

A N T E N N A I R

'BATC DTX1' DVB-S Encoder / Modulator

USER GUIDE Issue 1.2



This Guide should be used in connection with firmware 01.00.01

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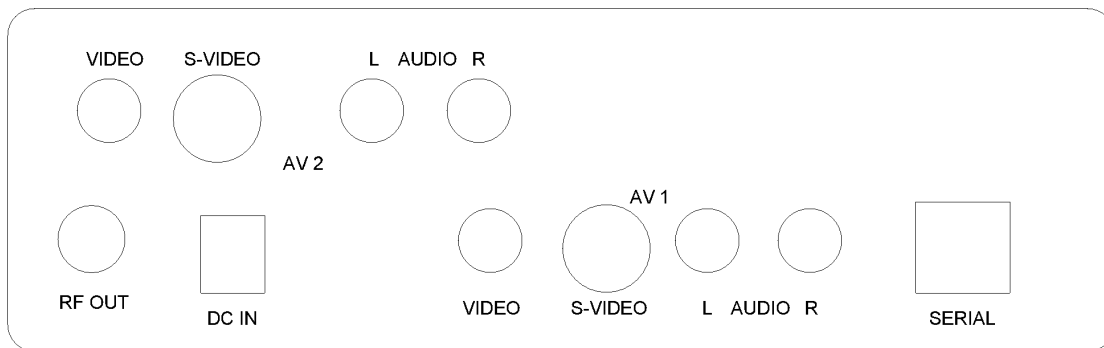
Foreword

This user guide contains basic instructions for installation and operation of both Single and Dual Channel DTX1 Modulators.

Please read through this document to determine how best to deploy the unit (location, connections & settings) to suit your intended application.

1. Hardware Installation – Boxed Version

The boxed unit should be located indoors, in a reasonably well ventilated location and away from direct sources of heat such as radiators, direct sunlight, or excessively hot electronic equipment. The rear of a dual unit is arranged like this:



(Figure 1) Rear Panel

Connections are arranged in two horizontal rows. The lower row is always present on both Single and Dual units, whereas the upper row is only present on Dual units. On the bottom row, connections from left to right are as follows:

1	'F' Connector	UHF Output into 50 Ohms coaxial cable.
2	Barrel ROKA Plug	12V 1A DC PSU Input, Centre Positive (+).
3	Yellow PHONO socket	Composite Video Input, PAL/ NTSC 75 Ohms
4	Mini DIN Socket	S-Video Input, PAL/ NTSC 75 Ohms
5	White PHONO Socket	Audio Channel LEFT input 10K Ohms
6	Red PHONO Socket	Audio Channel RIGHT input 10K Ohms
7	RJ45 Socket	Serial Connection to host - reserved.

(Table 1) Connectors Main

N.B. The group AV1 are the primary input feed.

On the top row from left to right connections are the secondary feed AV2 as follows:

1	Yellow PHONO socket	Composite Video Input, PAL/ NTSC 75 Ohms
2	Mini DIN Socket	S-Video Input, PAL/ NTSC 75 Ohms
3	White PHONO Socket	Audio Channel LEFT input 10K Ohms
4	Red PHONO Socket	Audio Channel RIGHT input 10K Ohms

(Table 2) *Connectors (Expansion)*

In the majority of cases, the only connections used will be DC Power, UHF RF output, and Video and Sound inputs. You may select whether to use S Video or PHONO video inputs in the menu options (see later). If a Stereo sound source is not available, using just one of the two inputs for a Mono source will automatically feed audio to both LEFT and RIGHT channels of the modulated output, but with reduced input impedance. For best picture quality choose an S-Video picture source as opposed to composite video where possible. In all cases use good quality screened leads. Make all connections before powering up the unit.

The RF Output can be fed directly to a PA or depending on sensitivity you may require an intermediate amplifier such as a MMIC block. Nominal full power out is -6dBm.

2. Bare Board Version

If you have purchased the 'bare bones' DTX1 board from BATC you will have to provide a 5 button keypad to operate it, or a serial cable to a host PC running a terminal program. For more details of hardware connections and the serial command set, refer to <http://www.dtx1.info/> where you can also obtain the latest firmware upgrades and other information.

2.1. BATC DTX1 – A Quick Guide to Getting Started!

2.1.1. Some words of Caution

Please note – the DTX1 PCB contains static sensitive devices. You should take appropriate care to make sure you don't damage it. Always work with an ant-static wrist strap to discharge any static before touching the card even if it's unpowered. Also, there are switching power supply circuits on the board which convert the 12V DC input to various low voltages, which should not be touched during operation (e.g. to see how warm they might be!) as this might upset the sensitive feedback circuitry, and so cause excessive voltages and damage to components. The general rule is – don't touch the board while it's working, and don't zap it while it isn't!

2.1.2. Housing the Board.

The DTX1 PCB is made up of 6 layers, and contains quite a lot of copper to dissipate unwanted heat from the various IC's on it. When fitted in the extruded aluminium case (also available from BATC) this heat is dealt with by conduction to the slide-in grooves at the side of the case, and by conduction from the F connector to the rear panel to which it should be affixed. We aren't talking about a lot of heat here – the whole thing only takes about 6 watts – but anything which can be done to reduce the operating temperature

makes for more stable and reliable electronics. So if you are using your own metalwork (preferred over an ABS box) use metal stand-offs, bolts or whatever to mount the PCB, and make use of conduction through the F connector, which will help keep the modulator IC temperature down.

2.1.3. Powering the Board

Supply voltage is +12 Volts nominal, with the CENTRE PIN POSITIVE.

The board will operate reliably from 10 to 15V DC. We recommend a 1A PSU to have something in reserve, especially you might be adding a secondary encoder at some point.

2.1.4. Controlling the Board

Either a simple keypad, or RS-232 serial commands, may be used. If the cased option is being built up, this comes with an 'Antennair Quadrant' front panel membrane (the DTX1 is a derivative of a commercially available unit). Simply plug the membrane ribbon connector into the 6 pin connector on the PCB. If you are making up your own case, connect up 5 buttons (press to make switches) so that they all have one end in common. Wire as per table below.

2.1.5. Keyboard Connector P1

(Pin 1 is the nearest to the corner of the board)

PIN No.	SIGNAL
1	RIGHT
2	DOWN
3	LEFT
4	ENTER
5	UP
6	COMMON

(Table 3) *Keypad Connector*

2.1.6. RF Output P3

Output is approx -5dBm into 50 Ohms from the 'F' connector at the rear of the board. Do not short circuit, or allow static charges to damage the output circuit.

2.1.7. Audio and Video Inputs

1V Stereo Audio into 10K Ohms Red and White PHONO, and 1V Video into 75 Ohms PHONO, or Y/C into 75 Ohms S Video Mini DIN connector. PAL and NTSC supported.

2.1.8. Serial Port P16

(Pin 1 is the furthest from the corner of the board)

PIN No.	SIGNAL
1	GROUND (via. 10 Ohms)
2	CTS
3	TXD
4	RTS
5	RXD
6	DSR

(Table 4) *Serial Connector*

For the serial option, make up a cable to your PC, the DTX1 end is wired as follows to an RJ11 connector. Set your terminal to 115K, N,8,1.

2.2. Getting on Air

2.2.1. Pre-sets

The units has three pre-set locations (memories) where the whole configuration of the unit can be stored or recalled for quick access to different configurations. As shipped, there are 3 useful pre-sets already stored in non-volatile memory, called P1 P2 and P3, as follows:

PRESET	P1 – for 70cms		P2 – for 1248 MHz		P3 – for 1275 MHz	
	AV1	AV2	AV1	AV2	AV1	AV2
Frequency	437 MHz		1248 MHz		1275 MHz	
Symbol Rate	2 Ms / second		4 Ms / Second		4 Ms / second	
FEC	1/2		1/2		3/4	
Video in	Composite	Composite	Composite	Composite	Composite	Composite
RF	100%		100%		100%	
Provider name	BATC		BATC		BATC	
Network name	DTX1		DTX1		DTX1	
Channel name	Call sign CH1	Call sign CH2	Call sign CH1	Call sign Ch2	Call sign CH1	Call sign CH2
PMT PID	0xFFF = 4095	0x1000=4096	0xFFF = 4095	0x1000=4096	0xFFF = 4095	0x1000=4096
Video PID	0x100 = 256	0x200 = 512	0x100 = 256	0x200 = 512	0x100 = 256	0x200 = 512
Audio PID	0x101 = 257	0x201 = 513	0x101 = 257	0x201 = 513	0x101 = 257	0x201 = 513
Aux PID *	0x102 = 258	0x202 = 514	0x102 = 258	0x202 = 514	0x102 = 258	0x202 = 514

(Table 5) Pre-sets. Prefix 0x indicates hexadecimal notation. Decimal values have = prefix.

* Reserved for future use

2.2.2. Load from Pre-set

Choose the configuration that best suits your requirements from the above table. Select P1 / P2 / P3 to load the current configuration from that pre-set location. (Factory default is set to be P1).

2.2.3. Save to Pre-set

If you edit a configuration you may save it to keep the new values. Select P1 / P2 / P3 to save the current configuration to that pre-set location.

3. Menu Navigation

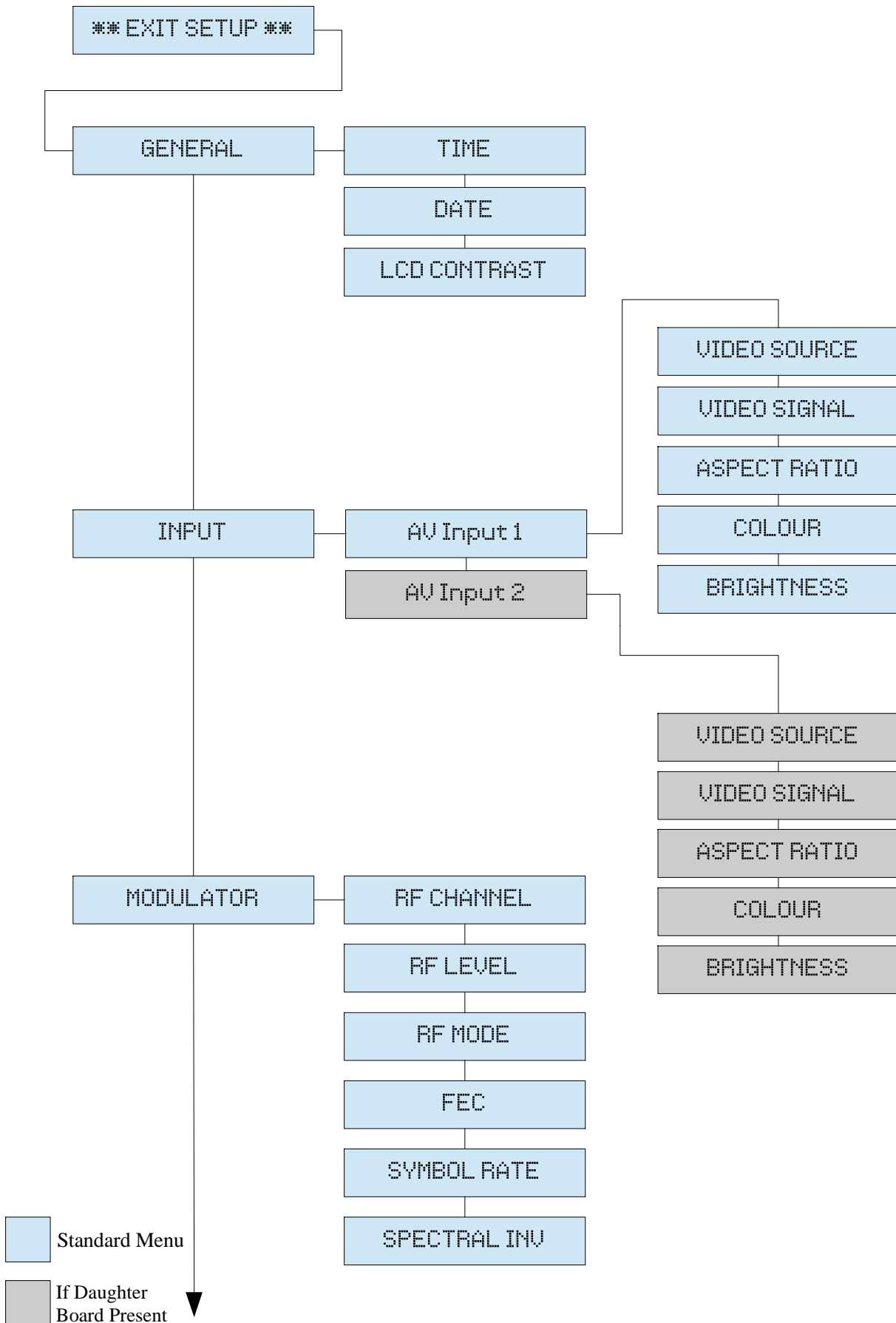
The menu system allows the user to set up various operating details such as Operating Frequency, Logical Channel Number (e.g. 555), Time and Date, Video Source type and Channel Name and so on.

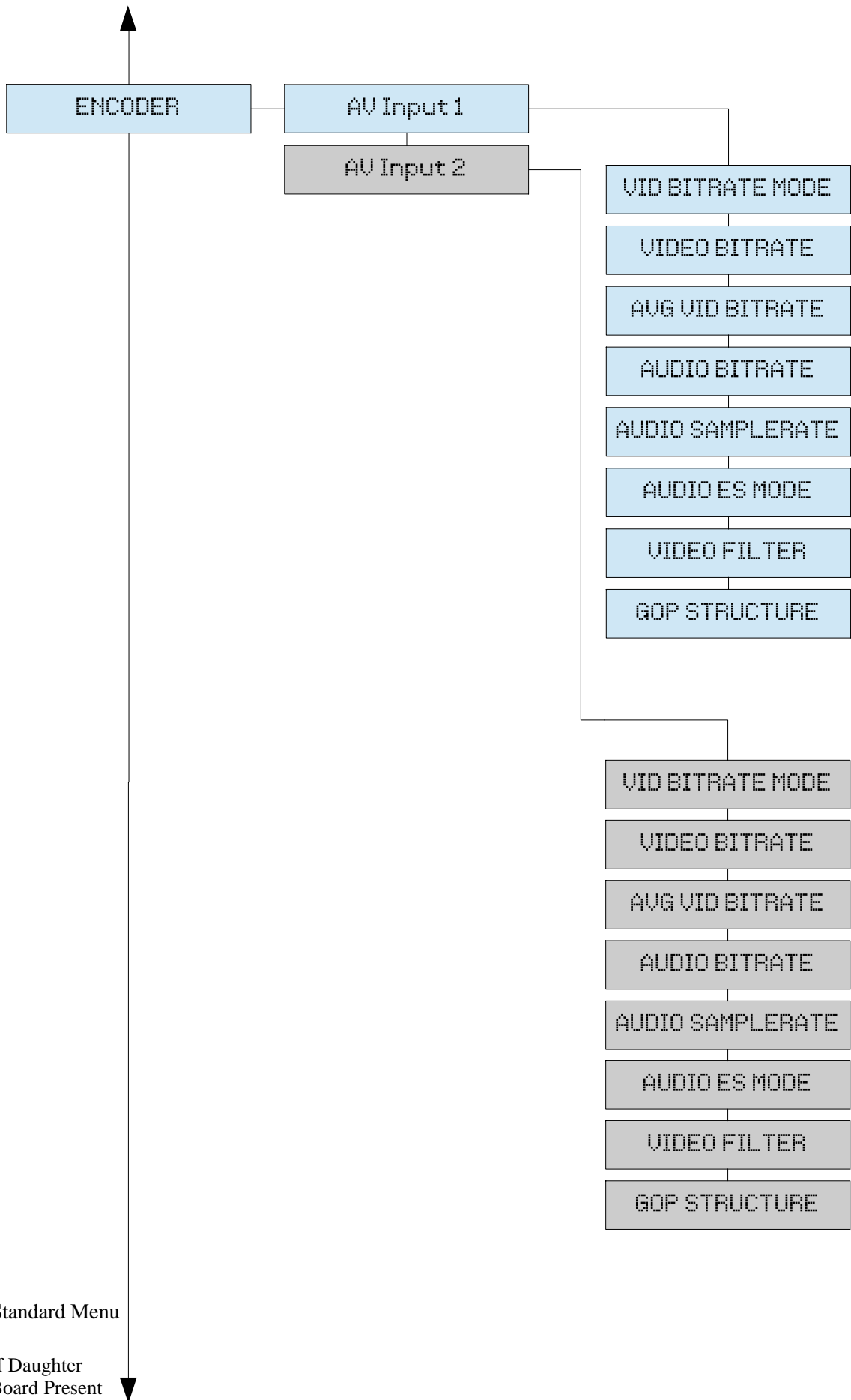
The menu is navigated by a simple 5-button arrangement, whilst observing the LCD at the left of the front panel. The centre key is the 'OK' or 'Enter' function.

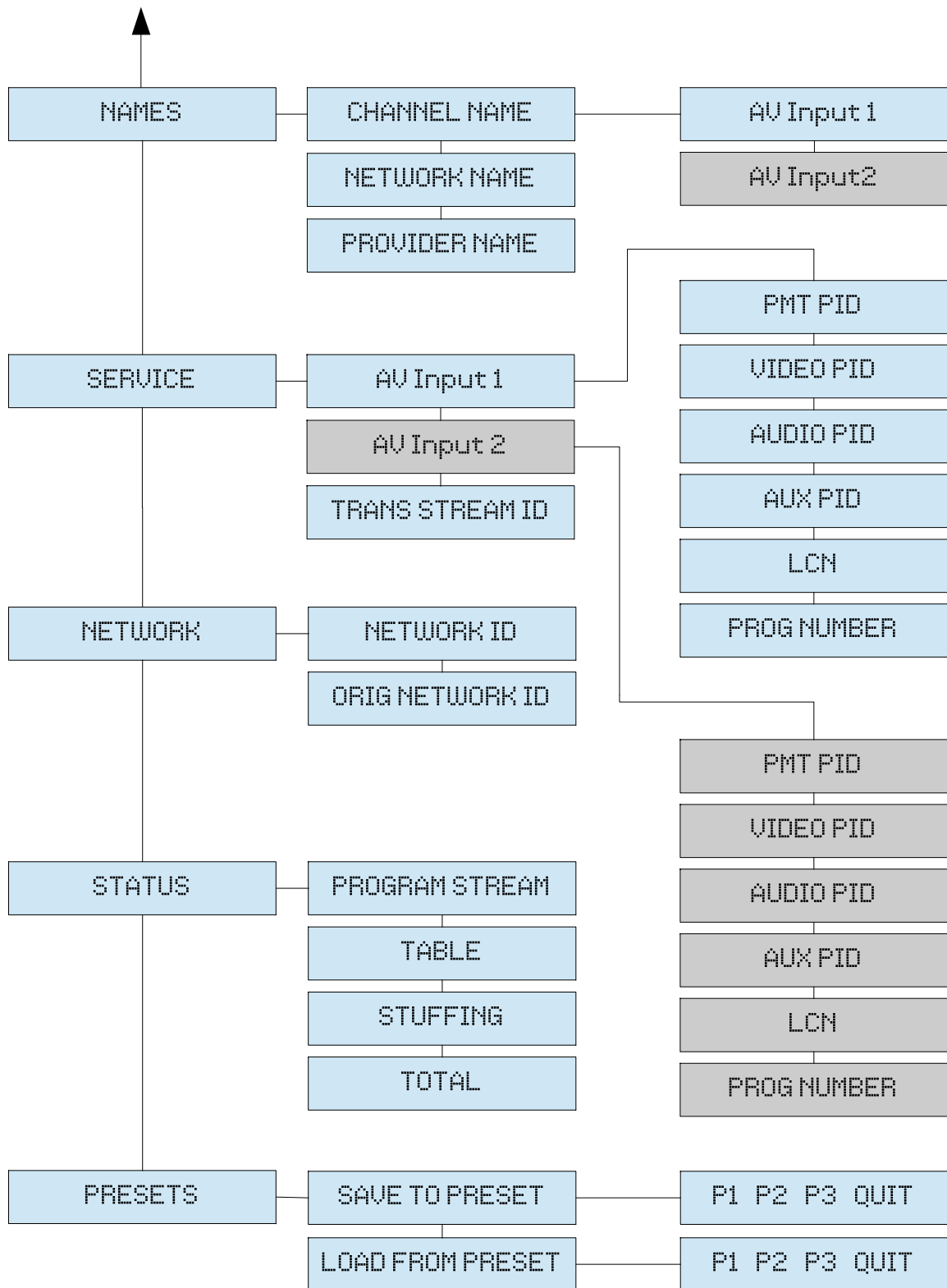
The left, right, up and down buttons will be referred to as <, >, ^ & v respectively.

The menu structure for the 'BATC DTX1' (and Antennair 'Quadrant', of which it is a derivative) is shown in the next 3 pages.

3.1. Menu Structure







Standard Menu

If Daughter Board Present

When you first power up the unit, the RED LED will be illuminated and there will be a delay of 10 seconds or more before any display appears. This is normal. After the internal firmware has loaded you should see the default display:



```
BATC DTX1 DVB-S
437.0MHz [<21]
```

N.B. The final part of this screen shows whether you have a single or dual channel unit. Single channel units show a single arrow in the middle of the char on the display, the dual channel unit will show two arrows (one above the other) in the char on the display. This means the unit is up and running, (on a frequency less than UHF Channel 21) at a frequency of 437.0 MHz. The GREEN LED will be illuminated.

Note: the LCD font depends on the panel used, and so may vary somewhat.

You can set up the unit using a 5 button keypad, or by means of commands over the serial port (the serial commands are documented in section 5.1). For now we presume a keypad is being used.

To change any parameter, press the OK button, which will invoke the menu system as per previous diagram. The message



```
** EXIT SETUP **
```

will appear, which invites you to cancel, either by doing nothing (time-out 20 seconds) or by pressing the OK button once more. In this case the message



```
<Leaving Setup>
```

will be displayed momentarily before returning to the default display.

Let's assume you want to change the default RF frequency. Press the OK button then press the v (= down!) button until you get



```
MODULATOR
```

Then press the OK button again which will take you to the menu section dealing with modulator parameters.

You should see:



```
MODULATOR
437.0MHz [<21]
```

Press the OK button once more; the 1st digit of the frequency will flash, inviting you to alter it. Use the ^ or v buttons to increment or decrement this digit of the frequency, use the < & > keys to select other digits of the frequency or UHF channel number to select the frequency you want to use, then press the OK button followed by the < button to take you back to the Modulator menu, and < once more then OK to return to the default display, which will now show the new RF frequency and channel of your choice.

The above example demonstrates the way the menu system can be navigated. Up and Down buttons change parameters, and Left and Right buttons select various options within sub-menus, with the OK button confirming actions.

After using it a few times you should find it quite straightforward. Don't be put off by all the various modulator and encoder options, which are provided for specialist users; the factory defaults will provide a viable system out of the box.

Furthermore, if you suspect that you have made some unwanted changes but aren't sure what they were, you have the option of returning the unit to factory defaults. This will undo all the changes you have made, so use with caution.

To invoke factory reset, switch off power to the unit. Now press and hold the ^ and v buttons at once, while re-applying power. Keep these two buttons pressed until the default display shows, then release them. You should see the message



Defaults Loaded

then eventually



BATC DTX1 DVB-S
437.0MHz [<21]-

N.B. For Dual units, there will be two arrows shown!

3.2. General Notes on Menu Options and Usage

Under GENERAL, set the unit's time to the time of day in GMT, and date to the present date.

Under INPUT, choose the VIDEO SOURCE i.e. S Video or PHONO, for each AV input. *The DTX1 cannot auto detect which input to use.* Also select whether you have a PAL or NTSC source (*the DTX1 cannot auto detect TV Standards, but it can have different standards set on the two AV inputs, which is rather neat*). For ASPECT RATIO the usual (default) is AUTO. This will read the wide screen signalling information (WSS, where present) in the video input and set up the picture accordingly. If your source has no WSS present (half a line of dashes at the picture top left) then set manually to 4:3 or 16:9 as required.

Under MODULATOR, set the required RF frequency or output channel, and adjust the RF level setting to suit your PA and any intermediate MMIC amplifier stage.

Note: Outside of the menu structure, the UP key toggles RF ON and RF OFF.

Leave all ENCODER settings alone, unless for any reason you have a picture which is

noisy at source in which case you can try lower VIDEO FILTER settings, which affect picture sharpness.

Under NAMES, choose and enter the displayed CHANNEL NAME for each video input (AV1, AV2) and if required the common NETWORK NAME.

Under SERVICE, only edit the LCN as described above, for each AV input. (Just to re-cap, these are the channel numbers as shown on a DVB TV).

Under NETWORK make sure this is not the same as any broadcast networks.

STATUS is an engineering readout of system performance and can be ignored.

3.3. LED Indicators

RED LED	Power ON
GREEN LED	STATUS OK (encoder running)
YELLOW LED	RF ON

(Table 5) *LED Indicators*

4. Configuration

This section defines the various settings that can be changed within the modulator either from the on-board LCD display & keypad or via the RS232 interface.

4.1. General

General unit settings

4.1.1. Time

Allows the setting of the DTX1 on-board Real Time Clock.

4.1.2. Date

Allows the setting of the DTX1 on-board RTC

4.1.3. LCD Contrast

This parameter sets the bias voltage, in order to control the contrast of the on-board LCD Display.

4.2. Input

(AV Input 1 & AV input 2 [if fitted]) This parameter specifies the characteristics of the video input signal.

4.2.1. Video Source

This parameter allows the Video source for encoding

Video Source = COMP : Composite PHONO input
Video Source = S-VID : S-video Mini DIN Input

4.2.2. Video Signal

This parameter allows the selection of the video standard

Video Signal = PAL : PAL 625 line 50Hz Video standard
Video Signal = NTSC : NTSC 525 line 60Hz Video standard

4.2.3. Aspect Ratio

This parameter controls the aspect ratio of the encoder video

Aspect ratio = AUTO : Aspect switched by video
Aspect ratio = 16:9 : Aspect fixed at 16:9
Aspect ratio = 4:3 : Aspect fixed at 4:3

4.2.4. Contrast

This parameter allows for the adjustment of video contrast in the encoded video

Contrast = (0 → 255) : Video input contrast adjust

4.2.5. Colour

This parameter allows for the adjustment of video colour saturation in the encoded video.

Colour = (0 → 255) : Video input colour adjust

4.2.6. Brightness

This parameter allows for the adjustment of video brightness in the encoded video.

Brightness = (0 → 255) : Video input brightness adjust

4.3. Modulator

4.3.1. RF Frequency

These parameters controls the output transmission frequency and are selectable in 100Khz steps or as a UHF channel number.

4.3.2. RF Level

This parameter control the output level of the modulator between 0 and 100%.

Rf-level = 0 : RF level = 0 %
Rf-level =100 : RF level = 100 %

4.3.3. RF Mode

This parameter control the default state of the RF output at power on.

RF Mode = ON : RF active on power on.
RF Mode = OFF : RF inactive at power on.

4.3.4. FEC

This parameter selects the required Forward Error Correction code rate.

FEC = 1/2 : Maximum error correction
FEC = 2/3 :
FEC = 3/4 :
FEC = 5/6 :
FEC = 7/8 : Minimum error correction

4.3.5. Symbol Rate

This parameter allows the adjustment of the DVB-S symbol-rate, as such this also controls the bandwidth of modulated signal as the bandwidth is directly proportional to the symbol rate.

SYMBOLRATE (1.0 → 30.0) MSym / s

SR = Symbol Rate

DR = Data Rate

CRv = Viterbi Forward Error Correction e.g. 1/2, 2/3, 3/4, 5/6, 7/8

CRrs = Reed Solomon FEC e.g. 188/204

m = modulation factor (transmission rate bits per symbol). QPSK=2

Formula: $SR = DR / (m \times CRv \times CRrs)$

4.3.6. Spectral Inversion

This parameter controls whether the I&Q signals in the baseband constellation should be swapped, this is only required for very special applications.

SPECTRAL INV = NO : Output is non inverted spectrum
SPECTRAL INV = YES : Output is inverted spectrum

4.4. Encoder

4.4.1. System Bit-rate Mode

This parameter allows the selection of Constant Bit-rate or Variable bit-rate modes for the encoder output.

SYS BITRATE MODE = CBR : Constant Bit-rate

SYS BITRATE MODE = VBR : Variable Bit-rate

4.4.2. System Bit-rate

This parameter selects the total system bit-rate of the MPEG stream.

SYSTEM BITRATE (512 → 12800) kbit/s

4.4.3. Avg System Bit-rate

This parameter selects the average target system bit rate while running in variable bit-rate mode, while in VBR mode this value must be set less than the total system bit-rate as defined by SYSTEM BITRATE above.

SYSTEM BITRATE (512 → 12800) kbit/s

4.4.4. Audio Bit-rate

This parameter controls the audio encoder bit-rate

AUDIO BITRATE = (64 / 128 / 192 / 256 / 320 / 384) kbit/s

4.4.5. Audio Sample-rate

This parameter controls the sampling rate of the analogue audio input

AUDIO SAMPLE RATE = (32000 / 44100 / 48000) bit/s

4.4.6. Audio ES Mode

This parameter controls the encoding mode of the audio encoder.

AUDIO ES MODE = stereo : Standard stereo input

AUDIO ES MODE = Single Channel : Mono audio

AUDIO ES MODE = Dual Channel : Two independent Channels

AUDIO ES MODE = Joint Stereo : Joint differential encoding

4.4.7. Video Filter

This parameter select the spatial video filter mode

VIDEO FILTER = SOFT : Soft video filter

VIDEO FILTER = NORM : Normal video filter

VIDEO FILTER = SHARP : Sharp video filter

4.4.8. GOP Structure

These parameters defines the encoding sequence of the frames from the encoder and the size of the encoding structure.

SIZE = (1 → 30), STRUCTURE = (IIII / IPPP / IBPB / IBBP)

4.5. Names

4.5.1. Channel Names - (AV Input 1 [AV Input 2 if fitted])

This parameter defines channel name. (can be set to user call sign)

4.5.2. Network Name

This parameter defined the Network Name.

4.5.3. Provider Name

This Parameter defines the provider name.

4.6. Service

4.6.1. PMT PID - (AV Input 1 [AV Input 2 if fitted])

The parameter defines the PMT (Program Map Table) which defines all the elements that make up the individual program within the transport stream, it is important that this PMT PID is unique and is not set the same as any other PID within this multiplex.

PMT PID = (0x0020 → 0x1FFE)

4.6.2. Video PID - (AV Input 1 [AV Input 2 if fitted])

This parameter defines the PID of the Video stream within the Transport stream, it is important that this Video PID is unique and is not set the same as any other PID within this multiplex.

VIDEO PID = (0x0020 → 0x1FFE)

4.6.3. Audio PID - (AV input 1 [AV Input 2 if fitted])

This parameter defines the PID of the Audio Stream within the Transport stream, it is important that this Audio PID is unique and is not set the same as any other PID within this multiplex.

AUDIO PID = (0x0020 → 0x1FFE)

4.6.4. AUX PID - (AV Input 1 [AV Input 2 if fitted])

This parameter defines the PID of the auxiliary stream with the Transport Stream, it is important that this AUX PID is unique and is not set the same as any other PID within this multiplex.

AUX PID = (0x0020 → 0x1FFE)

4.6.5. LCN - (AV Input 1 [AV Input 2 if fitted])

This parameter defines the Logical Channel number of this program.

LCN = (001 → 999)

4.6.6. Program Number

This parameter defines the Transport stream program number and must be unique within the transport stream.

PROG NUMBER = (00001 → 65535)

4.6.7. Trans Stream ID

This parameter defined the transport stream ID

TRANS STREAM ID = (0x0000 → 0xFFFF)

4.7. Network

4.7.1. Network ID

This parameter defines the network ID

NETWORK ID = (0x0000 → 0xFFFF)

4.7.2. Orig Network ID

This parameter defines the original network ID

ORIG NETWORK ID = (0x0000 → 0xFFFF)

4.8. Status

4.8.1. Program Stream

This status display show the number of bytes transferred per second and percentage utilisation within the whole transport stream.

4.8.2. Table

This status display show the number of bytes transferred per second and percentage utilisation of SI tables within the current transport stream.

4.8.3. Stuffing

This status display show the number of bytes transferred per second and percentage of stuffing packets inserted within the current transport stream.

5. Serial port settings

Baud rate 115200

Data-bits 8

Parity None

Stop-bits 1

Handshake None

5.1. Serial Command Set

Command	Description	Values	Default	Note
General				
time	Current Time & Date	[HH:MM:SS DD/MM/YY]	None	0
genlcd	LCD contrast	[min 120, max 200]	170	1
default	Load factory defaults		None	0
restart	Restart the unit		None	0
reboot	Reboot the unit		None	0
ver	Firmware version		None	0
Video				
vidsrc	Video source	[0=COMP 1=SVID]	0	2
vidsig	Video signal	[0=PAL 1=NTSC]	0	2
vidasp	Video Aspect ratio	[0=Auto 1=4:3 2=16:9]	0	2
vidcont	Video contrast	[0=Min, 255=MAX]	100	2
vidcol	Video colour	[0=Min, 255=MAX]	128	2
vidbri	Video brightness	[0=Min, 255=MAX]	128	2

Command	Description	Values	Default	Note
Transport stream				
tsbrmode	TS bit rate mode	[0=CBR 1=VBR]	0	1
tsbr	TS system bit rate	[Min=576, Max= 12800]	1728	1
tsvbr	TS average bit rate	[Min=576, Max= 12800]	1024	1
tsaubr	TS Audio bit rate	[1=64K 2=128K 3=192K 4=256K 5=320K 6=384K (64K steps)]	1	1
tsausr	TS Audio Sample rate	[0=32000 1=44100 2=48000]	1	1
tsaumode	TS audio mode	[0=Stereo 1=Joint_St 2=Dual_Ch 3=Single_Ch]	0	1
PID				
pidvid	PID Video	[Min 32, Max 65534]	100 / 200	2
pidaud	PID Audio	[Min 32, Max 65534]	101 / 201	2
pidaux	PID AUX	[Min 32, Max 65534]	102 / 202	2
pidpmt	PID PMT	[Min 32, Max 65534]	4095 / 4096	2
Channel				
chno	Channel Number Name	[Min=1, Max=65535]	1 / 2	2
chlcn	Channel LCN	[Min=1, Max=999]	55 / 56	2
chname	Channel Name	[Channel name Max 16 chars]	Call sign CH1 / Call sign CH2	2
Network				
netname	Network Name	[Network name max 16 chars]	DTX1	1

Command	Description	Values	Default	Note
netprname	Network provider name	[Network name max 16 chars]	BATC	1
netnid	Network ID	[Min=1, Max=65535]	12290	1
netonid	Original network ID	[Min=1, Max=65535]	9018	1
nettsid	Transport stream ID	[Min=1, Max=65535]	4386	1
Modulator				
modfreq	RF Frequency	[Min=350.0MHz Max=1350.0MHz]	437.0 MHz	1,3
modrfmode	RF power-up mode	[0=OFF 1=ON]	1	1
modspecinv	Spectral mode	[0=Norm 1=Inverted]	0	1
modgain	RF Gain	[Min 0, Max 100]	100	1
modfec	Forward Error Correction value	[0=1/2 1=2/3 2=3/4 4=5/6 5=7/8]	0	1
modsym	DVB-S Symbol rate	[Min=10, Max=300 (1.0Ms->30.0Ms)] Hardware limits 1 to 8.	2.0	1
modrf	RF output Toggle	[0=RF off, 1=RF on]	None	1

(Table 6) *Serial Commands*

Note 0: These commands do not require any parameters.

Note 1: These commands require a single parameter.

Note 2: These commands require a two parameters, the first identifies the AV channel 0 or 1 and the second contains the parameter value.

Note 3: The frequency setting is adjustable in 100KHz steps. e.g. 1000.0 MHz
Usage from 150MHz to 2GHz is allowed but with degraded performance.

**** Please Note that all values set & displayed via the serial port are currently in decimal, however some values, such as PID's and NET ID's are displayed in Hexadecimal while using the on-board LCD menu structure.****

Examples:

Direct commands

Loading Default settings	'default'	: returns 'OK'
Set RF output off	'modrf 0'	: returns 'OK'
Set RF output on	'modrf 1'	: returns 'OK'
Setting Time & Date:	'time HH:MM:SS DD/MM/YY'	: returns 'OK'
Reading Time & Date:	'time ?'	: returns '15:14:40 06/04/13'
		: then 'OK'

Single parameter commands

Reading a parameter:	'genlcd ?'	: returns 'genlcd=0170' then 'OK'
Setting a parameter:	'genlcd 170'	: returns 'OK'

Dual Parameter commands

Reading LCN of AV1:	'chlcn 0 ?'	: returns 'chlcn 0=0055' then 'OK'
Reading LCN of AV2:	'chlcn 1 ?'	: returns 'chlcn 1=0056' then 'OK'
Setting LCN of AV1:	'chlcd 0 55'	: returns 'OK'
Setting LCN of AV2:	'chlcd 1 56'	: returns 'OK'

Commands that take two parameters, the first parameter identified the AV channel and the second parameter is the setting. In the single channel unit the main board is AV channel 0, if the extended daughter card is fitted then the extra channel available on this card is AV channel 1.

6. Flashing new firmware via the Bootloader.

Loading new firmware into the DVB-T/S controller board.

6.1. Power up the unit with hyper-terminal (or other comms package that supports x-modem protocol) connected to the serial port. The unit will respond with the following :

Bootloader V00.01.01 -Crypt- (02.05.01)

%

6.2. Type the word BOOT (in upper case) at the % prompt and press return. Note: there is a short window in which this must be typed, if this is not fulfilled then a time-out will occur and the existing firmware will be started. In this case restart from step 6.1.

Bootloader V00.01.01 -Crypt- (02.05.01)

%BOOT

6.3. The bootloader should then respond with the active boot reply 'Boot'

Bootloader V00.01.01 -Crypt- (02.05.01)

%Boot>

6.4. This confirms the command had been received successfully. The unit is now in firmware upload mode and you have 10 seconds in which to start an X-Modem session (binary file upload using X-Modem). Following the prompt the user will see a single 'C' character sent once per second, this is the XMODEM CRC sync byte. Please start the Firmware upload during this phase. The firmware must be uploaded using the XMODEM-CRC protocol, this can be found under 'send file' in Hyper-terminal or similar comms package.

Bootloader V00.01.01 -Crypt- (02.05.01)

%Boot>CCCC

6.5. If the XMODEM transfer does not start within 10 Seconds, then a boot loader time-out will occur and the boot loader will exit.

Assuming a successful transfer of the new firmware, the boot loader will respond with a success message and start the new firmware.

Bootloader V00.01.01 -Crypt- (02.05.01)

%Boot>CCCCC

update success

starting app

6.6. The new firmware upload process is complete and control will then be passed back to the main firmware, please confirm new firmware version on the LCD screen or serial output on start-up.

7. Product Support

The DTX1 is supplied by special arrangement to the British Amateur Television Club (BATC) and all support is provided either via our FAQ pages at www.dtx1.info/ or the BATC forum pages <http://tinyurl.com/BATCDTX1> or, if you cannot find an answer to your question there, you can email support@dtx1.info

Please do not email or telephone Antennair Limited directly as we cannot offer this level of support for the DTX1, which is sold at a supported price.

Appendix 1

BATC DTX1 DVB-S Encoder / Modulator Technical Specification.

RF Connector:	F type coaxial.
Active Circuit Output Z	50 Ω .
RF Output Frequency Range:	Nominal 350MHz to 1350MHz (although 150MHz to 2GHz is selectable). The RF output must be filtered before transmission.
Full RF Output Power over Nominal Range	-5dBm +/-2 dBm into 50 Ω (adjustable)
Channel Bandwidth:	Set by Symbol Rate, typical usage is 1, 2, 4, 6, 8 MHz (I and Q have 10MHz Low Pass filters). Modulation Mode: QPSK.
FEC Code Rates:	1/2, 2/3, 3/4, 5/6, 7/8.
Spectral Inversion:	Selectable, inverted or non-inverted.
MER	35dB typical within Nominal RF Range.
MPEG Bit rate:	Up to 15Mb/s, High Quality Encoder.
Secondary Transport:	Stream Input port for future expansion board.
Audio Input:	Stereo into PHONO sockets, Red and White.
Audio Level:	1V RMS into 10K Ω .
Mono Mode:	An audio feed to only one channel appears on both L&R.
Composite Video Input:	PHONO socket, Yellow.
Y/C (S Video) Input:	Mini DIN socket.
Video Level:	1V p-p into 75 Ω .
Standards:	PAL and NTSC supported, 9 Bit high performance A/D Decoder.
Wide Screen Mode:	Automatic WSS or Manual 16:9 or 4:3 Aspect Ratio.
DC Power:	12V DC 6W typical.
Power connector:	2.5mm Barrel type – centre Positive (+).
Serial port:	RS-232 port. Connector: RJ11.
Firmware:	Can be re-flashed over serial port using “Hyperterminal” etc.
Primary Display:	2x16 LCD Panel with LED Back-light.
Secondary Display:	LEDs for Power, Encoder Status and & RF Output.
Control:	(a) Requires 5 button keypad or equivalent. (b) Serial command over RS-232 (ideal for remote use).
Non Volatile Pre-sets:	For storage and recall of popular settings (3 provided).
Construction:	Single Eurocard width 6 Layer PCB.

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