

D2MANAGE™



V4.1

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1. Hardware Setup:



1. Power: Supplied by 5V 3.6 amp external power supply provided with unit.
2. RS-232: Serial port for receiving diagnostic messages for unit. Please use provided DB9 to RJ11 adaptor and cable.
3. Ethernet (option): Gigabit Data Port used for sending/receiving Transport Streams over IP.
4. Control Ethernet: Used by D2Manage software for configuring the unit. Please note the provided Cat-5 cable is for connecting through a switch/router. If you want to directly connect from a laptop/PC you will need a crossover cable (not provided).
5. ASI x IN: Input ports for ASI transport streams.
6. ASI x Out: Output ports for ASI output transport streams.
7. SMPTE 310 (option): Output port for SMPTE-310 transport stream.

2. Basic D2Manage Setup:

2.1 Connecting to D2Mux

1. D2Manage will automatically query for units on startup. If a unit is connected after startup press Find D2Mux (see figure 1) to query unit. This will locate any D2Mux units on the network. The control ethernet comes configured for IP address 192.168.1.100. Use the IP Setup application provided on the installation CD to change the static IP address. The unit can be configured for DHCP by setting the IP address 0.0.0.0. **WARNING:** IP Setup, and D2Manage use the same port for discovering D2Mux units so they can not be open at the same time.

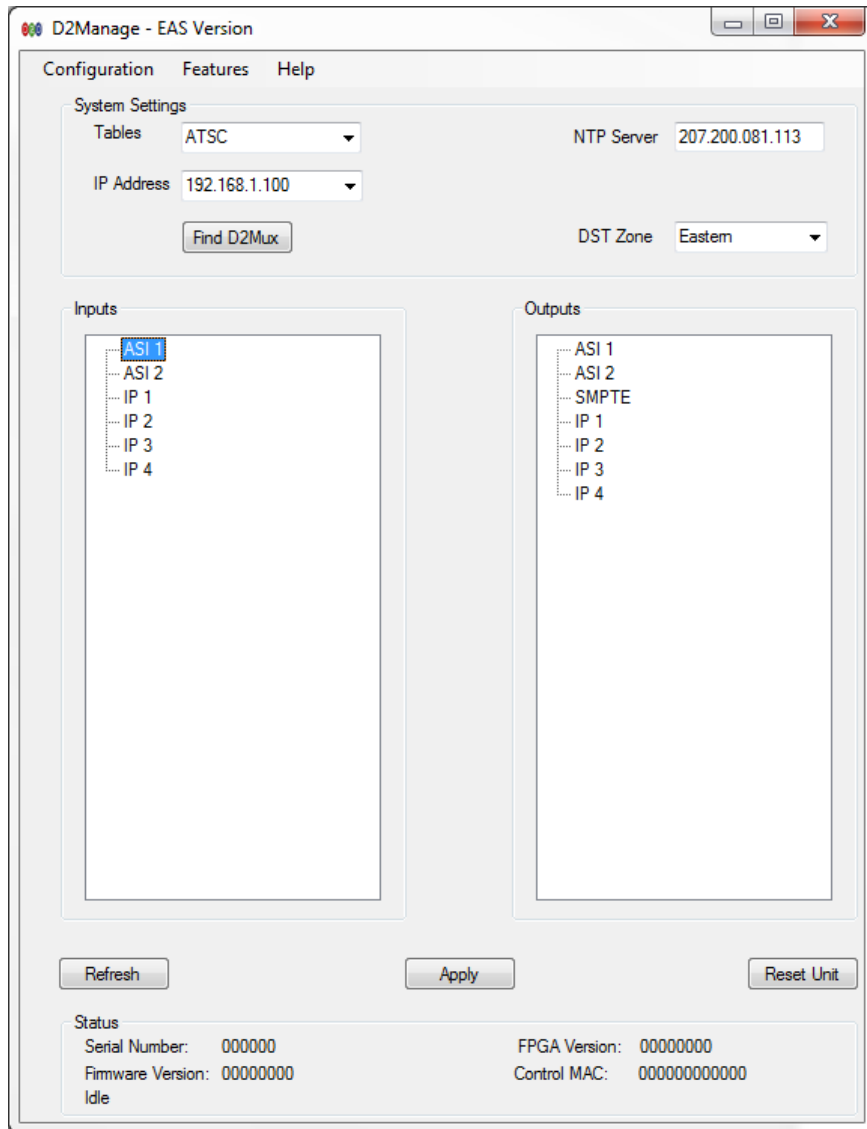


Figure 1

2.2 Retrieving Current Configuration

Make sure inputs are connected to D2Manage and then press the Refresh button. Settings will be updated with current values and incoming programs will be displayed in the input boxes (see figure 2). If an input/output is not feature enabled the appropriate box will be grayed out. Please contact sales@d2dtechnologies.com to inquire about enabling features.

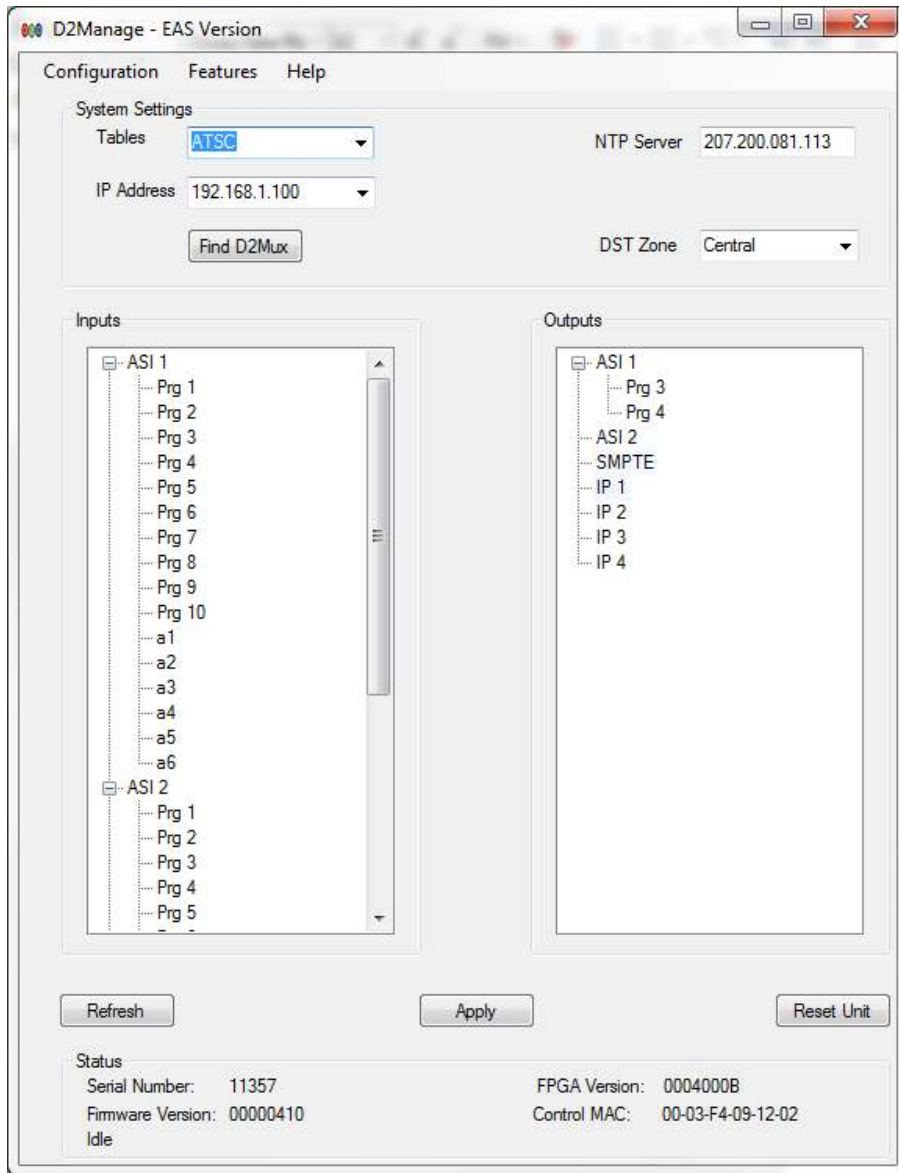


Figure 3

2.3 Setting GigE Data Port Settings

Select Configuration->Network to open GigE Data Port Settings page (see Fig 2.3). Note: Unit must have GIGE option to use this feature. GigE port operates only on GigE capable networks. Please contact sales@d2dtechnologies.com to inquire about a software version for 10/100 only networks.

- a. Gige IP Address: IP address for GigE data port. Set to 000.000.000.000 for DHCP mode.

- b. GigE Gateway: Gateway IP address for GigE data port.
- c. GigE Subnet Mask: Subnet Mask for GigE data port.
- d. GigE ASI Passthrough: When Passthrough mode is enabled the incoming transport stream on ASI1 is passed to IP 1 output exactly as it comes in. IP 1 input is passed to ASI 1 output exactly as it comes in.
NOTE: In this mode you will not see any incoming programs in the inputs after a refresh. Use this feature for easy setup when using the D2Mux strictly as an ASI to IP/IP to ASI converter.

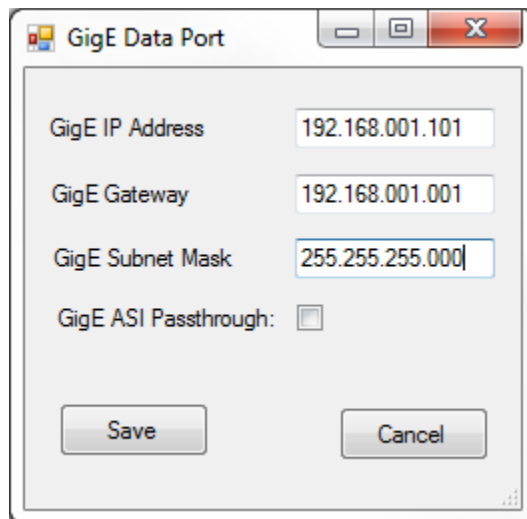


Figure 2.3

2.4 Setting Automated PSIP Settings

Select Configuration->PSIP to open Automated PSIP Settings page (see Fig 2.4).
Note: Unit must have PSIP option to use this feature.

- a. FTP URL: FTP URL for TitanTV(BIM) PSIP data service.
- b. UserName: TitanTV assigned user name.
- c. Password: TitanTV assigned password.



Figure 2.4

2.5 Viewing Available Features

Select Features->View to open Features Page (see Figure 4) to see what features are available.

- a. PSIP – Enables the D2Guide Dynamic PSIP generator.
- b. GIGE – Enables a single IP input and single IP output. This feature is also needed for the D2Alert EAS Injector.
- c. IMUX4 – Enables the D2iMux. There are two versions, one which enables four IP inputs and one which enables four IP outputs.

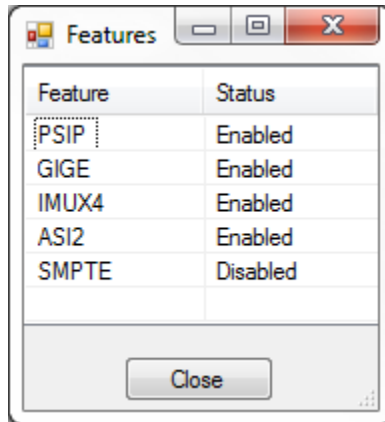


Figure 4

2.6 Modifying System Settings

System settings are located at top of main page (see figure 1).

- a. IP Address: IP Address of D2Mux (Read Only).
- b. NTP Server: IP Address of NTP Server. Set to 000.000.000.000 to use NTP Server Pool.
- c. DST Zone: Daylight Savings Time Zone. Please contact D2D if your time zone is not listed.
- d. Tables: PSIP tables type. D2Mux can be configured to generate MPEG only tables, ATSC tables, or DVB tables.

2.7 Selecting Input Programs for Output

Drag and drop the inputs you want to pass from the input ports to the desired Output ports (see figure 5).

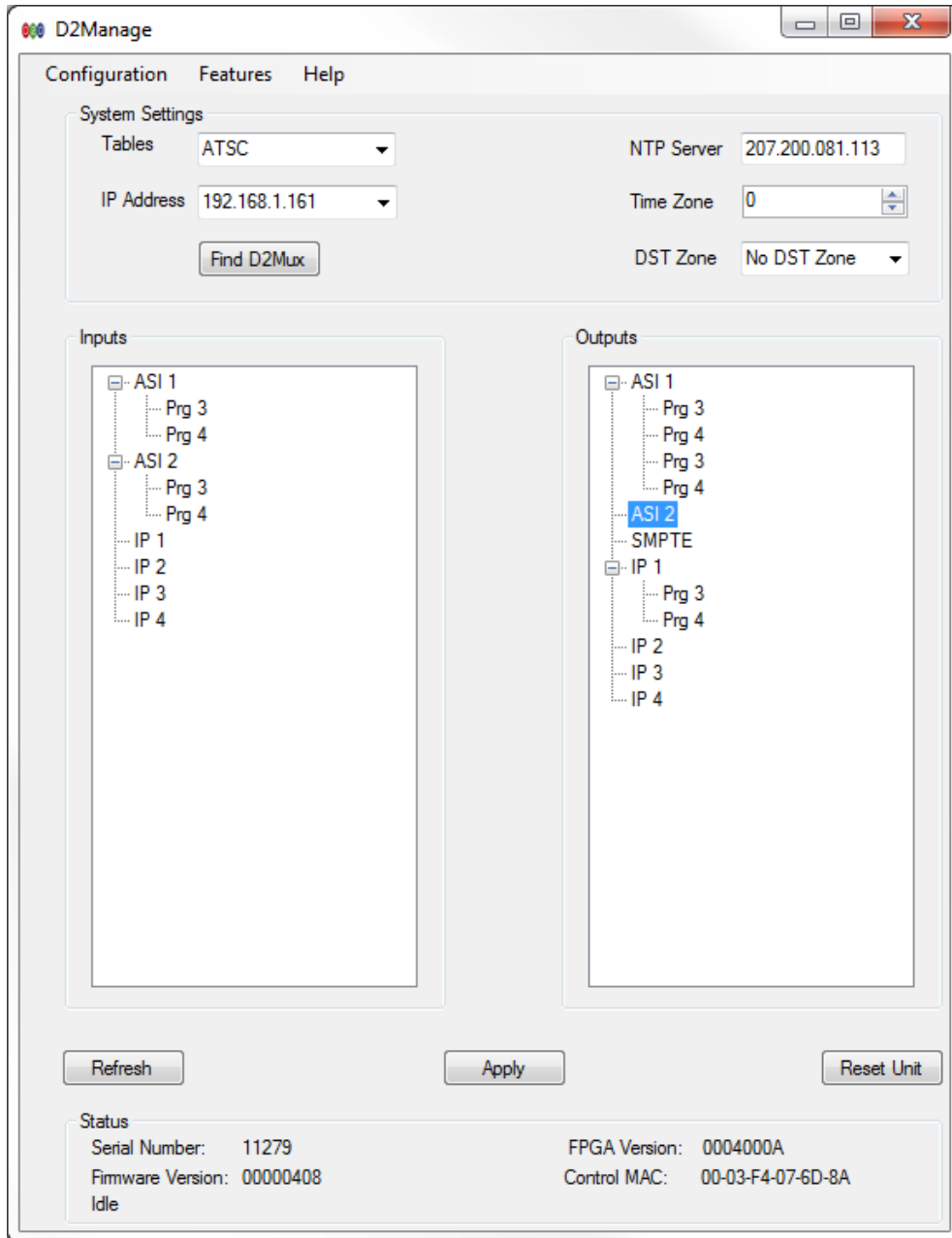


Figure 5

2.8 Configuring Output Transport Stream Settings

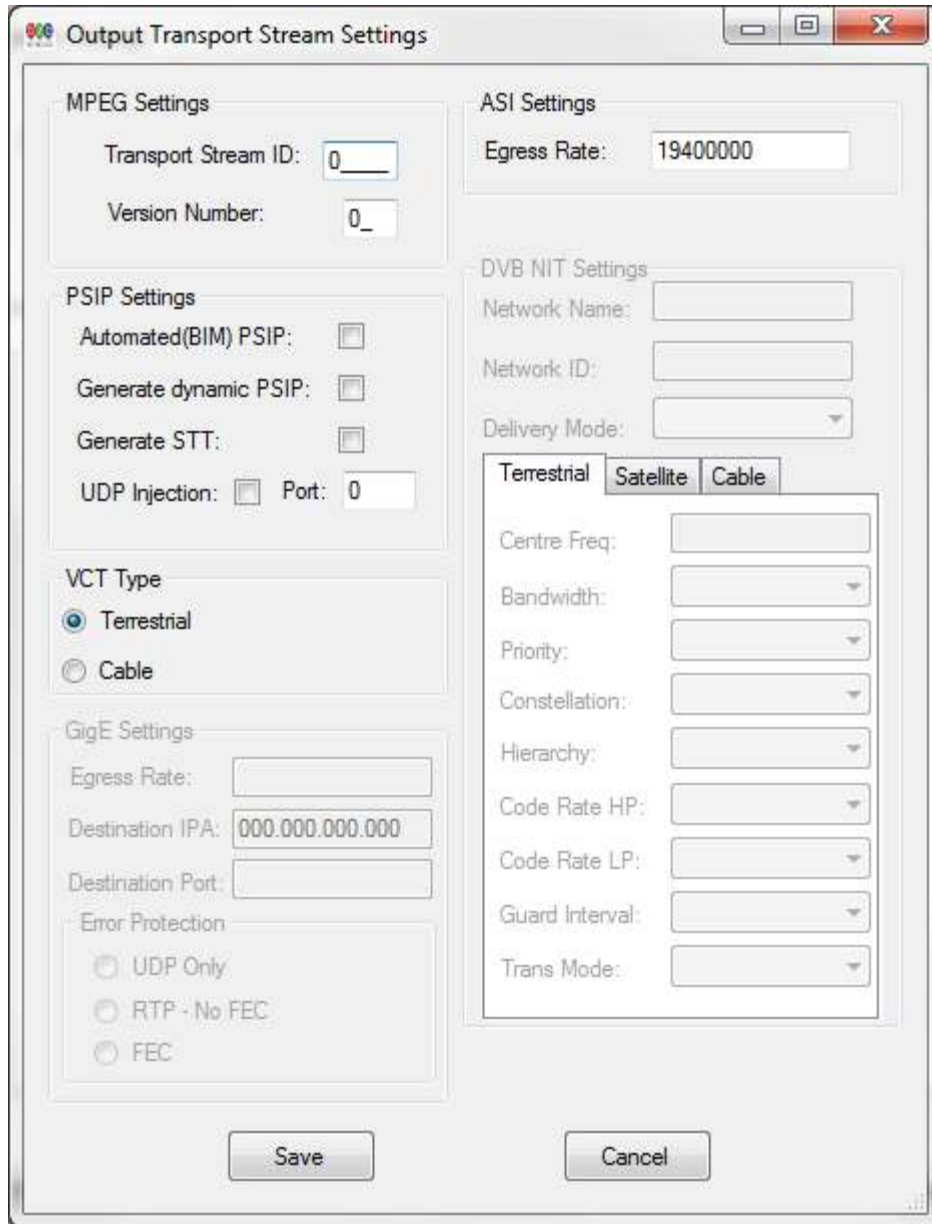


Figure 6

View and modify output transport stream settings by selecting an output port, right clicking, and selecting “Edit Transport Stream” (See Figure 6).

- a. Mpeg Settings
 1. Transport Stream ID: Unique ID to identify transport stream within a network.
 2. Version Number: Used to set version number of ATSC tables. Typically no longer used. D2Mux now automatically increment version number.
- b. PSIP Settings

1. Automated (BIM) PSIP: When selected D2Mux will automatically pull PSIP schedules from TitanTV (BIM). This requires the D2Guide feature and a subscription to BIM's TitanTV service.
 2. Generate Dynamic PSIP (D2Guide Only): Used by D2Guide to enable Dynamic PSIP
 3. Generate STT: When selected D2Mux will generate the STT table.
 4. UDP Injection: Enables D2Mux to receive PSIP tables on the configured UDP port number from third party PSIP generators and inject them into the multiplex.
- c. VCT Type: Used to select Terrestrial (TVCT) or Cable (CVCT) VCT.
- d. Gige Settings (GigE Option Only)
1. Egress Rate: Total output bitrate entered as bps. Null packets will be used to fill. Valid settings: - 1000000 (1 Mbps) -100000000 (100 Mbps).
 2. Destination IPA: IP Address of destination. May be unicast or multicast.
 3. Destination Port: UDP Port of destination.
 4. Error Protection.
 - a. UDP Only – No Error Protection.
 - b. RTP – No FEC. Uses RTP packets for re-ordering out of order packets.
 - c. FEC – NOT IMPLEMENTED AT THIS TIME
- e. ASI Settings (ASI Ports Only)
1. Egress Rate: 10000 Kbps to 213 Mbps.
- f. DVB NIT Settings (Table Type must be set to DVB to enable)
1. Network Name: Name of network.
 2. Network ID: ID to uniquely identify network.
 3. Delivery Mode: Used to select delivery mode with options of Terrestrial, Satellite, and Cable.
- g. Terrestrial Settings
1. Centre Frequency: Center Frequency in multiple of 10 Hz.
 2. Bandwidth: Bandwidth of network. 5 to 8 MHz.
 3. Priority: Specifies whether network is High or Low priority.
 4. Constellation: Specifies constellation pattern.
 5. Hierarchy: Specifies whether network is hierarchal, and if so, also specifies alpha and inter-leaver depth.
 6. Code Rate HP: Specifies inner FEC scheme for high priority level.
 7. Code Rate LP: Specifies inner FEC scheme for low priority level.
 8. Guard Interval: Guard interval of network.
 9. Transmission Mode: Specifies number of carriers in OFDM frame.
- h. Satellite Settings
1. Frequency: Satellite Frequency in GHz.
 2. Orbital Position: Orbital position of satellite in degrees.
 3. West East Flag: Indicates if satellite is Western or Eastern part of the orbit.
 4. Polarization: Polarization of transmitted signal.
 5. Roll-off: Roll-off factor used in DVB-S2 only.

6. Modulation System: Specifies the broadcast scheme.
 7. Modulation Type: Specifies the modulation scheme.
 8. Symbol Rate: Specifies the symbol rate in MSymbols/S.
 9. FEC Inner: Specifies the Inner FEC scheme.
- i. Cable Settings
1. Frequency: Cable Frequency in MHz.
 2. FEC Outer: Specifies outer FEC scheme.
 3. FEC Inner: Specifies inner FEC scheme.
 4. Modulation: Specifies the modulation scheme.
 5. Symbol Rate: Specifies the symbol rate in MSymbols/S.

2.9 Configuring Output Program Settings

Source Program

Program Name: Prg 3 Program Number: 3 Input Port: 0

Output Program

Program Name: D2D-1

Program Number: 3

PMT Pid (hex): 100

PCR Pid (hex): 31

Elementary Streams

Output Pid (hex)	Type	Input Pid (hex)
<input checked="" type="checkbox"/> 31	MPEG-2 Video	31
<input checked="" type="checkbox"/> 34	AC3 Audio	34
<input checked="" type="checkbox"/> 35	AC3 Audio	35

VCT Entry

Major Channel Number: 31

Minor Channel Number: 1

Frequency: 0

Hidden:

Hide Guide:

Path Select: (CVCT Only)

Out of Band: (CVCT Only)

Source ID: 0

Static Eit Entry

Title: _____

DVB Fields

Service Provider: _____

Service Type: _____

Logical Channel Number: _____

Save Cancel

Figure 7.

View and modify program settings by selecting an output program, right clicking, and selecting “Edit Program” (See Figure 7).

- a. Source Program Box displays the input settings of the program.
- b. Output Program
 1. Program Name: Name of program in output transport stream. Seven characters maximum per ATSC standard.

2. Program Number: Program number of program in output stream. Must be unique within a transport stream.
 3. PMT: PMT of program in output stream.
 4. PCR: PCR PID of program in output stream. Typically carried in same PID as video. If this is the case and video PID is remapped, PCR PID must be changed to match.
- c. VCT Entry
1. Major Channel Number: Combined with Minor Channel Number forms a unique virtual channel number.
 2. Minor Channel Number: Combined with Major Channel Number forms a unique virtual channel number.
 3. Hidden: When set channel is not accessible by set top box.
 4. Hide Guide: When channel is hidden Hide Guide determines if channel is displayed in guide information.
 5. Path Select (CVCT only): Specifies transmission path.
 6. Out of Band (CVCT only): When set indicates program carried out of band.
 7. Source ID: Uniquely identifies program and is used to link programs to dynamic psip (EIT/ETT tables).
- d. Elementary Streams
1. Output PID: Click on output once to select and second time to edit. Double click on output to toggle check box. If check box is unchecked elementary stream will be dropped from program.
- e. Static EIT Entry: If static EITs are enabled you may also enter a title name to be used in the static EITs.
- f. DVB Fields
1. Service Provider: Name of service provider.
 2. Service Type: Specifies type of service.
 3. Logical Channel Number: Specifies logical or “virtual” channel number.

2.10 Apply Configuration Settings

Once all configurations have been set, send configurations to D2Mux by pressing the Apply button on the main window.

3. Gigabit Data Ethernet Configuration

3.1 Gigabit Ethernet Transmit Configuration:

Right click on IP Output port and select “Edit Transport Stream” and edit GigE settings (Figure 8).

- a. Egress Rate: Total output bitrate entered as bps. Null packets will be used to fill. Valid settings: - 1000000 (1 Mbps) -100000000 (100 Mbps).
- b. Destination IPA: IP Address of destination. May be unicast or multicast.
- c. Destination Port: UDP Port of destination.
- d. Error Protection.
 1. UDP Only – No Error Protection.
 2. RTP – No FEC. Uses RTP packets for re-ordering out of order packets.
 3. FEC – NOT IMPLEMENTED AT THIS TIME

The screenshot shows the 'Output Transport Stream Settings' dialog box. It contains the following fields and options:

- MPEG Settings:** Transport Stream ID: 0, Version Number: 0
- ASI Settings:** Egress Rate: [empty]
- PSIP Settings:** Generate static EIT: , Generate dynamic PSIP: , Generate STT: , UDP Injection: Port: 0
- VCT Type:** Terrestrial, Cable
- GigE Settings:** Egress Rate: 1000000, Destination IPA: 100.001.010.012, Destination Port: 0
- Error Protection:** UDP Only, RTP - No FEC, FEC
- DVB NIT Settings:** Network Name: [empty], Network ID: [empty], Delivery Mode: [dropdown]
- Transmission Mode:** Terrestrial, Satellite, Cable tabs. Centre Freq: [empty], Bandwidth: [dropdown], Priority: [dropdown], Constellation: [dropdown], Hierarchy: [dropdown], Code Rate HP: [dropdown], Code Rate LP: [dropdown], Guard Interval: [dropdown], Trans Mode: [dropdown]

Buttons: Save, Cancel

Figure 8

3.2 Gigabit Ethernet Receive Configuration:

Right click on IP Input port, select “Edit Transport Stream” and edit GigE settings (Figure 9).

- a. Receive Port: UDP to listen on from reception.
- b. Multicast Enabled: Check box to enable Multicast reception. When multicast not enabled, GigE Data Port IP Address is used.
- c. Multicast IPA: IP Address to listen for reception when Multicast is enabled.
- d. Error Protection.
 1. UDP Only – No Error Protection.
 2. RTP – No FEC. Uses RTP packets for re-ordering out of order packets.
 3. FEC – NOT IMPLEMENTED AT THIS TIME

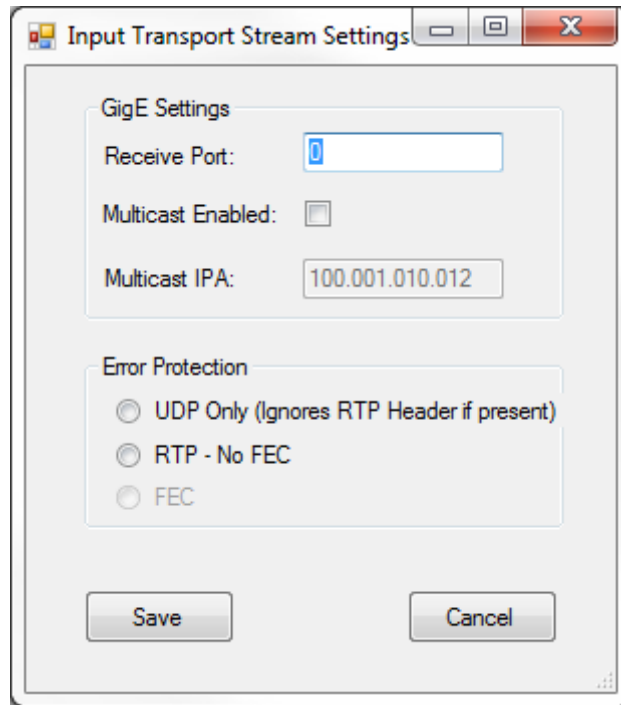


Figure 9

4. Reprogramming D2Mux

1. Load new D2Mux firmware using the AutoUpdate application included in the installation CD (see Figure 10).
2. Load new FPGA code into D2Mux by FTPing D2Mux.bit file into root directory. D2Mux must be reset for code to be installed.
3. WARNING: AutoUpdate, IP Setup, and D2Manage use the same port for discovering D2Mux units so they can not be open at the same time.

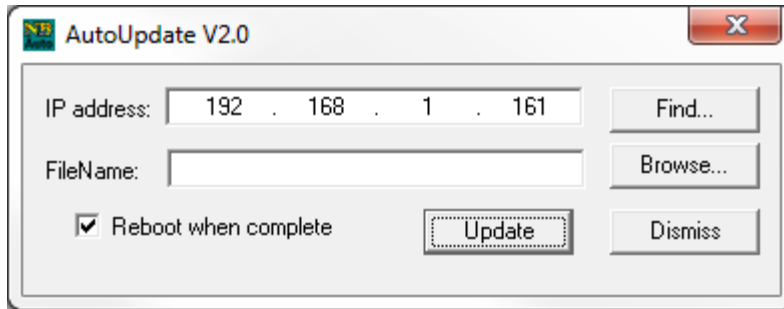


Figure 10

5. Setting up Dynamic PSIP using D2Guide

5.1 Manual Dynamic PSIP:

Setting up Dynamic PSIP (D2Guide feature required):

1. Dynamic PSIP must first be enabled by selecting it on the Transport Stream settings (see section 2.7).

2. Configure your output programs giving each one a unique Source ID. The Source ID will be used to link the schedule files to the programs (see section 2.7).
3. Create a schedule file in excel with the following format (samples and template included on installation disk):

There are two variations for the format: Standard and Day of Week):

Standard: The Standard format uses YYYYMMDD. All dates and times are in GMT

air_date(YYYYMMDD)	air_time(HHMM)	duration(HHMM)	Event ID	EIT Title	ETT Title
20150710	0000	0030	00003	D2D Prog 3	D2D Prog 3 Extended Te
20150710	0030	0030	00004	D2D Prog 4	D2D Prog 4 Extended Te
20150710	0100	0030	00005	D2D Prog 5	D2D Prog 5 Extended Te
20150710	0130	0030	00006	D2D Prog 6	D2D Prog 6 Extended Te

Day of Week: The Day of Week format is the same as Standard except it uses a day of the week index instead of YYYYMMDD with 0 = Sunday and 6 = Saturday. This is useful for schedules which mostly repeat week to week. All times are in GMT.

air_date(YYYYMMDD)	air_time(HHMM)	duration(HHMM)	Event ID	EIT Title	ETT Title
4	0000	0030	00003	D2D Prog 3	D2D Prog 3 Extended Te
4	0030	0030	00004	D2D Prog 4	D2D Prog 4 Extended Te
4	0100	0030	00005	D2D Prog 5	D2D Prog 5 Extended Te
4	0130	0030	00006	D2D Prog 6	D2D Prog 6 Extended Te

4. Save the file as a tab delimited text file with the following file name: EIT Files - EIT_tsid_maj_min.TXT. tsid is Transport Stream ID, maj is Major Channel# and min is Minor Channel# Ex. EIT_210_18_1.TXT for for transport stream ID 210, major channel# 18, minor channel# 1.
5. FTP the schedules to the SCH directory on the Unit.

6. D2Guide will automatically detect new schedules and use them to create the dynamic PSIP tables.

5.2 Automated Dynamic PSIP:

1. This feature requires the D2Guide option and a subscription to BIM's TitanTV PSIP data service.
2. Setup the TitanTV assigned FTP URL, UserName, and Password (see section 2.4).

6. Configuring D2Alert

Interfacing D2Mux to Digital Alert Systems DASDEC-II (D2Alert Option only). The D2Alert option requires the GIGE feature. The D2Alert requires a special version of the D2Manage software which is indicated by "D2Manage – EAS Version" in the title bar of the main page.

1. Setup GigE Data Port IP address (see section 2.3).
2. Set receive UDP port on IP input 1. (see section 3.2).
3. If using multicast stream, enable multicast receive and set multicast address (see section 3.2).
4. Point DASDEC-II ip output to the GigE Data Port IP address and receive port set in steps 1-3.
5. DASDEC-II video stream must be on PID 0x44 and the audio stream on PID 0x45. These are the DASDEC-II default settings.
6. When the D2Mux detects a transport stream containing video on PID 0x44 coming in on the configured GigE IP address and receive port, it will replace all incoming ASI programs with the DASDEC-II alert program.
7. The D2Alert defaults to replacing all incoming programs with the alert program. Please refer to the D2Alert Messaging Protocol for directions on how to select individual programs using UDP messaging.

7. Troubleshooting Guide

7.1 Channels show up on channel guide but can't be decoded.

1. Are PID values unique? For each output all PIDs must be unique.
2. If using Drake encoders, our PMTs default to same as Drakes default video PIDs so one of them must be remapped.

3. If pcr is on the same PID as the video and the video pid is remapped, the pcr PID also needs to be changed to match the new PCR pid. If this is not done, typically the set top will show the program in the channel list but it will not be able to decode program or there will be lip sync issues.
4. Is the total bitrate of all the programs and associated tables exceeding transport stream output bitrate? This will cause packets to be dropped from all programs.

7.2 Input Programs do not show up when doing a refresh

1. Verify ASI sources.
2. If IP input verify UDP port and Gige Data Port IP address are configured to match the incoming IP stream. If it is multicast make sure the multicast IP address is set properly.
3. If ASI input LEDs are not working properly and the FGPA version number is not valid the FPGA is probably not getting loaded. Remove the lid from the unit and verify the SD is seated properly.
4. If IP input verify the IP address and UDP port match incoming IP stream. If GigE port is using DHCP, make sure the network has a DHCP server to assign an IP address to the GigE port.