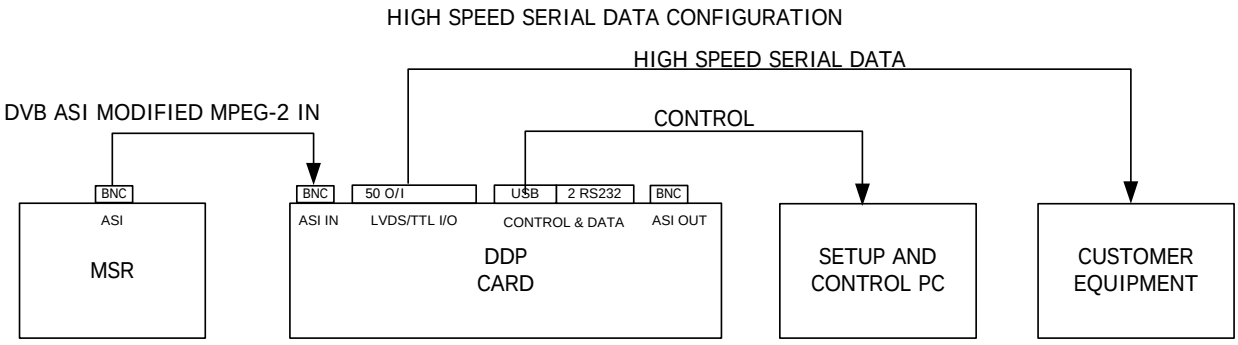

Figure 3 System Configuration for DDPC with High Speed Data, AES Decryption optional.

1. Install MSR and other devices as their user manuals describe.
2. Attach the short BNC cable to the MSR closest to the DB-9.
3. Attach the other end of the short BNC cable to the ASI IN connector.
4. Attach one end of the USB cable to the DDPC and the other end to the PC.
5. Attach the 50-pin ribbon cable to the 50-pin connector. Check for keying on the inside of the connector.

Note: To remove the 50-pin ribbon cable you must apply pressure to both sides of the plug and pull. There is a latch on both sides.

6. Attach the other side to a cable coming from the specialized high-speed serial data equipment. See Appendix A for pin outs.
7. Turn on the MSR and open its supporting software. See the MSR manual for specific directions
8. Click on configuration/Down Converter, enter password, and make sure the CARD SLOT that the DDPC is in is on.
9. When on click on the Apply box. Click on Configuration/Save Settings, to save.
10. Now that the System Active LED is on or blinking you can set up the DDPC. See section 6.3.1.
11. Power on and configure the rest of the devices and it is ready to go.

4.1.3 User Data w/wo AES Decryption Setup

The User Data with or without AES Decryption needs two BNC cables, one special Serial Cable, and a USB cable. A short BNC cable, one special Serial Cable, and a USB cable are shipped with

the DDPC unit. Figure 4 shows the DDPC system configuration for User Data w/wo AES Decryption Setup. The steps necessary to setup the system configuration in Figure 4 are shown below.

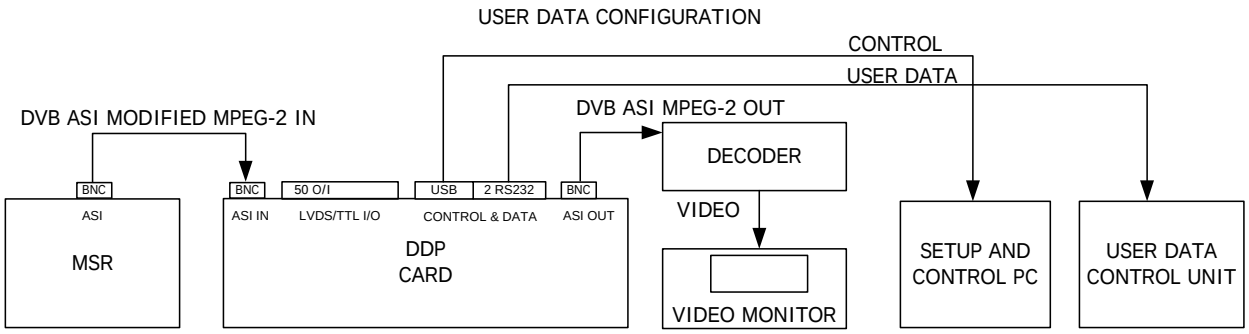

Figure 4 System Configuration for DDPC with User Data w/wo AES Decryption Setup

1. Install MSR and other devices as their user manuals describe.
2. Attach the short BNC cable to the MSR closest to the DB-9.
3. Attach the other end of the short BNC cable to the ASI IN connector.
4. Attach one end of the USB cable to the DDPC and the other end to the PC.
5. Attach the 10-pin connector to the DDPC next to the USB connector.
6. Attach the Data DB-9 to the cable coming from the User Data Control Unit' serial port. See Appendix B to see pin outs.
7. Attach one end of BNC cable to the DDPC ASI OUT connector and the other to the Decoder.
8. Attach a video cable from the one video/audio output ports on the Decoder to a video monitor.
9. Turn on the MSR and open its supporting software. See the MSR manual for specific directions
10. Click on configuration/Down Converter, enter password, and make sure the CARD SLOT that the DDPC is in is on.
11. When on click on the Apply box. Click on Configuration/Save Settings, to save.
12. Now that the System Active LED is on or blinking you can set up the DDPC. See section 6.3.1.
13. Power on and configure the rest of the devices and it is ready to go.

4.1.4 High Throughput 4K Setup

The 4K needs two BNC cables, a USB cable, a Combiner Card one short 50-pin ribbon cable and two longer 50-pin ribbon cables. A short BNC cable and USB cable are shipped with the DDPC unit. The Combiner Card and ribbon cables are shipped with 4K option MSR-s. Figure 4 shows the DDPC system configuration for 4K Setup. The steps necessary to setup the system configuration in Figure 4 are shown below.

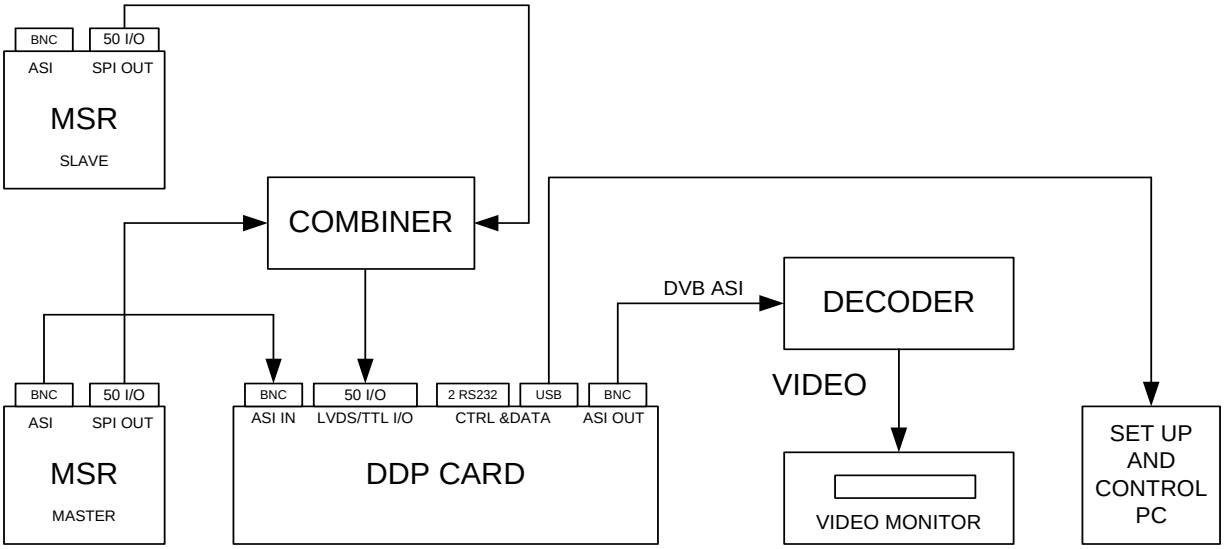

Figure 5 4K System Configuration for DDPC with 4K

1. Install MSR and other devices as their user manuals describe.
2. Attach the short BNC cable to the BNC connector of MSR closest.
3. Attach the other end of the short BNC cable to the ASI IN connector.
4. Attach one end of the USB cable to the DDPC and the other end to the PC.
5. Attach one end of BNC cable to the DDPC ASI OUT connector and the other to the Decoder.
6. Attach a video cable from the one video/audio output ports on the Decoder to a video monitor.
7. Attach a 50-pin short ribbon cable to the J107 of Combiner Card.
8. Attach 2 long 50-pin ribbon cables to the J100 and J107 of the Combiner Card.
9. Attach the other ends of 50-pin ribbon cables to SPI OUT connectors of each MSR.
10. Turn on the MSR and open its supporting software for 4K MSR. See the MSR manual (100-M0061) for specific directions.
11. Click on configuration/Down Converter, enter password, and make sure the CARD SLOT that the DDPC is in is on.
12. When turned on, click on the Apply box. Click on Configuration/Save Settings, to save.

5 Hardware Overview

The DDPC is designed to fit in one slot of the MSR or in an optional external 4”x3”x1” enclosure.

All user interface connectors (RS-232, USB, ASI in/out and 50 pin LVDS/LVTTL) and two led indicators (System Active and Function Active) are located on the rear of the DDPC unit panel. When installed in the MSR, power comes from the MSR’s 12V power supply. When in an external enclosure, power comes from a 2-pin 2mm JST connector near the top. The rear and top view of the DDPC unit is illustrated in Figure 5.

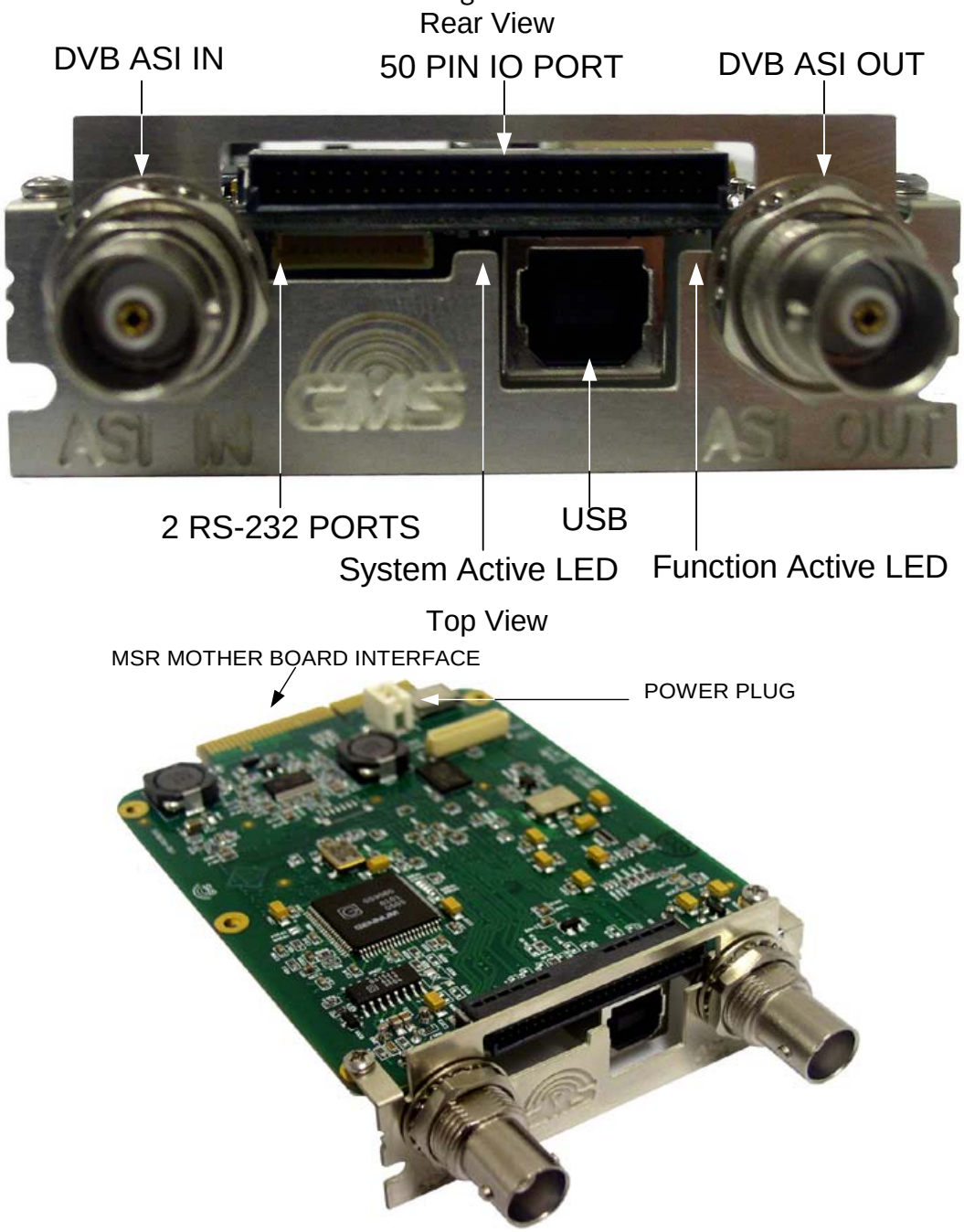

Figure 6 Rear/Top views

The DDPC has a Micro-controller and an FPGA that can do highly complex computations. Its ability to accept and produce serial ASI and 44 I/O data pins make it a most versatile tool. The DDPC is protected with a 1 amp resettable fuse. The board is designed to accept 9-15 VDC input power. Power consumption is application dependant. Refer to application. The internal logic diagram is shown in figure 6.

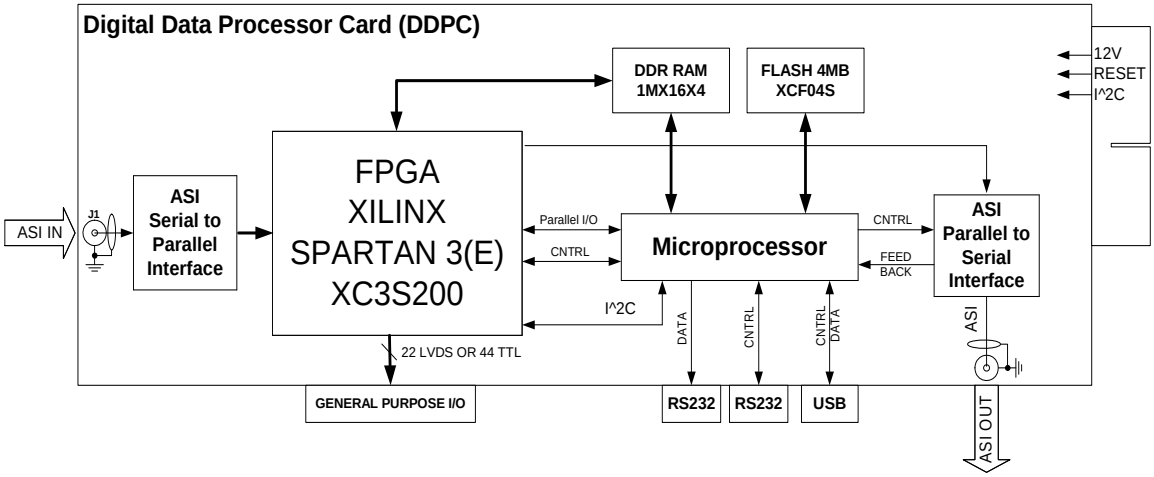

Figure 7 Internal Logic Diagram

The DDPC fits into any slot in the MSR except #1 if diversity tuners are loaded. The MSR's "switched 12 VDC" must be turned on for the card slot that the DDPC is in. The MSR can talk to the DDPC through the 80-pin connector via I2C port on the connector.

5.1 DDPC CONNECTION DIAGRAM

Figure 7 shows a comprehensive connection diagram for the DDPC. See section 4.1 for individual configuration setups. In the following section will explain the connections and the LEDs used by the DDPC.

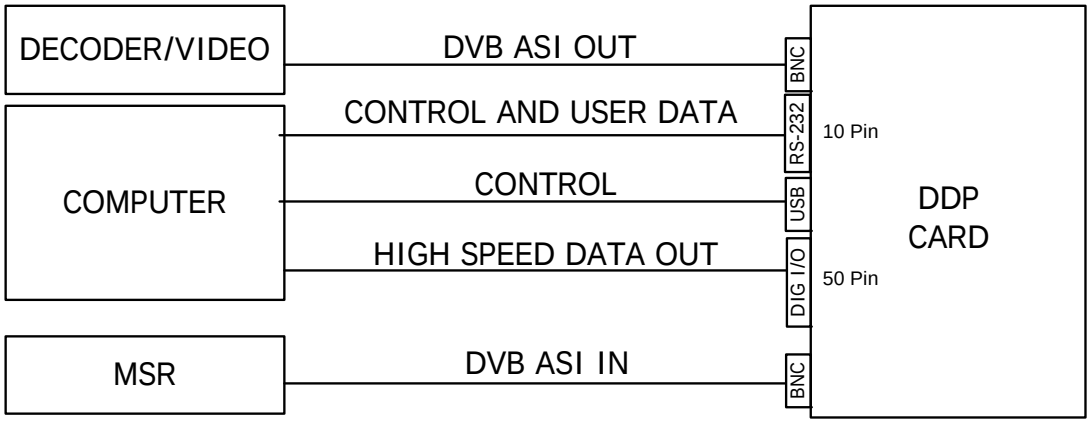

Figure 8 DVB ASI in/out and Data/Control diagrams

5.2 DDPC BACK PANEL

Located on the back panel are all interface connectors (two RS-232, USB, ASI IN/OUT and 50 pin LVDS/LVTTL) and two status LED indicators (System Active and Function Active). See Figure 5 Rear View for their location.

5.2.1 System Active LED

A solid LED indicates that the system has power, and a blinking LED indicates data is being received.

5.2.2 Function Active LED

The Function Active LED indicates that data is being processed by the DDPC. If the light is off then the data is not being processed and is leaving the same as it enters. For example if the AES Decryption mode is turned on and the Function Active LED is on, the ASI stream is being decrypted. If the Function Active LED is off then the ASI stream is not being decrypted.

5.2.3 DVB ASI IN (Asynchronous Serial Interface)

The DVB MPEG transport stream in high-speed serial format is input on this port via a BNC-F connector. The DVB ASI transport stream must conform to the ETSI Spec TR101891 V1.1.1 (2001 – 2002). Then the data is fed into the FPGA.

5.2.4 DVB ASI OUT (Asynchronous Serial Interface)

The DVB MPEG transport stream in high-speed serial format is output on this port via a BNC-F connector. The DVB ASI transport stream conforms to ETSI Spec TR101891 V1.1.1 (2001 – 2002).

5.2.5 TWO RS-232 PORTS

The DDPC has two RS-232 serial ports connected to a JST SM10B-SRSS-TB 10 pin right angle connector. The control (CNTL) port is used to directly control the DDPC. You will be able to interact with the software GUI and down load firmware updates. The MCU shares this port with the USB. The data (DATA) port is used to extract User Data. Table 1 shows the Two RS-232 Connections.

Pin	Signal	Description
1	Gnd	Ground Connection
2	CNTL Rx	Transmit Control
3	CNTL Tx	Receive Control
4	Gnd	Ground Connection
5	DATA Tx	Transmit User Data
6	DATA Rx	Receive User Data
7	Gnd	Ground Connection
8	SDA	I2C Data
9	SCL	I2C Clock
10	Gnd	Ground Connection

Table 1 RS-232 Connector

5.2.6 USB

The USB-1 is used to directly control the DDPC through a USB-B connector. It will be able to interact with the software GUI and down load firmware updates. The USB will need to be installed into a computer. The MCU shares this port with the RS-232 control (CNTL) port. Table 2 shows the USB Connections.

To load USB Drivers see "Loading USB Drivers for *DDPC*" on CD-ROM.

Pin	Signal	Description
1	5V	5V POWER
2	USBDM	D -
3	USBDP	D +
4	USB GND	GND

Table 2 USB Connector

5.2.7 50 PIN IO PORT

The 50 PIN IO PORT is a data IO interface connected to an ERNI 054596 0.05-inch header. There are 44 data lines, 4 dedicated ground lines and 2 lines that can be ground or 3.3 volts, factory settable only. Each data pair has been designed to support 1 LVDS pair or 2 LVTTL data lines. There are four (LVTTL or two LVDS) lines that go to FPGA global clock pins. Table 3 shows the 50 PIN IO Connections.

Pin	Signal	Pin	Signal
1	1Negative Data 0	2	1Positive Data 0
3	1Negative Data 1	4	1Positive Data 1
5	1Negative Data 2	6	1Positive Data 2
7	1Negative Data 3	7	1Positive Data 3
9	1Negative Data 4	10	1Positive Data 4
11	1Negative Clock	12	1Positive Clock
13	1Negative Valid	14	1Positive Valid
15	1Negative Sync	16	1Positive Sync
17	Ground	18	Ground
19	1Negative Data 5	20	1Positive Data 5
21	1Negative Data 6	22	1Positive Data 6
23	1Negative Data 7	24	1Positive Data 7
25	Ground/3.3V	26	Ground/3.3V
27	2Negative Data 0	28	2Positive Data 0
29	2Negative Data 1	30	2Positive Data 1
31	2Negative Data 2	32	2Positive Data 2
33	2Negative Data 3	34	2Positive Data 3
35	2Negative Data 4	36	2Positive Data 4
37	2Negative Clock	38	2Positive Clock
39	2Negative Valid	40	2Positive Valid
41	2Negative Sync	42	2Positive Sync
43	Ground	44	Ground
45	2Negative Data 5	46	2Positive Data 5
47	2Negative Data 6	48	2Positive Data 6
49	2Negative Data 7	50	2Positive Data 7

Table 3 50 PIN IO Connector

5.3 DDPC Top side

Located near the front of the DDPC are the POWER PLUG and the MSR MOTHER BOARD INTERFACE, these two connectors supply power and I2C control from the MSR Mother Board (future). See Figure 5 Top View.

5.3.1 POWER PLUG

The POWER PLUG connector is a JST B2B-PH-SMT-TBT 2MM pitch. It can receive 12 volts from a different source than the MSR for stand-alone cases. Table 4 shows the POWER PLUG Connections.

Pin	Signal	Description
1	12V	Power Connection
2	Gnd	Ground Connection

Table 4 Power Connector

5.3.2 MSR Mother Board Interface

The MSR MOTHER BOARD INTERFACE edge connector connects the DDPC to the MSR 80 pin SAMTEC MEC1-140-02-F-D-A. This gives the DDPC power and I2C control. The connector also passes through diversity tuner data from one tuner to the next. Table 5 shows the MSR MOTHER BOARD INTERFACE Connections.

NOTE: The DDPC should not be placed in slot 1 if turners are used in the same MSR.

PIN	SIGNAL	PIN
1 through 16	Pass tuner diversity data to	29 through 46
17 through 26	No Connect	
27 and 28	Pass tuner diversity data to	47 and 48
31 and 32	Edge Connector Key Pins, No Connect	
49	I2C Data (SDA)	
50	Reset	
51	I2C Clock (SCL)	
52 through 56 61 through 66 71 through 76	Ground	
57 through 60	Isolated 1.8V	
57 through 70	Isolated 5V	
57 through 80	MSR Source 12V	

Table 5 MSR Mother Board Interface

6 Software Overview

Configuration, control and monitoring of the DDPC unit can be implemented by using the Windows based control program supplied for each application. This program provides control of the AES decryption key and mode, high-speed data lost connection byte, and other needed settings. The DDPC can be setup once and will continue to run without flaw even when powered down, except when AES Decryption is set to "*AES, NEVER Store the key in the DDP" mode*, or the transmitter has changes certain settings explained later in this section. No other interface will be needed.

6.1 System Requirements

The DDPC Control program has been developed and tested on Microsoft Windows 2000 and Windows XP.

6.2 Software Installation

The following instructions outline the installation process for DDPC Control program:

1. *Insert provided CD-ROM into computer CD drive.*
2. *Run 'setup.exe' file. This will launch the GMS_DDPC setup program and several initial setup files will begin to be copied into the computer.*
3. *After the initial setup files are copied, the GMS_ DDPC setup program will prompt the user to close any applications that are running. Once all other programs are exited, click on the 'OK' button.*
4. *The GMS_* DDPC *setup program will prompt the user to click on the 'computer icon' button to begin installation. If desired, the user can change the destination directory from the default. Click on the 'computer icon' button.*
5. *The GMS_ DDPC setup program will then prompt the user to 'Choose Program Group'. If desired, the user can change the program group from the default. Click on the 'Continue' button.*
6. *After installing the DDPC program, the setup program will display a window indicating the setup was completed successfully. Click 'OK'.*

To load USB Drivers see "Loading USB Drivers for *DDPC*" on CD-ROM.

6.3 Software Functions

The *DDPC* control software provides the user access to many different configuration and control options. When the program is launched the specific configuration screen will appear. Select the serial port and a few options and the DDPC will be ready to run.

The DDPC has the following configurations: 128 bit AES Decryption, AES Encryption, and High-Speed Data from MPEG-2 transport stream. User Data is planned in the near future. These functions can be used alone or combined. For other configurations contact us at www.cobham.com/gms.

6.3.1 Function AES Decryption

When the program is launched, the screen shown in Figure 8 is displayed. The user should first select the serial port the computer is connected to via the Serial Port Selector and connection region. To configure the *DDPC*, the user must select a Descrambling mode, type in the Descrambling key, if in AES mode, and then click on Apply. Click on update to store these settings after powering off. The following section explains the various functions.

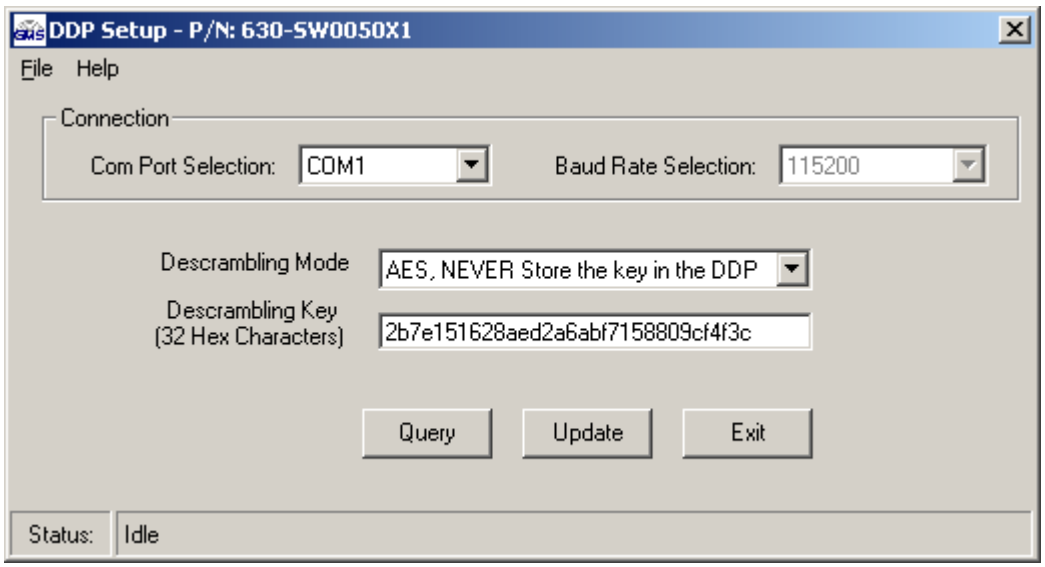

Figure 9 AES Decryption Descrambling Mode

6.3.1.1 Function AES Decryption Buttons and Selects

Com Port Selection: Select the COM port that the DDPC is connected to.

Query Button: Clicking on this button will set all the fields to the current operation mode, except the Descrambling Key.

Update Button: Load the DDPC with the new Descrambling Mode and Descrambling Key. This will save the settings and take a minute to reboot your DDPC.

Descrambling mode: As figure 9 shows, this box selects three different modes.

- *Bypass mode*: This mode does not do any AES Decryption. All other functions are not affected.
- *AES, NEVER Store the key in the DDP mode*: This mode does AES Decryption but the Decryption key must be reloaded every time it is powered off. This is for higher security.
- *AES, Store the key in DDP mode*: This mode does AES Decryption and the DDPC remembers the Decryption key so when the DDPC is powered on it will come up working.

Descrambling key: This box loads the decryption key. The *Descrambling mode* must be set to an AES mode before this input is available.

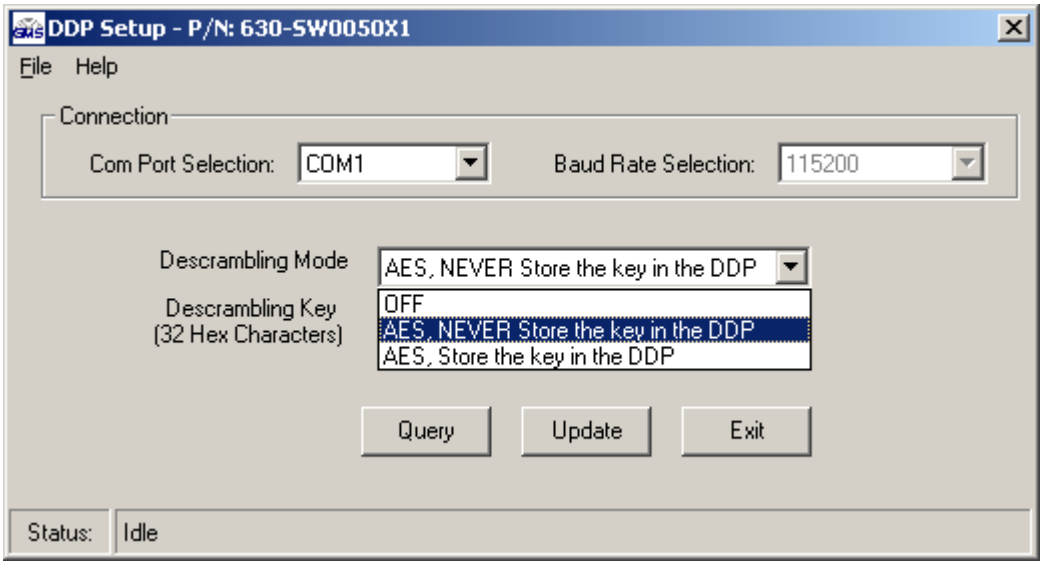

Figure 10 AES Decryption Descrambling Mode

6.3.2 Function High-Speed Data

When this program is launched the screen shown in figure 10 is shown. The user should first select the serial port the computer is connected to via the Serial Port Selector and connection region. There is no need to change any settings to make the DDPC function in High-Speed Data mode. The Option menu will only be enabled if you have purchased the AES Decryption option. See AES Decryption for a full explanation of the settings. To change High-Speed Data you must set all functions as desired, click on Apply, and click on Save. The following section explains the various functions.

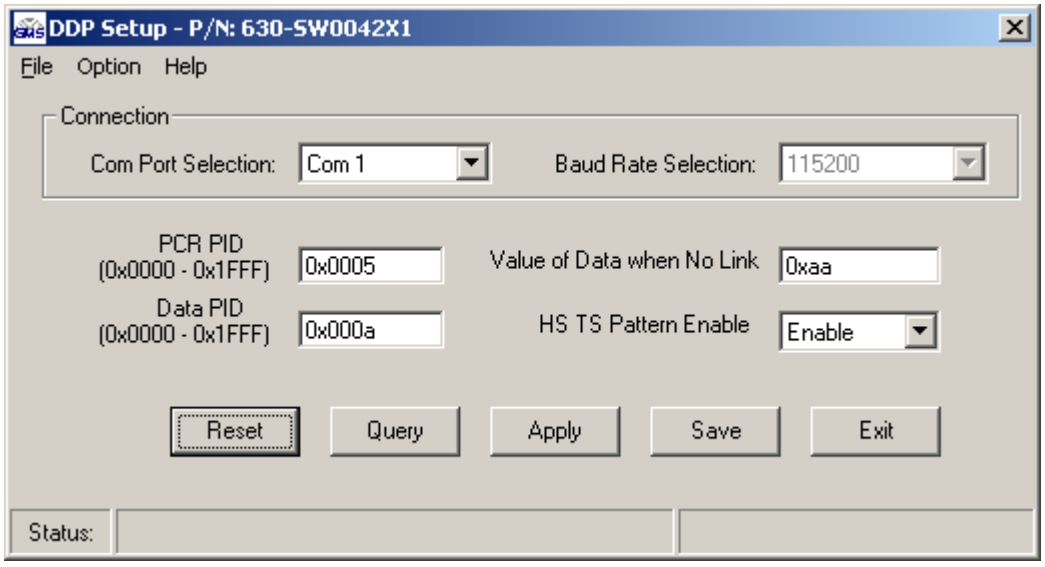

Figure 11 Configure High Speed Data

6.3.2.1 Function High-Speed Data Buttons and Selects

Com Port Selection: Select the COM port that the DDPC is connected to.

Reset Button: Clicking on this button re-initializes the DDPC FPGA.

Query Button: Clicking on this button will set all the fields to the current operation mode, except the Descrambling Key.

Apply Button: Load the DDPC with the new Descrambling Mode and Descrambling Key.

Save Button: Clicking this button will save the settings to the DDPC so when power is recycled the DDPC will remember the last settings.

Value of Data when No Link: This box loads the No Link byte. This byte will be outputted when the DDPC is no longer receiving valid data through the link.

PCR PID: This box loads the 13-bit PCR PID into the DDPC. The PCR PID of the DDPC must match the High-Speed Data transmitter's PCR PID.

Data PID: This box loads the 13-bit Data PID into the DDPC. The Data PID of the DDPC must match the High-Speed Data transmitter's Data PID.

For information on all other buttons refer to the AES Decryption function section.

6.3.3 Function User Data

When this program is launched the screen will look a lot like the previous functions. The user should first select the serial port the computer is connected to via the Serial Port Selector and connection region. To enable the User Data click *Insert User Data* button. The PID should match the one in the Transmitter. To change User Data you must set all functions as desired, click on Apply, and click on Save.

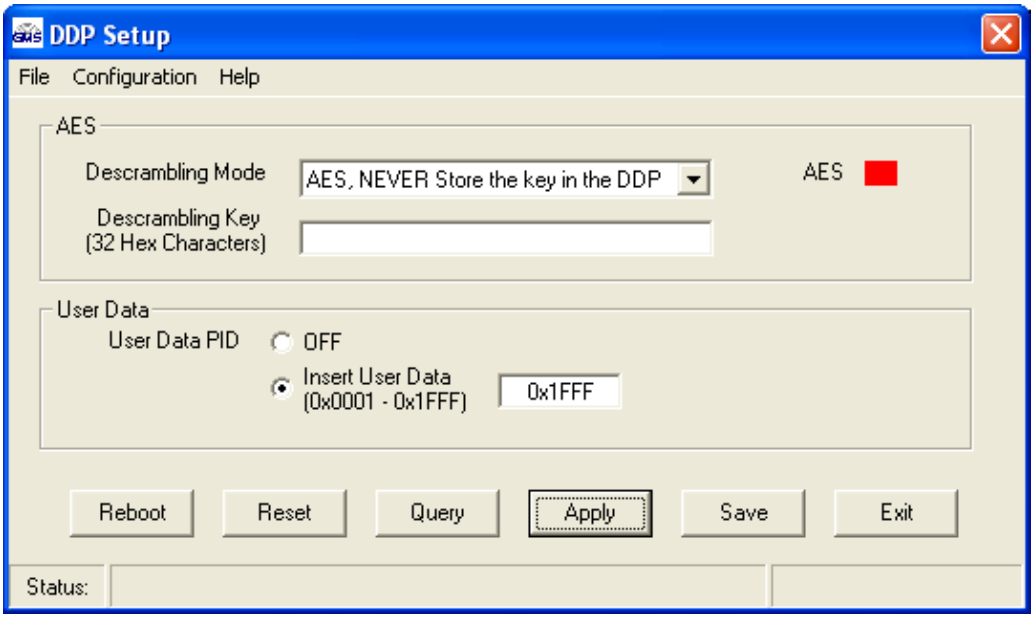

Figure 12 User Data Mode

6.3.3.1 Function User Data Buttons and Selects

Com Port Selection: Select the COM port that the DDPC is connected to.

Reset Button: Clicking on this button re-initializes the DDPC FPGA.

Query Button: Clicking on this button will set all the fields to the current operation mode, except the Descrambling Key.

Apply Button: Load the DDPC with the new Descrambling Mode and Descrambling Key.

Save Button: Clicking this button will save the settings to the DDPC so when power is recycled the DDPC will remember the last settings.

User Data PID has two selections: *OFF* and *Insert User Data*. The value of PID can be changed in the PID window.

6.3.4 Function 4K

When the program is launched, the screen shown in Figure 13 is displayed. The user should first select the serial port the computer is connected to via the Serial Port Selector and connection region. To configure the *DDPC*, the user must enable 4K mode, and then click on Apply. Click on Save to store these settings after powering off. The following section explains the various functions.

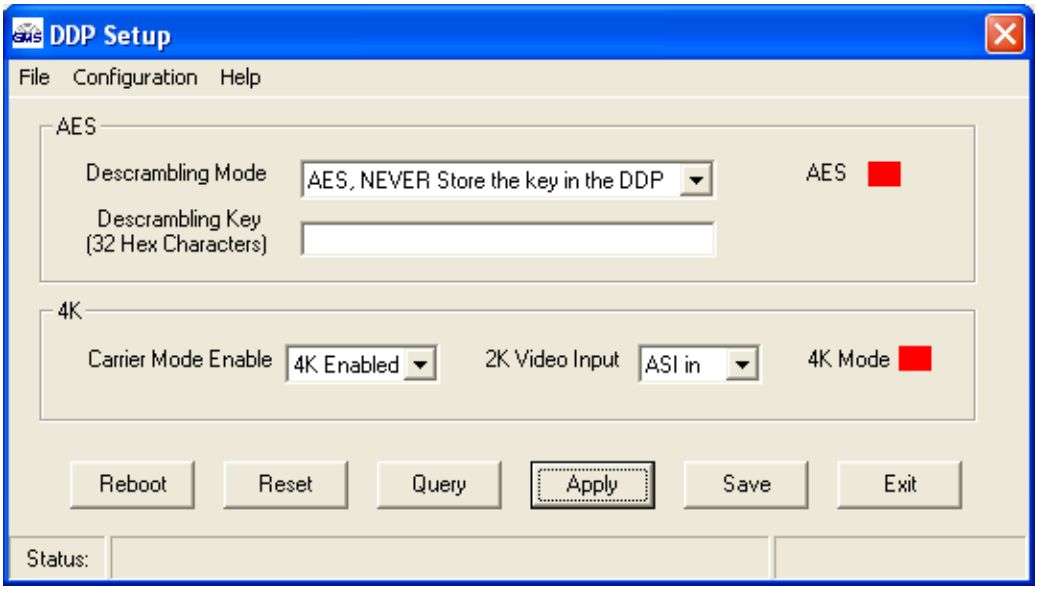

Figure 13 4K Mode

6.3.4.1 Function 4K Buttons and Selects

Com Port Selection: Select the COM port that the DDPC is connected to.

Reset Button: Clicking on this button re-initializes the DDPC FPGA.

Query Button: Clicking on this button will set all the fields to the current operation mode, except the Descrambling Key.

Apply Button: Load the DDPC with the new Descrambling Mode and Descrambling Key.

Save Button: Clicking this button will save the settings to the DDPC so when power is recycled the DDPC will remember the last settings.

4K Mode: This box indicates the mode of the received signal (Red for 2K and green for 4K).

7 Specifications

The following sections outline the overall specifications for the DDPC unit.

Main Board
- Processors
  - Xilinx FPGA
  - AVR Micro-controller
- Interfaces
  - Control
    - 2 RS-232C via JST SM10B-SRSS-TB 10 pin
    - USB-1 via USB-B Connector
    - MSR I2C via 80 pin edge connector, mates with SAMTEC MEC1-140-02-F-D-A
  - Transport/Data Stream in/out
    - ASI in via BNC-F Connector
    - 50 Pin I/O Micro-Header, ERNI 054596 0.05-inch Connector
    - ASI out via BNC-F Connector
  - DC Power
    - 2 pin, AMP 350786-2 Connector
    - MSR via 80 pin edge connector, mates with SAMTEC MEC1-140-02-F-D-A
  - AC Power (Optional with external in-line cable assembly)

- Controls & Status
  - "ACTIVE" – Provides indication that system is powered and processing data
  - "FUNCTION" – Provides indication that the special function is active
  - Full DDPC System control and status is accessed through either its RS-232C or USB-1 control ports via the supplied MS Windows based control application.
- Physical
  - Size (inches): 3.8 x 2.78 x 0.5 (Less Connectors)
    (cm): 9.65 x 7.06 x 1.27
  - Weight: 2.0 oz (56.5 grams)
- Environmental:
  - Operational Temperature: -10 to 70 deg C
  - Humidity: Up to 100% non-condensing
- DC Power
  - DC Voltage Range: 9 -15V
  - Power Consumption: 4.8 Watts

Case (go to www.cobham.com/gms for details)

MSR (Sold Separately)
See separate data sheets
Rack-Mount (Sold Separately)

Appendix A: Cable, DDPC to High-Speed Data out

Appendix B: Cable, User Data RS-232