BROADCAST
WIRELESS SYSTEMS

B110 HEVC Codec Integration Document

Version 5.14

CONTENTS

B110 PCB DESCRIPTION

B110 is a broadcast quality HEVC codec module. The B110 can be configured as either encoder or decoder, but not both. The B110 is ideal for integration into broadcast systems such as wireless cameras, studio to transmitter links, satellite modems and ENG vehicles.

Offering exceptional compression ratios on video resolutions up to 4K UHD. The B110 codec module supports low latency making it ideal for live applications such as wireless cameras, ENG, SNG, Robotics and Aircraft Downlinks.

HEVC offers many advantages over H.264. HEVC compression offers bitrate savings of up to 50% over traditional H.264 solutions, this saves money on storage and contribution bandwidth, and increases range for downlink and robotics customers. HEVC also supports the new 4K UHD formats required for contribution. The additional efficiency of HEVC makes wireless transmission of 4K possible, or alternative 4 HD images. The B110 codec module from BWS is the ideal solution for those wishing to move to HEVC.

Latency is critical in many applications and the B110 codec is built to minimise latency without compromising quality. The 60mS end to end latency in HD, typically 75mS in UHD, makes the B110 a solution suitable for all live events,

The B110 codec encoder compresses a single 4K UHD input or up to 4 HD inputs in one unit. Each input can support 2 stereo pairs of embedded audio. Compressed streams are available as IP or on DVB_ASI for interoperability.

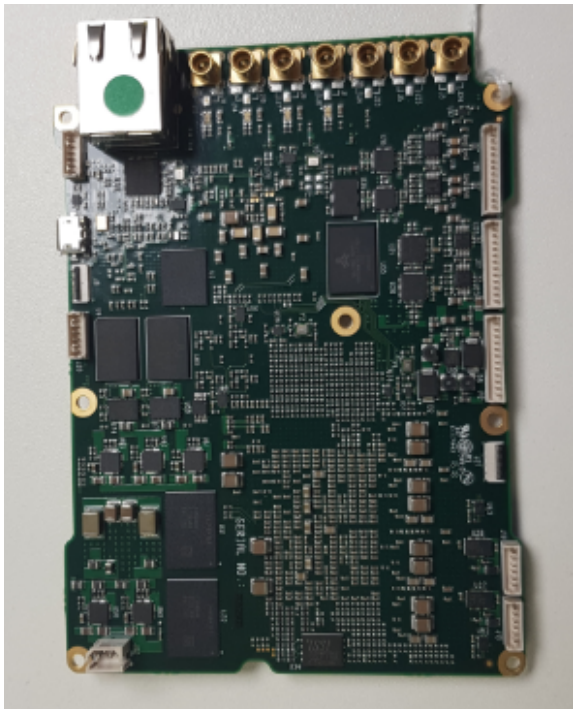
The B110 codec decoder compresses a single 4K UHD output or up to 4 HD outputs in one unit. Each output can support 2 stereo pairs of embedded audio. Compressed streams are input on DVB_ASI for interoperability (an additional module is required for decoder IP inputs)

The compact, design is easy to integrate offering a low risk route to market for customers.

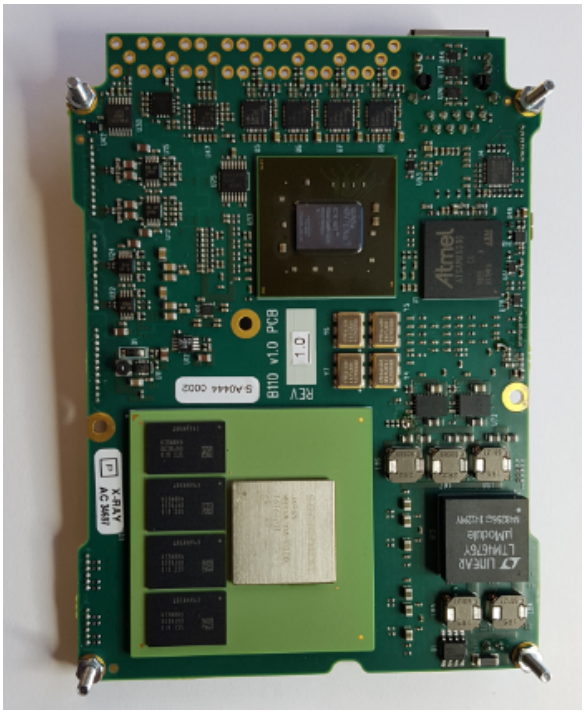
Features:

- High quality HEVC codec
- Low Latency for live applications
- Supports 4K UHD
- Supports 4 simultaneous 1080 HD as an encoder (quad mode), 4 as a decoder (quad mode)
- IP and DVB_ASI out
- DVB_ASI in (IP In via additional module)
- Genlock support at decoder (Tri Level Composite)
- Video multiplexing and switching at the encoder
- Encryption (DES)
- FEC in IP interface
- Compact design

- Small size and low power consumption
- Web browser (can be customised) and serial control
- Available in module format



B110 top side. MCX connectors, HFL connectors are also available



B110 bottom side.

SPECIFICATION

Connectors

HDSDI 3G 1-4	H.FL (OEM) double stamped MCX and DIN (75 ohm)
DVB ASI Out	H.FL (OEM)
DVB ASI In	H.FL (OEM)
Genlock In	H.FL (OEM) (Input only, for use in decoder mode)
Network Primary	RJ45 with integrated magnetics
Network Secondary	Molex Picoblade no magnetics
USB	Micro USB
Serial RS232	Molex Picoblade
Stereo Audio In	Molex Picoblade
Stereo Audio Out	Molex Picoblade
Front Panel	Molex FPC
Expansion Header	Molex Picoblade
Power	Molex Spox

Option Interfaces through expansion connector

HDMI In	HDMI Connector
12G-SDI	MCX
SMPTE 2022-6	Fibre

Video Encoder / Decoder

Coding Modes	HEVC

Number of Encoders	Ultra HD = 1, Full HD = 4 (Quad mode), Full HD = 4 (MCPC mode)
Number of Decoders	Ultra HD = 1, Full HD = 4 (Quad mode), Full HD = 2 (MCPC mode)
Profiles	4K Ultra HD. (3840 x 2160 pixels) 4:2:2/4:2:0, 8/10-bit 2160p / 23.98 / 24 / 25 / 29.97 / 30 / 50 / 59.94 / 60 Full HD. 4:2:2/4:2:0, 8/10-bit 720p / 50 / 59.94 / 60 1080i / 50 / 59.94 / 60 1080p / 23.98 / 24 / 25 / 29.97 / 30 / 50 / 59.94 / 60 1080psf / 23.98 / 24 / 25 / 29.97 / 30 (licensed feature) SD 4.2.2/4.2.0 480i / 29.97 576i / 25
Legacy encoding modes	H.264 and MPEG2
Latency (see table)	
Encoder + Decoder	UHD 59p (2SI format) = 66ms UHD 50p (2SI format) = 75ms FHD 59p = 55ms FHD 50p = 70ms FHD 59i = 83ms FHD 50i = 98ms

Audio Encoder / Decoder

Format	Embedded
Encoder	MPEG-1 Layer 1 (licensed feature), MPEG-1 Layer 2, AAC-LC
Quantity	16 channels (8 pairs)

Genlock In (Decoder Mode)

Format	Tri Level Composite

Analogue Audio

Input Audio	2 pair line / mic level
Max Level	24dBu (balanced)
Phantom Power	48V Phantom Power

Stream Inputs / Outputs

DVB_ASI	Transport stream to 90Mb/s
IP Interface	Primary is Gigabit Ethernet Secondary 10/100 base-T
IP Stream Format	Unicast / Multicast / UDP / RTP (SMPTE-2022 FEC available with external module)
Parallel Transport Stream	Packet Start, 8 bit and clock

Indicators

Indicators	Video Input Active Power On

Control

Remote	IP web browser Control RS232 2 ports

Dimensions

Size (WxDxH)	124.25 x 91mm
Weight	200g
Mounting	7x M2.5 holes

Power

Voltage In:	9 – 18V (Reverse polarity protected)
Consumed Power	14 -18W (depends on mode, genlock, power and temperature)

Licencing Options

The B110 has the following order codes

B110-E-MCX :B110 Encoder PCB with MCX connectors, HD support (no quad mode)
B110-E-HFL :B110 Encoder PCB with HFL connectors, HD support (no quad mode)
B110-D-MCX :B110 Decoder PCB with MCX connectors, HD support (no quad mode)
B110-D-HFL :B110 Decoder PCB with HFL connectors, HD support (no quad mode)

The following features are controlled under software license.

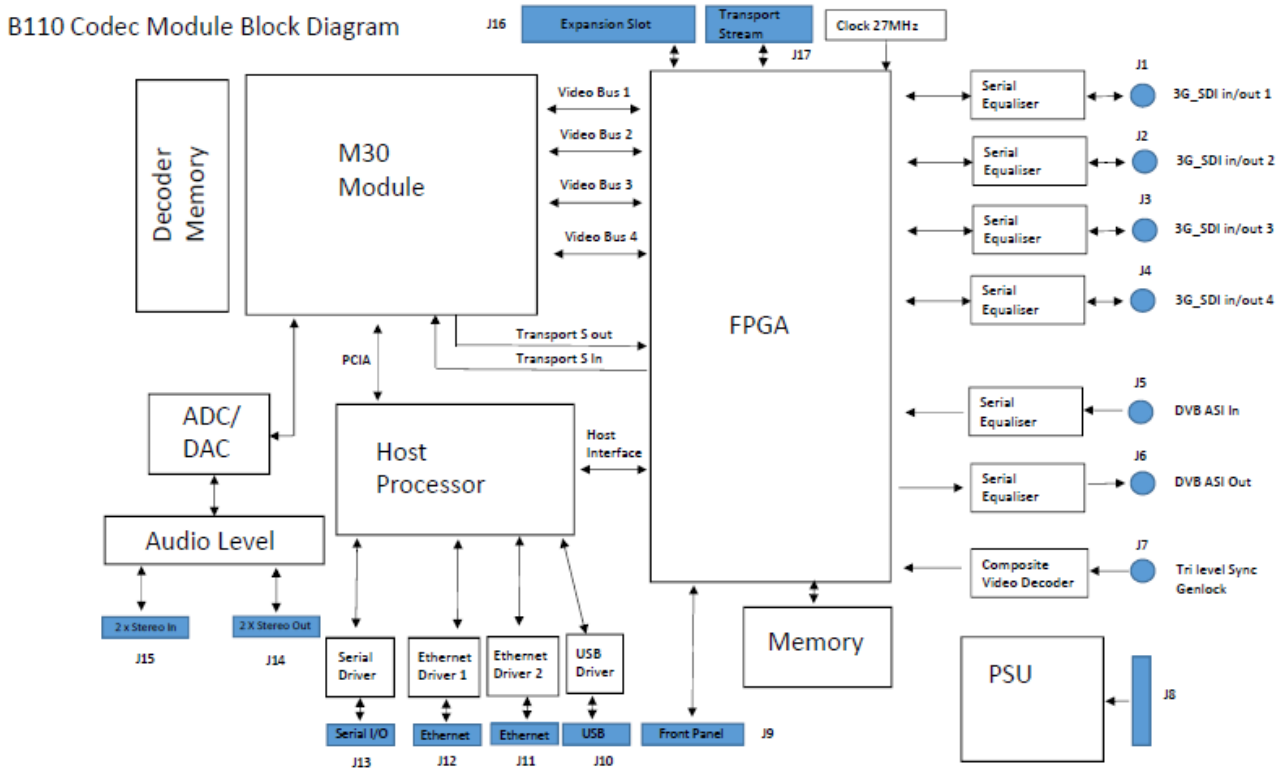
LIC-Codec :Allows PCB to be encoder or decoder
LIC-4K :Enables 4K at PCB
LIC-Quad :Enables Quad mode
HEVC-IP-D :Option module for IP input at decoder

Quad Mode Explained

The B110 encoder PCB has a unique (licensable) feature known as quad mode.
In this mode it will accept 4 HD inputs (1080i or 720p mixtures of each are possible), these are synced together on the board to create a single image and transmitted with low latency to the decoder where there are output (synced) in their original format.

For users who do not wish to send 4 images simultaneously, the B110 can perform a seamless switch between the 4 HD inputs, removing the need for an external switch.

BLOCK DIAGRAM

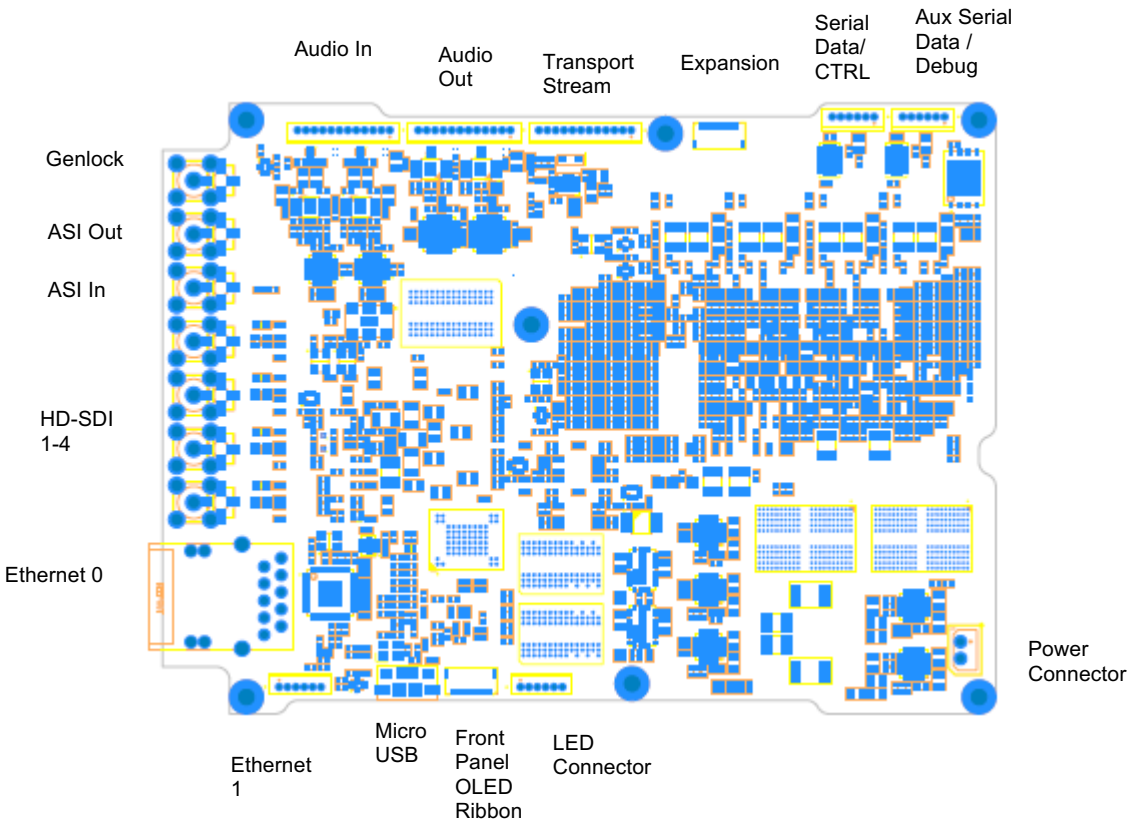


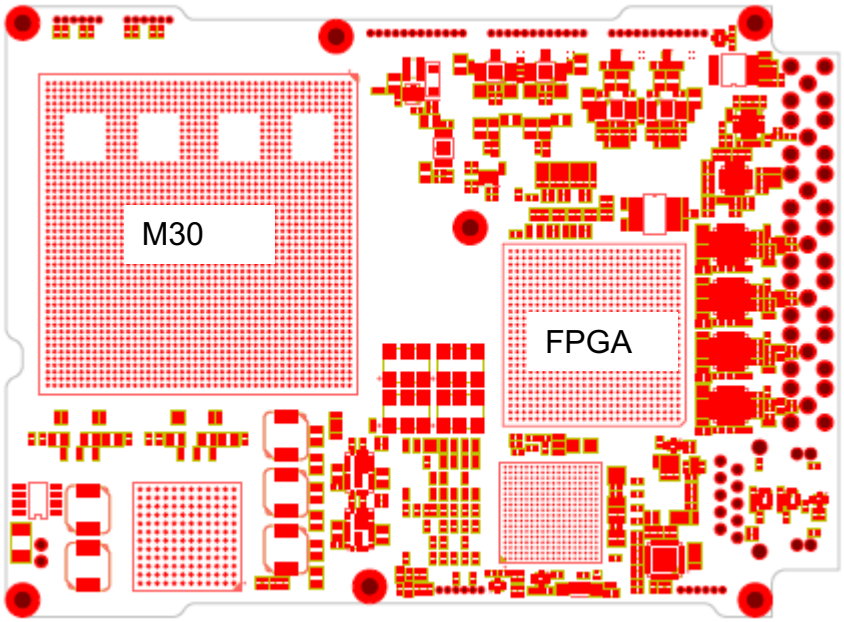
PCB LAYOUT

PCB Outline length 124.25mm width 91mm thickness 1.56mm

Note: FPGA and M30 are on the underside of the PCB and will need heatsinking

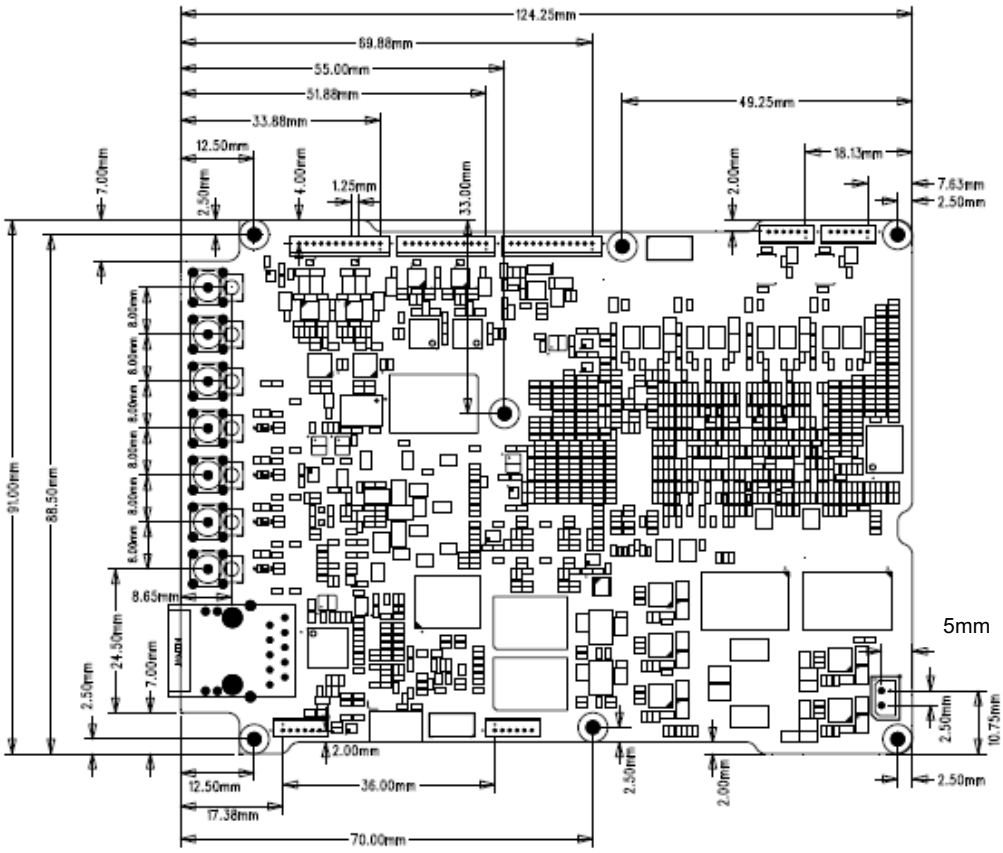
B110 Top Side

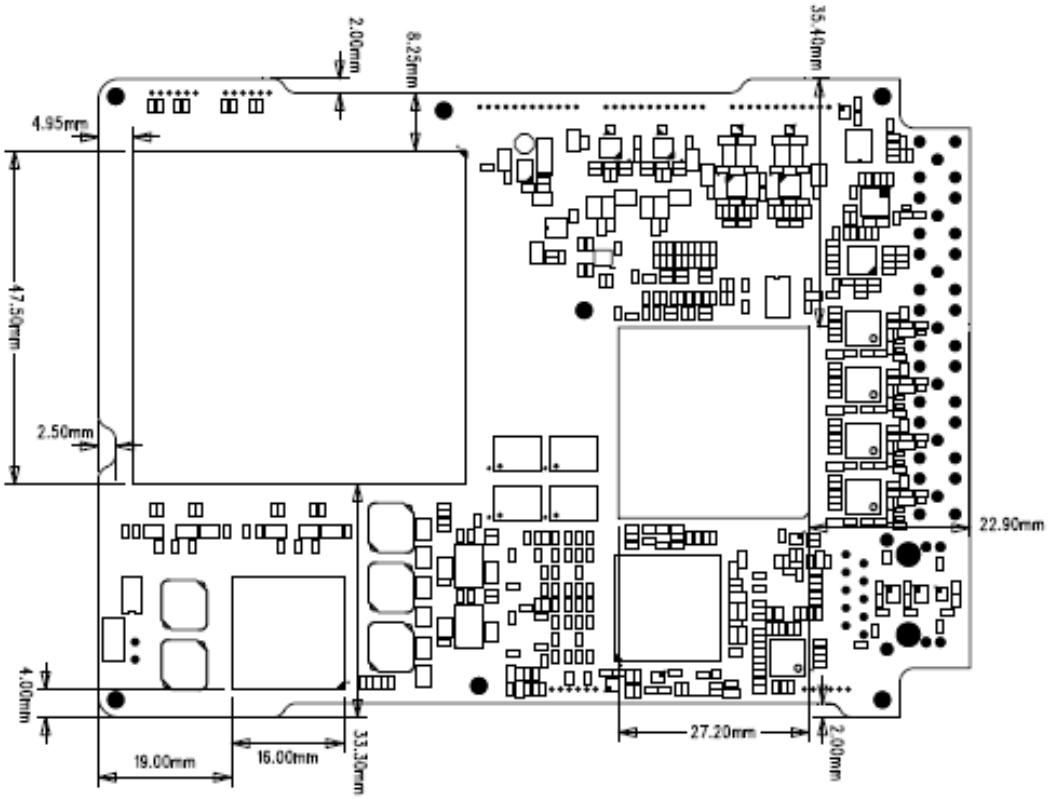




B110 Bottom Side – M30 and FPGA require cooling

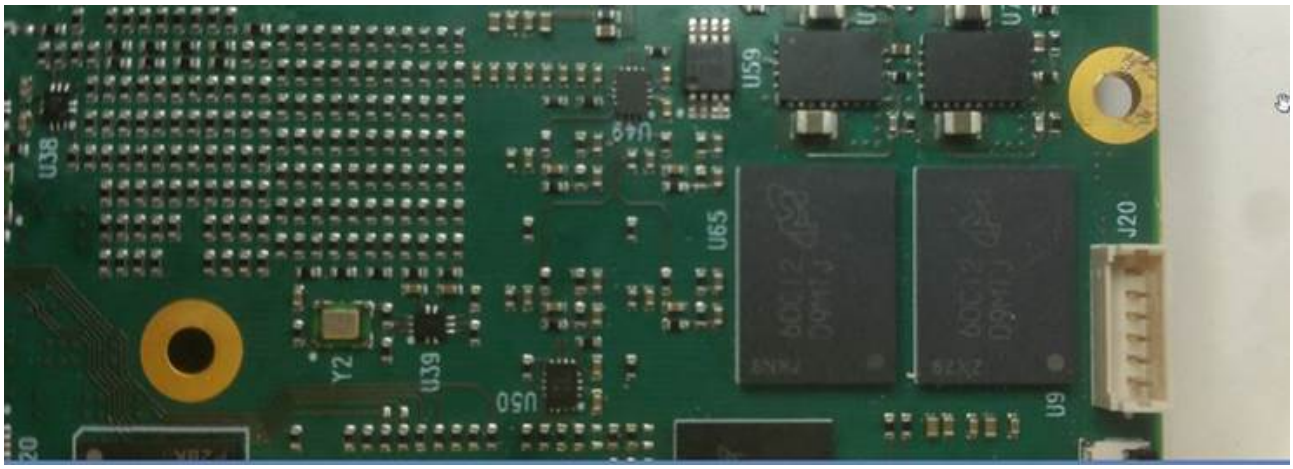
B110 PCB thickness is 1.5mm

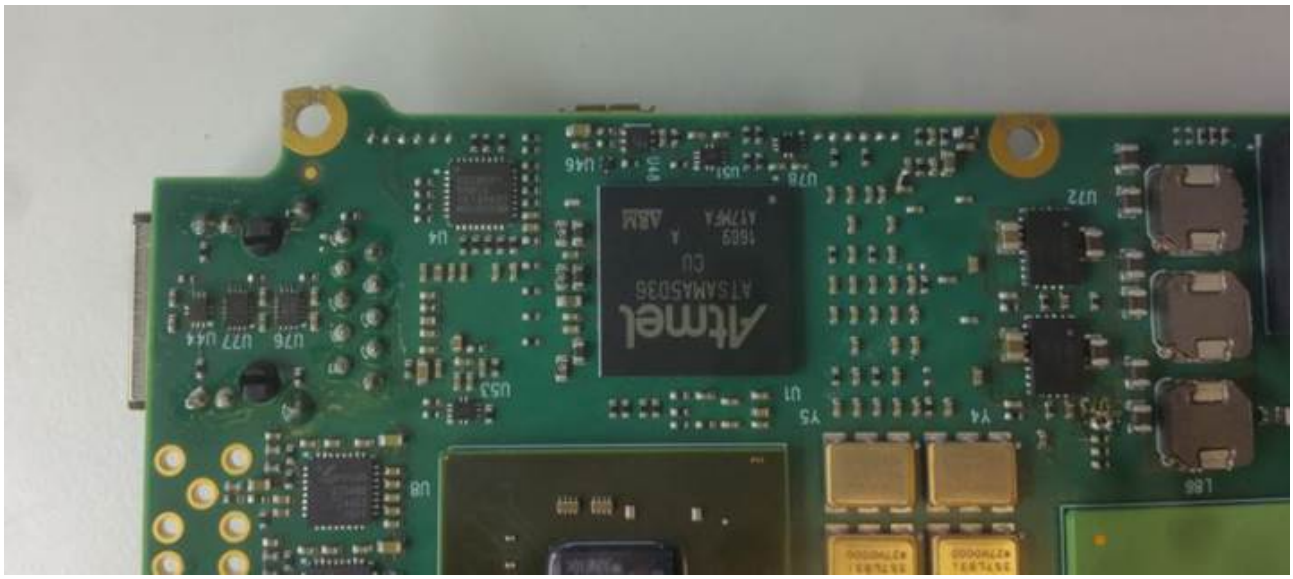




Mounting Holes

The mounting holes are m2.5, drill size is 2.7mm and the copper pad diameter is 5.8mm. This can result in pads being clipped in some areas as shown below.





Hot Component Heights and Dimensions

There are three types of component that get hot on the B110 all on the rear of the PCB. These components should be heatsunk to the chassis.

FPGA: 2.28mm, by adding height of the main package (1.34mm) and height of the raised die (0.92mm).
M30: 3.18mm, by adding height of the main package (1.9mm) and height of the raised die (1.28mm).
Equalisers (GS3490): 0.9 - 0.92mm

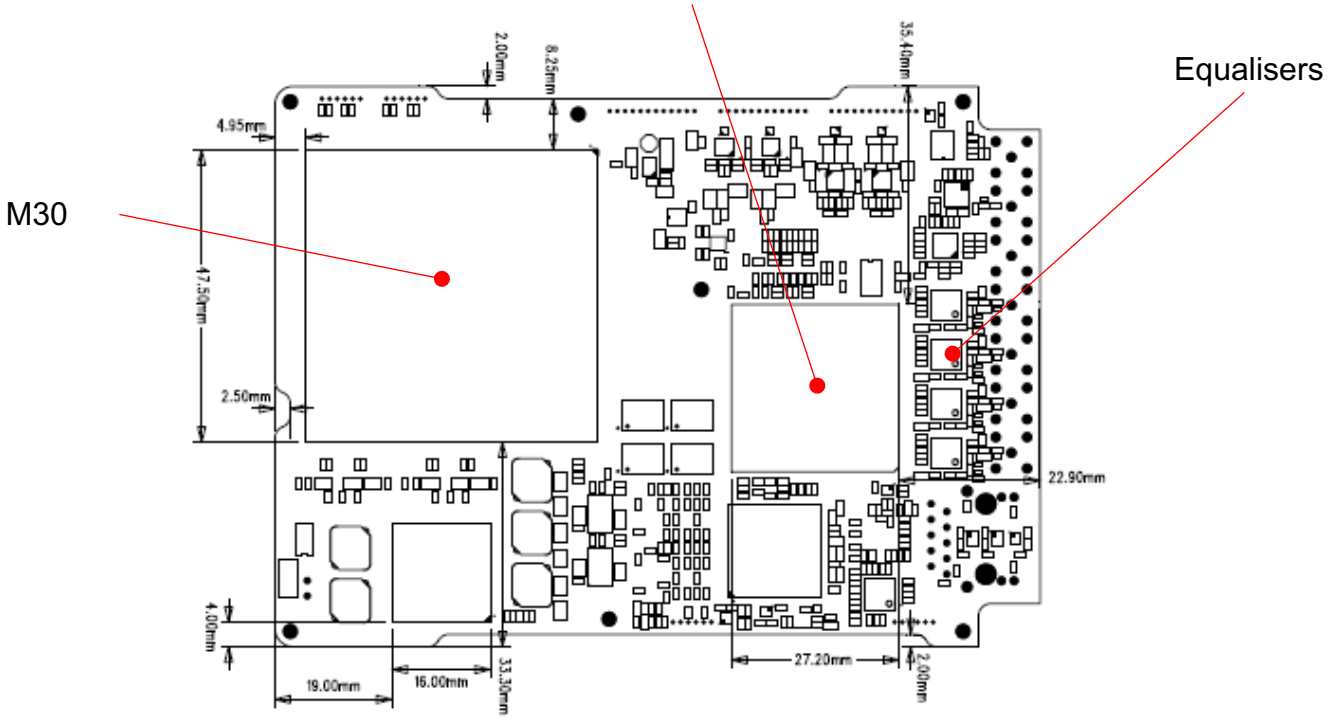
Maximum Temperatures

The operating temperatures for the devices are:

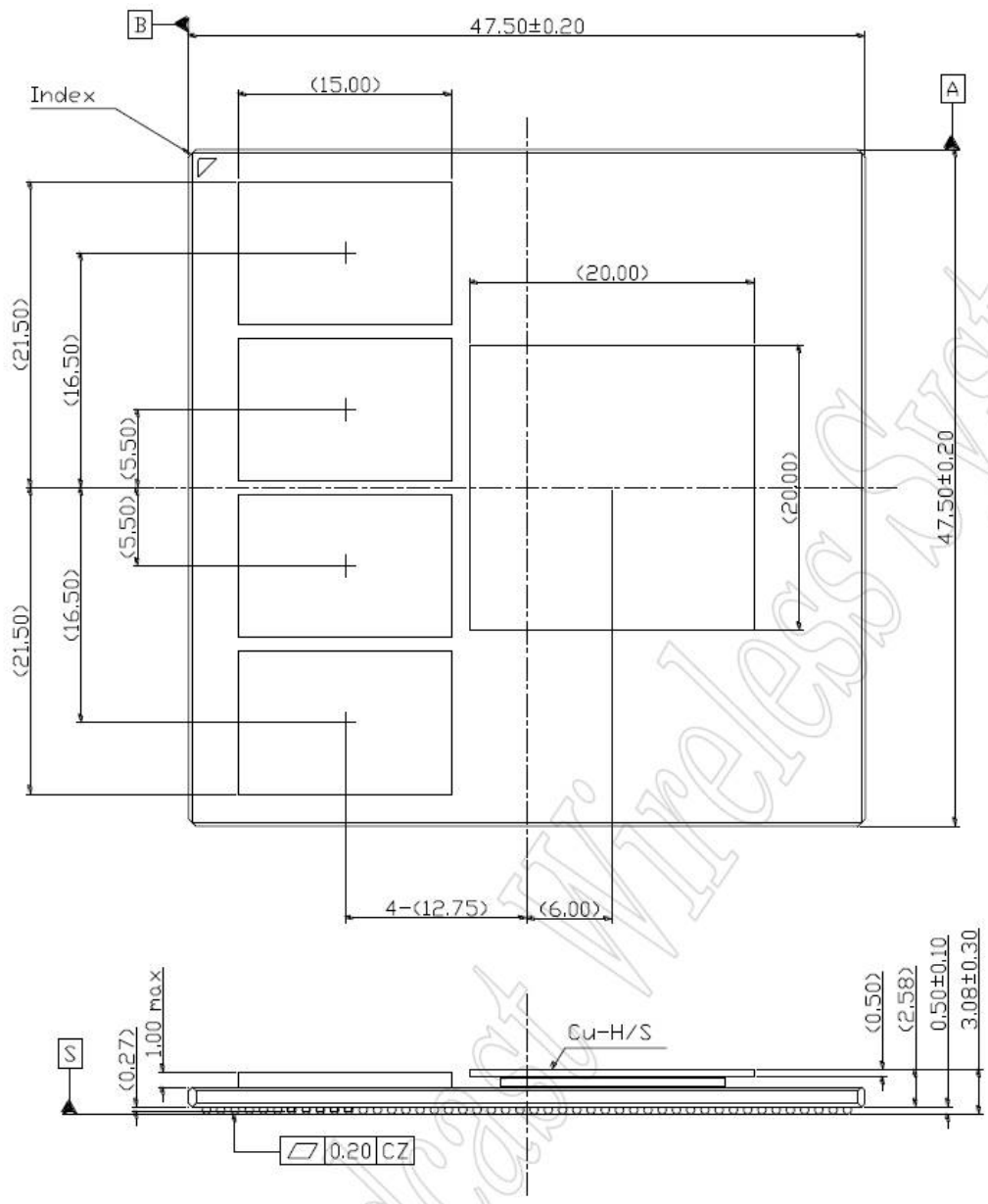
FPGA: 0 - +85degC
PSU: -40 - +125degC
M30: 0 – +85degC
Processor: -40 - +105degC

Actual temperatures for the FPGA and PSU can be read using RS232 commands. BWS recommends that the chassis design should limit the temperature rise to 30degC above ambient.

FPGA



M30 Package Dimensions

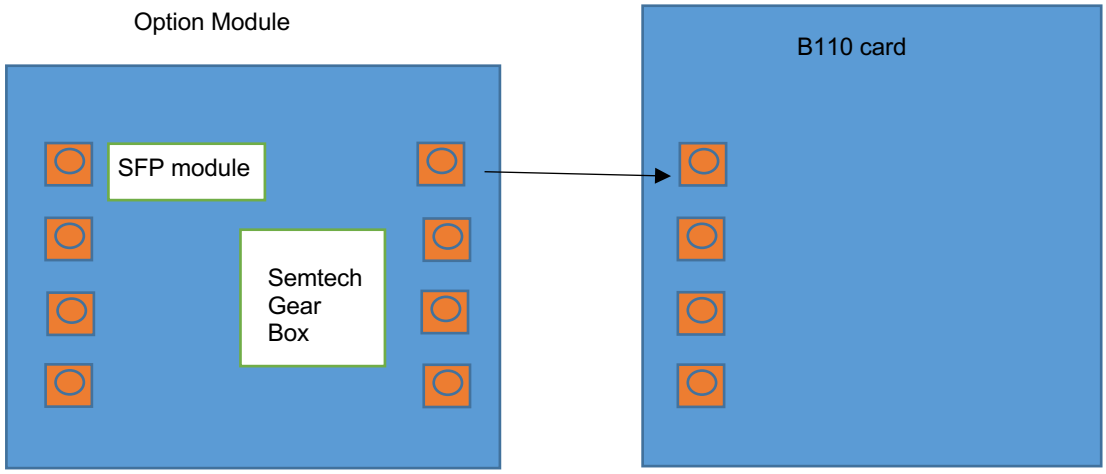


Last Wireless System

4K VIDEO I/O

Standard video I/O employs 4 off 3G HDSDI

Additional video interfaces are supported through the option interface using an option card.



Video Input Options via Option Module

- 12G-SDI
- SMPTE 2022-6 Fibre
- HDMI
- 4 x 3G-SDI

LATENCY

Video Resolution	End to End Latency
UHD 59p (2SI format)	66mS
UHD 50p (2SI format)	75mS
HD 1920 x 1080 I50	98mS
HD 1920 x 1080 I59	83mS
HD 1920 x 1080 p50	70mS
HD 1920 x 1080 p59	55mS

Delay Mode Settings:

Delay modes are set using the command

Video Delay Mode	vdel	RW	Integer	1	0=Normal Delay, 1=Low Delay, 2 = Ultra Low Delay

The encoder and decoder should be paired to operate in the same modes.

Normal Delay: The encoder sets latency using Time stamps and CPB settings, these are followed by the decoder, this mode will result in longest delays but optimum image quality.

Low Delay: The encoder uses reduced buffers and restricted settings to minimise latency.

Ultra Low Delay: The decoder free runs, decoding packets as soon as possible, operating minimum buffers.

Auto Service Selection

Full decoder auto service selection is introduced in version 1.3 of the software.

This mode is controlled by the dsel = 1 (auto) command, and the vprn (program number) command.

If auto service selection is selected, then the decoder will use the Service Information Tables (SIT) in the stream to select PIDS and formats.

Specifically the decoder will search the PAT to look for a program number match, if a match is found it will use the corresponding PMT to extract all the video, audio and PCR PIDs.

It will also use all the elementary stream types in the PMT to set the appropriate video formats HEVC, H.264 and MPEG2. Audio formats are also automated from the elementary stream types in the PMT

0x3 = MPEG 1 Audio
0x4 = MPEG 2 Audio (not supported by M30)
0x6 = Linear PCM (this identifier is assumed always to be Linear PCM rather than data)
0xF = AAC

Additionally video resolution is then extracted from the video headers eg UHD, HD etc

PCB CONTROL

Preferred control interface for OEMs is serial RS232 on J19

Baud Rate: 9K6
Format: 8 bit, no parity, 1 stop bit

The following section describes the control protocol employed on the RS232 link for controlling the B110 PCB.

RS232 Control – General Principles

Normal operation involves sending a packet from the control device (normally a PC) to the device being controlled. If the packet satisfies an address integrity check, then the controlled device will action the command and send a reply.
For compatibility with modems an ASCII style protocol is used.
Ports are set for 8 bits, No parity, 1 stop

Packet Structure Sending (from PC)

ASCII	Value	
STX	02h	Start byte
0-9	30h-39h	4 byte unit address. In range 0-9999
R **m** misc	20h-7Eh	1 byte command type. **r** read, **w** write or
I	20h-7E	1 byte indicator of internal data block
ABC	20h-7Eh	Command –three byte mnemonic
;	3Bh	Separator
PQR	20h-7Eh	Data –Optional, variable length
;	3Bh	Separator
X	20h-7Eh	Sum Check

ETX	03h	End byte

Packet Structure Reply (from controlled device)

ASCII	Value	
STX	02h	Start byte
0-9 9999	30h-39h	4 byte unit address. In range 0-
Z	20h-7Eh	Status BYTE
PQR	20h-7Eh	Data –Optional, variable length
;	3Bh	Separator
X	20h-7Eh	Sum Check
ETX	03h	End byte

The Sum check byte is the summation of all bytes in the packet, not including the start and end bytes. Higher order bytes are ignored and the final byte result is modified to prevent ASCII control characters being sent. Bit 7 (highest) is forced high.
Status byte will indicate command performed OK, or indicate an error.

ASCII	Meaning
1	All OK
E	General error, Command could not be actioned

Typically E will be returned if the message is formatted incorrectly (separators in wrong place) or if commands are in upper case, or if commands do not match against the allowed list of commands, or if the checksum is wrong.

Addresses in the range 0001 to 9998 are for general use. Address 0000 is reserved and 9999 is a broadcast address. i.e. any device will reply to this address. Its reply will contain its own specific address.
All data in the transmitter and receiver is stored as one of 5 data types, Double, String, List, Integer or HexInteger. The data type dictates the contents of the data section of the reply.

- List – 1 byte for sending. Value is hexadecimal coded as ASCII. 2 byte reply. Reply represents index into original choice list. e.g. Reply 02 indicates entry 2 in original list.
- Double - variable length. Reply always contains decimal point and 4 decimal places. Can have 1 to 3 digits before decimal.
- Integer - 6byte reply. integer value with stuffed with preceding zeros. e.g. GOP reply 000012 = GOP length 12
- String - Variable length. Reply is string excluding null terminator
- HexInteger – 8byte Hex reply

B110 Command List

Parameter	Cmd	R/W	Type	Default	Comment
Unit Address	gadd	RW	Integer	0001	Range 0001 to 9998. Can be read using address 9999 (the global address)
Software Version	sswv	R	String	N/A	
Hardware Version **********	shwv	R	Hex	N/A	0xXXXXXXX2 = “Slow” 0xXXXXXXX3 = “Fast” 0xXXXXXX1X = Encoder 0xXXXXXX2X = Decoder 0xXXXXXX5X = DVB-T Tx 0xXXXXX2XX = B110.2 0xXXXXX9XX = B110.3 0xXXXX0XXX = 1x 3G 0xXXXX1XXX = 1x 6G 0xXXXX2XXX = 1x 12G 0xXXXXCXXX = 4x 3G 0xXXX1XXXX = B177
Unit Mode	umod	RW	Integer	0	0 = Encoder, 1 = Decoder
IP Interface Name 0	iina	RW	String	Port 1	Custom name for interface **********
IP Address 0	iipa	RW	String	192.168.0.21	This is the static IP address used when DHCP is disabled
Gateway Address 0	igwa	RW	String	192.168.0.1	This is the gateway address
IP Mask 0	imsk	RW	String	255.255.255.0	IP subnet mask
DHCP 0	idhc	RW	Integer	1	0 = DHCP disabled, 1 = DHCP enabled
MAC Address 0 **********	imac	R	String	N/A	Interface MAC address
IP Active Address 0	sipa	R	String	N/A	This is the current IP address
IP Active Gateway 0	siga	R	String	N/A	Current IP gateway **********
IP Active Subnet Mask 0	sima	R	String	N/A	Current IP subnet mask **********
IP Interface Name 1	iin1	RW	String	Port 2	Custom name for interface **********
IP Address 1	iip1	RW	String	192.168.1.21	This is the static IP address used when DHCP is disabled
Gateway Address 1	igw1	RW	String	192.168.1.1	This is the gateway address
IP Mask 1	ims1	RW	String	255.255.255.0	IP subnet mask

DHCP 1	idh1	RW	Integer	1	0 = DHCP disabled, 1 = DHCP enabled
MAC Address 1 **********	ima1	R	String	N/A	Interface MAC address
IP Active Address 1	sip1	R	String	N/A	This is the current IP address
IP Active Gateway 1	sig1	R	String	N/A	Current IP gateway **********
IP Active Subnet Mask 1	sim1	R	String	N/A	Current IP subnet mask **********
IP Bridge	ibrg	RW	Integer	0	0 = Not bridged, 1 = Bridged
Video Bitrate	vbrt	RW	Integer	15000	Encoder video bitrate in Kbps. 0 = auto mode and used in conjunction with Mux Bitrate
Video Source	vsrc	RW	Integer	0	Encoder 0 = Default 1 = QuadSync 1******* 2 = QuadSync 2******* 3 = QuadSync 3******* 4 = QuadSync 4******* 5 = Pattern********** Decoder 0 = Decoder 1 = Pattern**********

Video Format	vfmt	RW	Integer	28	0=480i59 1=576i50 2=480p59 3=576p50 4=720p50 5=720p59 6=720p60 7=1080i50 8=1080i59 9=1080i60 10=1080p23 11=1080p24 12=1080p25 13=1080p29 14=1080p30 15=1080psf23 16=1080psf24 17=1080psf25 18=1080psf29 19=1080psf30 20=1080p50 21=1080p59 22=1080p60 23=2160p23 24=2160p24 25=2160p25 26=2160p29 27=2160p30 28=2160p50 29=2160p59 30=2160p60
Video Chroma Format	vchr	RW	Integer	1	0=4:2:0. 1=4:2:2
Video Bit Depth	vbit	RW	Integer	1	0=8 bit, 1=10 bit
Video Delay Mode	vdel	RW	Integer	1	0=Normal Delay, 1=Low Delay, 2 = Ultra Low Delay ****
Video Mode	venc	RW	Integer	0	0=HEVC, 1=H264, 2=MPEG2
Video PID	vpid	RW	Integer	100	
Manual Mode	vman	RW	Integer	0	Engineering mode to allow setting various parameters
Audio PID 0	apid	RW	Integer	200	
Audio PID 1	api1	RW	Integer	201	
Audio PID 2	api2	RW	Integer	202	
Audio PID 3	api3	RW	Integer	203	

Audio PID 4*********	api4	RW	Integer	204	
Audio PID 5*********	api5	RW	Integer	205	
Audio PID 6*********	api6	RW	Integer	206	
Audio PID 7*********	api7	RW	Integer	207	
Data PID******	dpid	RW	Integer	259	
Ancillary PID **********	dpi1	RW	Integer	261	
PCR PID	ppid	RW	Integer	257	
PMT PID	pmid	RW	Integer	256	
NIT PID	spid	RW	Integer	31	
Audio Mode 0	aenc	RW	Integer	1	0 = Off 1 = LPCM (16bit) 2 = AAC-LC ***** 3 = MPEG-1 Layer 1 ***** 4 = MPEG-1 Layer 2 ***** 5 = LPCM (20bit) ***** 6 = LPCM (24bit) *****
Audio Bitrate 0 **********	abra	RW	Integer	0	MPEG-1 Layer 1 0 = 448kbps 1 = 384kbps 2 = 320kbps 3 = 256kbps 4 = 192kbps MPEG-1 Layer 2 0 = 384kbps 1 = 256kbps 2 = 192kbps 3 = 128kbps 4 = 96kbps AAC-LC 0 = 256kbps 1 = 192kbps 2 = 128kbps 3 = 96kbps 4 = 64kbps

Audio Source 0	asrc	RW	Integer	0	Encoder 0 = Analogue 1 1 = Embedded 1 (1/2) 2 = Tone 3 = Analogue 2 4 = Embedded 1 (1/2) ****** Decoder 0 = Audio On 1 = Test Tone On
Audio Mode 1	aen1	RW	Integer	0	0 = Off 1 = LPCM (16bit) 2 = AAC-LC ***** 3 = MPEG-1 Layer 1 ***** 4 = MPEG-1 Layer 2 ***** 5 = LPCM (20bit) ***** 6 = LPCM (24bit) *****
Audio Bitrate 1 **********	abr1	RW	Integer	0	MPEG-1 Layer 1 0 = 448kbps 1 = 384kbps 2 = 320kbps 3 = 256kbps 4 = 192kbps MPEG-1 Layer 2 0 = 384kbps 1 = 256kbps 2 = 192kbps 3 = 128kbps 4 = 96kbps AAC-LC 0 = 256kbps 1 = 192kbps 2 = 128kbps 3 = 96kbps 4 = 64kbps
Audio Source 1	asr1	RW	Integer	0	Encoder 0 = Analogue 1 1 = Embedded 1 (3/4) 2 = Tone 3 = Analogue 2 4 = Embedded 2 (1/2) ****** Decoder 0 = Audio On 1 = Test Tone On

Audio Mode 2	aen2	RW	Integer	0	0 = Off 1 = LPCM (16bit) 2 = AAC-LC ***** 3 = MPEG-1 Layer 1 ***** 4 = MPEG-1 Layer 2 ***** 5 = LPCM (20bit) ***** 6 = LPCM (24bit) *****
Audio Bitrate 2 **********	abr2	RW	Integer	0	MPEG-1 Layer 1 0 = 448kbps 1 = 384kbps 2 = 320kbps 3 = 256kbps 4 = 192kbps MPEG-1 Layer 2 0 = 384kbps 1 = 256kbps 2 = 192kbps 3 = 128kbps 4 = 96kbps AAC-LC 0 = 256kbps 1 = 192kbps 2 = 128kbps 3 = 96kbps 4 = 64kbps
Audio Source 2	asr2	RW	Integer	0	Encoder 0 = Analogue 1 1 = Embedded 1 (5/6) 2 = Tone 3 = Analogue 2 4 = Embedded 3 (1/2) ****** Decoder 0 = Audio On 1 = Test Tone On
Audio Mode 3	aen3	RW	Integer	0	0 = Off 1 = LPCM (16bit) 2 = AAC-LC ***** 3 = MPEG-1 Layer 1 ***** 4 = MPEG-1 Layer 2 ***** 5 = LPCM (20bit) ***** 6 = LPCM (24bit) *****

Audio Bitrate 3 **********	abr3	RW	Integer	0	MPEG-1 Layer 1 0 = 448kbps 1 = 384kbps 2 = 320kbps 3 = 256kbps 4 = 192kbps MPEG-1 Layer 2 0 = 384kbps 1 = 256kbps 2 = 192kbps 3 = 128kbps 4 = 96kbps AAC-LC 0 = 256kbps 1 = 192kbps 2 = 128kbps 3 = 96kbps 4 = 64kbps
Audio Source 3	asr3	RW	Integer	0	Encoder 0 = Analogue 1 1 = Embedded 1 (7/8) 2 = Tone 3 = Analogue 2 4 = Embedded 4 (1/2) ****** Decoder 0 = Audio On 1 = Test Tone On
Audio Mode 4 *********	aen4	RW	Integer	0	0 = Off 1 = LPCM (16bit) 3 = MPEG-1 Layer 1 4 = MPEG-1 Layer 2 ********** 5 = LPCM (20bit) 6 = LPCM (24bit)
Audio Bitrate 4 **********	abr4	RW	Integer	0	MPEG-1 Layer 1 0 = 448kbps 1 = 384kbps 2 = 320kbps 3 = 256kbps 4 = 192kbps MPEG-1 Layer 2 0 = 384kbps 1 = 256kbps 2 = 192kbps 3 = 128kbps 4 = 96kbps

Audio Source 4 *********	asr4	RW	Integer	0	Encoder 0 = Analogue 1 1 = Embedded 1 (9/10) 2 = Tone 3 = Analogue 2 4 = Embedded 1 (3/4) Decoder 0 = Audio On 1 = Test Tone On
Audio Mode 5 *********	aen5	RW	Integer	0	0 = Off 1 = LPCM (16bit) 3 = MPEG-1 Layer 1 4 = MPEG-1 Layer 2 ********** 5 = LPCM (20bit) 6 = LPCM (24bit)
Audio Bitrate 5 **********	abr5	RW	Integer	0	MPEG-1 Layer 1 0 = 448kbps 1 = 384kbps 2 = 320kbps 3 = 256kbps 4 = 192kbps MPEG-1 Layer 2 0 = 384kbps 1 = 256kbps 2 = 192kbps 3 = 128kbps 4 = 96kbps
Audio Source 5 *********	asr5	RW	Integer	0	Encoder 0 = Analogue 1 1 = Embedded 1 (11/12) 2 = Tone 3 = Analogue 2 4 = Embedded 2 (3/4) Decoder 0 = Audio On 1 = Test Tone On
Audio Mode 6 *********	aen6	RW	Integer	0	0 = Off 1 = LPCM (16bit) 3 = MPEG-1 Layer 1 4 = MPEG-1 Layer 2 ********** 5 = LPCM (20bit) 6 = LPCM (24bit)

Audio Bitrate 6 **********	abr6	RW	Integer	0	MPEG-1 Layer 1 0 = 448kbps 1 = 384kbps 2 = 320kbps 3 = 256kbps 4 = 192kbps MPEG-1 Layer 2 0 = 384kbps 1 = 256kbps 2 = 192kbps 3 = 128kbps 4 = 96kbps
Audio Source 6 *********	asr6	RW	Integer	0	Encoder 0 = Analogue 1 1 = Embedded 1 (13/14) 2 = Tone 3 = Analogue 2 4 = Embedded 3 (3/4) Decoder 0 = Audio On 1 = Test Tone On
Audio Mode 7 *********	aen7	RW	Integer	0	0 = Off 1 = LPCM (16bit) 3 = MPEG-1 Layer 1 4 = MPEG-1 Layer 2 ********** 5 = LPCM (20bit) 6 = LPCM (24bit)
Audio Bitrate 7 **********	abr7	RW	Integer	0	MPEG-1 Layer 1 0 = 448kbps 1 = 384kbps 2 = 320kbps 3 = 256kbps 4 = 192kbps MPEG-1 Layer 2 0 = 384kbps 1 = 256kbps 2 = 192kbps 3 = 128kbps 4 = 96kbps

Audio Source 7 *********	asr7	RW	Integer	0	Encoder 0 = Analogue 1 1 = Embedded 1 (15/16) 2 = Tone 3 = Analogue 2 4 = Embedded 4 (3/4) Decoder 0 = Audio On 1 = Test Tone On
Audio Gain Left Channel *	agl0	RW	Integer	0	0 – 80.gain in 0.5db steps (e.g. 20 = 10dB gain)
Audio Gain Right Channel *	agr0	RW	Integer	0	0 – 80.gain in 0.5db steps (e.g. 20 = 10dB gain)
Audio 2 Gain Left Channel *	agl1	RW	Integer	0	0 – 80. gain in 0.5db steps (e.g. 20 = 10dB gain)
Audio 2 Gain Right Channel *	agr1	RW	Integer	0	0 – 80. gain in 0.5db steps (e.g. 20 = 10dB gain)
Phantom Power L0 *	apl0	RW	Integer	0	0=Disabled, 1=Enabled
Phantom Power R0 *	apr0	RW	Integer	0	0=Disabled, 1=Enabled
Phantom Power L1 *	apl1	RW	Integer	0	0=Disabled, 1=Enabled
Phantom Power R1 *	apr1	RW	Integer	0	0=Disabled, 1=Enabled
Encode / Decode Buffer	vcpb	RW	Integer	9000	Manual Mode… Overrides encoder buffer (ms) for all latency modes Encoder… ********** Sets encoder buffer (100ms steps) for Low latency mode Decoder… Sets decoder buffer (ms) if extra is required for 3rd party stream support
ASI Lock	salk	R	Integer	0	Decoder only. 0=not locked,1=locked
Video Lock	svlk	R	Integer	0	Encoder Only. 0=not locked, 1=locked. Bit3=VidA, Bit2=VidB, Bit1=VidC, Bit0=VidD. Eg 0x0=No lock, 0x8=Only VidA locked, 0xf=All locked.
Mux Bitrate	mbrt	RW	Integer	N/A	Bitrate in kb/s

Send Reset	grst	W	Integer	N/A	1=Send reset to apply config parameters 2=Send IP reset to apply ethernet parameters 7=System reboot
Refresh Remote Config ******	grea	R	Integer	N/A	Prompts refresh of any recent changes from web interface to be reflected in remote control config
Restore Defaults **	gdef	W	Integer	N/A	1 = restore defaults
FPGA Temperature **	stfp	R	String	N/A	Temperature string of FPGA core 0.1degC steps
PSU Temperature **	stbr	R	String	N/A	Temperature string of PSU device 0.1 degC steps
Input Voltage **	spvi	R	String	N/A	Input voltage string 0.1V steps
Electronic Serial Number **	gesn	R	Hex	N/A	
License Mask *****	glmk	R	Hex	N/A	Licensed feature mask: 0x00001 = Encoder 0x00002 = Decoder 0x00004 = H.265 HEVC 0x00008 = H.264 AVC 0x00010 = MPEG-2 0x00020 = Ultra Low Lat 0x00040 = UHD 0x00080 = 4:2:2 0x00100 = 10-bit 0x00200 = QuadSync 0x00400 = PSF 0x00800 = Dolby Align 0x01000 = DES 0x04000 = BISS 0x08000 = IP Streaming 0x10000 = IP Decoding 0x20000 = MPEG-1 ULL 0x80000 = Recording
Active Video Bitrate **	svbr	R	Integer	N/A	Used to read active video bitrate. When system rate is set and video rate (vbrt) = 0 video bitrate is automatic. Integer kb/s
Incoming ASI Bitrate*********	sabr	R	Integer	N/A	Integer kb/s

Input / Output Format	vifm	R/W	Integer	Default = 0	0 = 2SI (2 sample interleave) 1 = SQD (Square Division)
Analogue Reference Level Audio Pair 1	arl0	R/W	Integer	Default = 0	Encoder ********** 0 = +24dBu 1 = +18dBu 2 = +20dBu Decoder *** 0 = +24dBu 1 = +18dBu
Analogue Reference Level Audio Pair 2	arl1	R/W	Integer	Default = 0	Encoder ********** 0 = +24dBu 1 = +18dBu 2 = +20dBu Decoder *** 0 = +24dBu 1 = +18dBu
*** Decoder Video Conceal	vdcl	R/W	Integer	Default = 0	Range 0 to 100 How much broken video is displayed by receiver 0 = little 100 = maximum
*** Decoder Video Conceal REF	vdcr	R/W	Integer	Default = 0	Range 0 to 100 How much broken video is displayed by receiver 0 = little 100 = maximum
*** Genlock Mode	vglm	R/W	Integer	Default = 0	0 = OFF (PCR) 1 = On 2 = Internal Reference
*** Genlock Mode Line Offset	vglo	R/W	Integer	Default = 0	Video Format dependent
*** Genlock Pixel Offset	vgpo	R/W	Integer	Default = 0	Video Format dependent
*** Genlock Status	vgst	R	Integer		0 = No lock 1 = Clock alignment phase 2 = Pixel alignment phase 6 = Locked
Genlock Delay **********	vgde	R	Integer		Current genlock induced delay in microseconds
*** Video Fail Mode	vdfa	R/W	Integer	Default = 0	0 = Freeze Frame 1 = Blue Screen
*** Decoder Service Select	dsel	R/W	Integer	Default = 0	0 = Manual PID Mode 1 = Auto Service Select by program number
*** Program / Service Number	vprn	R/W	Integer	Default = 0	Stream Program Number (1 – 0xFFFF)

*** Program / Service Name	vsrv	R/W	String	Default: “Service 1”	Stream Program Name. Char string, max 32 chars.
*** Restart Apache	uwbr	W	Integer	Default = 0	1 = Restart Apache to help with Web upgrade
Active Video PID****	svp1	R	Integer		Current video PID
Active Audio PID0****	sap1	R	Integer		Current audio PID 0
Active Audio PID1****	sap2	R	Integer		Current audio PID 1
Active Audio PID2****	sap3	R	Integer		Current audio PID 2
Active Audio PID3****	sap4	R	Integer		Current audio PID 3
Active Audio PID4*********	sap5	R	Integer		Current audio PID 4
Active Audio PID5*********	sap6	R	Integer		Current audio PID 5
Active Audio PID6*********	sap7	R	Integer		Current audio PID 6
Active Audio PID7*********	sap8	R	Integer		Current audio PID 7
Active Data PID******	sdp1	R	Integer		Current data PID
Active Ancillary PID**********	sdp2	R	Integer		Current ancillary PID
Active PCR PID****	spp1	R	Integer		Current PCR PID
Active PMT PID****	spm1	R	Integer		Current PMT PID
Number of Services in Stream****	snsr	R	Integer		Detected number of services in the input transport stream
Active Service ID****	ssri	R	Integer		Current Service ID
Active Service Name****	ssrn	R	String		Current Service Name
Service OK Status****	svs1	R	Integer		0 = Selected program number/service not found 1 = Selected program number/service found
Status Vertical Resolution****	svr1	R	Integer		Horizontal pixel count
Status Horizontal resolution****	shr1	R	Integer		Vertical line count

Status Frame Rate****	sfr1	R	Integer		Actual frame rate (integer only part, e.g. 23=23.98)
Status Chroma****	sch1	R	Integer		1 = 4:2:0 2 = 4:2:2
Status Bit depth****	sbd1	R	Integer		8 = 8 bit 10 = 10 bit
Status Video Mode****	svm1	R	Integer		0=HEVC, 1=AVC, 2= MPEG2
Status Audio Decoder 1 **********	sam1	R	Integer		0 = Inactive 1 = LPCM 2 = AAC-LC 3 = MPEG-1 4 = MPEG-2
Status Audio Decoder 2 **********	sam2	R	Integer		0 = Inactive 1 = LPCM 2 = AAC-LC 3 = MPEG-1 4 = MPEG-2
Status Audio Decoder 3 **********	sam3	R	Integer		0 = Inactive 1 = LPCM 2 = AAC-LC 3 = MPEG-1 4 = MPEG-2
Status Audio Decoder 4 **********	sam4	R	Integer		0 = Inactive 1 = LPCM 2 = AAC-LC 3 = MPEG-1 4 = MPEG-2
Status Audio Decoder 5 **********	sam5	R	Integer		0 = Inactive 1 = LPCM 3 = MPEG-1
Status Audio Decoder 6 **********	sam6	R	Integer		0 = Inactive 1 = LPCM 3 = MPEG-1
Status Audio Decoder 7 **********	sam7	R	Integer		0 = Inactive 1 = LPCM 3 = MPEG-1
Status Audio Decoder 8 **********	sam8	R	Integer		0 = Inactive 1 = LPCM 3 = MPEG-1
Status Video Format****	svf1	R	Integer		Refer to “Video Format” table
Status SDI Format*******	ssf1	R	Integer		Refer to “Video Format” table
Video Decode Status****	svd1	R	Integer		0 = Video decoding Fail 1= Video decoding OK

Number of Audio services****	sanm	R	Integer		Number of audio PIDs/services found in the selected service
New Firmware Upgrade****	unfu	R	Integer		Checks if an upgrade is in progress. 0=no upgrade,1=upgrade in progress
Audio Level Ch1 Left	all0	R	Integer		Channel 1 Left, Scaled Numerical representation of audio level in dB. Range 0 – 90.
Audio Level Ch1 Right	alr0	R	Integer		Channel 1 Right, Scaled Numerical representation of audio level in dB. Range 0 – 90.
Audio Level Ch2 Left	all1	R	Integer		Channel 2 Left, Scaled Numerical representation of audio level in dB. Range 0 – 90.
Audio Level Ch2 Right	alr1	R	Integer		Channel 2 Right, Scaled Numerical representation of audio level in dB. Range 0 – 90.
Audio Level Ch3 Left	all2	R	Integer		Channel 3 Left, Scaled Numerical representation of audio level in dB. Range 0 – 90.
Audio Level Ch3 Right	alr2	R	Integer		Channel 3 Right, Scaled Numerical representation of audio level in dB. Range 0 – 90.
Audio Level Ch4 Left	all3	R	Integer		Channel 4 Left, Scaled Numerical representation of audio level in dB. Range 0 – 90.
Audio Level Ch4 Right	alr3	R	Integer		Channel 4 Right, Scaled Numerical representation of audio level in dB. Range 0 – 90.
Audio Level Ch5 Left*********	all4	R	Integer		Channel 5 Left, Scaled Numerical representation of audio level in dB. Range 0 – 90.
Audio Level Ch5 Right*********	alr4	R	Integer		Channel 5 Right, Scaled Numerical representation of audio level in dB. Range 0 – 90.

Audio Level Ch6 Left*********	all5	R	Integer		Channel 6 Left, Scaled Numerical representation of audio level in dB. Range 0 – 90.
Audio Level Ch6 Right*********	alr5	R	Integer		Channel 6 Right, Scaled Numerical representation of audio level in dB. Range 0 – 90.
Audio Level Ch7 Left*********	all6	R	Integer		Channel 7 Left, Scaled Numerical representation of audio level in dB. Range 0 – 90.
Audio Level Ch7 Right*********	alr6	R	Integer		Channel 7 Right, Scaled Numerical representation of audio level in dB. Range 0 – 90.
Audio Level Ch8 Left*********	all7	R	Integer		Channel 8 Left, Scaled Numerical representation of audio level in dB. Range 0 – 90.
Audio Level Ch8 Right*********	alr7	R	Integer		Channel 8 Right, Scaled Numerical representation of audio level in dB. Range 0 – 90.
QuadSync video mode	vsyn	RW	Integer		Encoder 0=Off 1=On ***** 2=Freerun ********** Decoder 0=Off 1=HD-SDI 1080i ***** 2=HD-SDI 1080psf ******* 3=HD-SDI 1080p ******* 4=3G-SDI 1080p ******* 5=HD-SDI 720p ********
HD duplication mode ******	vhdd	RW	Integer		0=Single HD output 1=Four HD outputs
Ancillary Extract/Insert Mode **********	danc	RW	integer		Encoder 0=Ignore 1=All Type 2 Decoder 0=Off 1=On

Data Mode ******	dmod	RW	integer		Encoder 0=Off 1=RS-232 2=External CFU ********** Decoder 0=Decoder output 1=Bypass **********
Data Baud ******	dbau	RW	integer		0=1200 1=2400 2=4800 3=9600 4=19200 5=38400 6=57600 7=115200
HDR/WCG Mode *******	vhdr	RW	integer		Encoder 0 = Auto 1 = SDR Rec.709/601 2 = SDR Rec.2020 CL 3 = SDR Rec.2020 NCL 4 = HLG Rec.2100 YCbCr 5 = HLG Rec.2100 ICtCp 6 = PQ Rec.2100 YCbCr 7 = PQ Rec.2100 ICtCp
Recording Enable **********	brec	RW	Integer	0	0 = Off 1 = On 2 = Triggered
IP Stream Enable *******	ipen	RW	Integer	0	Enables Stream transmit/receive, 0=Off, 1 = On
IP Stream Interface **********	ipif	RW	Integer	0	1 = Ethernet 0 2 = Ethernet 1 3 = External (HW module)
IP Stream Address *******	ipad	RW	String	239.16.33.210	Unicast or Multicast Stream destination address
IP Stream Port *******	ippn	RW	Integer	10000	Stream destination port number
IP Stream Protocol *******	ippr	RW	Integer	0	0=UDP, 1=RTP
IP Stream Type *******	ipam	RW	Integer	0	Decoder 0=Unicast, 1 = Multicast
IP Stream TTL *******	iptt	RW	Integer	10	Stream packet Time-to-Live

IP Stream TP per IP **********	iptp	RW	Integer	7	1 to 7, number of TS packets per IP packet
IP Receiver Status **********	sipr	R	Integer		0 = No Lock 1 = UDP 2 = RTP
DES Mode ******	desm	RW	Integer	0	0 = Off 1 = On
DES Key ******	desk	RW	Hex		Encryption/decryption key 14 character Hex string
Audio Decode Delay Ch1 *********	apts	RW	Integer	0	Decode offset (ms)
Audio Decode Delay Ch2 *********	apt1	RW	Integer	0	Decode offset (ms)
Audio Decode Delay Ch3 *********	apt2	RW	Integer	0	Decode offset (ms)
Audio Decode Delay Ch4 *********	apt3	RW	Integer	0	Decode offset (ms)
Audio Decode Delay Ch5 *********	apt4	RW	Integer	0	Decode offset (ms)
Audio Decode Delay Ch6 *********	apt5	RW	Integer	0	Decode offset (ms)
Audio Decode Delay Ch7 *********	apt6	RW	Integer	0	Decode offset (ms)
Audio Decode Delay Ch8 *********	apt7	RW	Integer	0	Decode offset (ms)

Detected SDI 1 input standard **********	svi1	R	Integer		0=Unlocked 1=Undefined 2=480i59 3=576i50 4=720p23 5=720p24 6=720p25 7=720p29 8=720p30 9=720p50 10=720p59 11=720p60 12=1080i50 13=1080i59 14=1080i60 15=1080psf23 16=1080psf24 17=1080psf25 18=1080psf29 19=1080psf30 20=1080p23 21=1080p24 22=1080p25 23=1080p29 24=1080p30 25=1080p50 Level A 26=1080p59 Level A 27=1080p60 Level A 28=1080p50 Level B 29=1080p59 Level B 30=1080p60 Level B 31=2Kpsf23 32=2Kpsf24 33=2Kpsf25 34=2Kpsf29 35=2Kpsf30 36=2Kp23 37=2Kp24 38=2Kp25 39=2Kp29 40=2Kp30 41=2Kp50 Level A 42=2Kp59 Level A 43=2Kp60 Level A 44=2Kp50 Level B 45=2Kp59 Level B 46=2Kp60 Level B

Detected SDI 2 input standard **********	svi2	R	Integer		See “Detected SDI 1 input standard”
Detected SDI 3 input standard **********	svi3	R	Integer		See “Detected SDI 1 input standard”
Detected SDI 4 input standard **********	svi4	R	Integer		See “Detected SDI 1 input standard”
ST352 Payload ID SDI1-A **********	sp1a	R	Hex		4 byte hex string e.g. “44332211” where “11” = 1st Payload byte “22” = 2nd Payload byte “33” = 3rd Payload byte “44” = 4th Payload byte SDIX-A is Stream 1 ID SDIX-B is Stream 2 ID
ST352 Payload ID SDI1-B **********	sp1b	R	Hex		See “ST352 Payload ID SDI1”
ST352 Payload ID SDI2-A **********	sp2a	R	Hex		See “ST352 Payload ID SDI1”
ST352 Payload ID SDI2-B **********	sp2b	R	Hex		See “ST352 Payload ID SDI1”
ST352 Payload ID SDI3-A **********	sp3a	R	Hex		See “ST352 Payload ID SDI1”
ST352 Payload ID SDI3-B **********	sp3b	R	Hex		See “ST352 Payload ID SDI1”
ST352 Payload ID SDI4-A **********	sp4a	R	Hex		See “ST352 Payload ID SDI1”
ST352 Payload ID SDI4-B **********	sp4b	R	Hex		See “ST352 Payload ID SDI1”
Video Spatial Filter **********	vspa	RW	Integer	0	0=Off 1-15=Strength of softening filter applied to video inputs
SRT Mode **********	srtm	RW	Integer	0	0 = Caller, 1 = Listener, 2 = Rendezvous
SRT Delay **********	srtd	RW	Integer	120	Buffer delay in ms. Range 20 – 8000

SRT Remote Host IP Address **********	srth	RW	String	192.168.0.210	Decoder Only. IP address of stream source encoder in “Caller” mode.

*Versions above 1.0B2 only
** Versions 1.1 and above only
*** Versions 1.2 and above only
**** Versions 1.3 and above only
***** Versions 1.4.5 and above only
****** Versions 1.5 and above only
******* Versions 1.6 and above only
******** Versions 1.6.1 and above only
********* Versions 1.7 and above only
********** Versions 1.7.2 and above only
*********** Versions 1.8 and above only
************ Versions 2.0 and above only
************* Versions 2.1 and above only
************** Versions 2.2 and above only
*************** Versions 2.3 and above only
**************** Versions 2.4 and above only

PCB POWER CONSUMPTION

The following figures have been measured by SocioNext using the M30 for power consumption while encoding. BWS estimates that the B110 PCB excluding the M30 will take 6-9W of power. From this we can estimate the total column on the right hand side of the table below.

		0.9V(W)	1.1V(W)	1.8V(W)	M30 Total(W)	PCB Total Max (W)
1ch	420 8bit 1080i59.94	3.5	0.4	0.2	4.1	13
	420 8bit 1080p59.94	3.7	0.5	0.3	4.5	14
	420 10bit 1080i59.94	3.5	0.5	0.3	4.3	13
	420 10bit 1080p59.94	3.7	0.6	0.3	4.6	14
	422 10bit 1080i59.94	3.6	0.5	0.2	4.3	13
	422 10bit 1080p59.94	3.7	0.6	0.3	4.6	14
	422 10bit 2160p59.94	4.8	1.3	0.3	6.4	15
2ch	422 10bit 1080i59.94	3.7	0.5	0.2	4.4	13
	422 10bit 1080p59.94	4.0	0.9	0.3	5.2	14
3ch	422 10bit 1080i59.94	3.9	0.7	0.3	4.9	14
	422 10bit 1080p59.94	4.3	0.9	0.3	5.5	15
4ch	422 10bit 1080i59.94	4.1	0.9	0.4	5.3	14
	422 10bit 1080p59.94	4.7	1.1	0.3	6.2	15

The following figures have been measured for decoding

	0.9V (W)	1.1V (W)	1.8V (W)	M30 Total (W)
2160p59.94 HEVC 420 8bit	3.6	0.7	0.5	4.8
1080p59.94 HEVC 420 8bit	3.2	0.4	0.3	3.9

CONNECTORS

Connector	Description	Type	Pins
J1/J6	3G-SDI I/O #1	H.FL (double stamped MCX and DIN)	
J9/J7	3G-SDI I/O #2	H.FL (double stamped MCX and DIN)	
J10/J14	3G-SDI I/O #3	H.FL (double stamped MCX and DIN)	
J11/J15	3G-SDI I/O #4	H.FL (double stamped MCX and DIN)	
J23/J4	DVB-ASI In	H.FL (double stamped MCX and DIN)	
J25/J5	DVB-ASI Out	H.FL (double stamped MCX and DIN)	
J24/J3	Genlock Tri Level Composite	H.FL (double stamped MCX and DIN)	
J22	DC IN	Molex SPOX (through hole)	2 way 1 = PWR 2 = GND
J8	Front Panel	Edge Ribbon Molex FPC side 0.5mm	12 way 1 = 1.8V 2 = I2C Clock 3 = I2C Data 4 = OLED Power Enable 5 = OLED Reset 6 = Cancel Switch 7 = Enter Switch 8 = Right Switch 9 = Left Switch 10 = Down Switch 11 = Up Switch 12 = GND
J27	USB	Micro USB	
J16	Ethernet 1 (no magnetics)	Molex Picoblade (through hole)	6 way 1= TX+ 2 = TX- 3= RX+ 4 = RX- 5 = LED 0 * 6 = LED 1 * *see section on ethernet LEDS

J2	Ethernet 0 (integrated magnetics)	RJ45	
J13	Aux Serial Data, CTRL, Debug	Molex Picoblade (through hole)	6 way 1 = PROC_TX_RS232 2 = PROC_RX_RS232 3 = GND 4 = M30_TX_RS232 5 = M30_RX_RS232 6 = GND
J18	Analogue Audio In (2 pairs)	Molex Picoblade (through hole)	12 way 1 = AUD_IN1_L+ 2 = AUD_IN1_L- 3 = GND 4 = AUD_IN1_R+ 5 = AUD_IN1_R- 6 = GND 7 = AUD_IN2_L+ 8 = AUD_IN2_L- 9 = GND 10 = AUD_IN2_R+ 11 = AUD_IN2_R- 12 = GND
J17	Analogue Audio Out (2 pairs)	Molex Picoblade (through hole)	12 way 1 = AUD_OUT1_L- 2 = AUD_OUT1_L+ 3 = GND 4 = AUD_OUT1_R+ 5 = AUD_OUT1_R- 6 = GND 7 = AUD_OUT2_L- 8 = AUD_OUT2_L+ 9 = GND 10 = AUD_OUT2_R+ 11 = AUD_OUT2_R- 12 = GND
J21	Expansion Header	12 way Edge Ribbon Molex FPC	1=1.8V 2=1.8V 3=3.3V 4=EXP5 5=EXP4 6=GND 7=EXP3 8=EXP2 9=GND

			10=EXP1 11=EXP0 12=GND
J12	Transport Stream	Molex Picoblade (through hole)	12 way 1 = TS_DATA0 2 = TS_DATA1 3 = TS_DATA2 4 = TS_DATA3 5 = TS_DATA4 6 = TS_DATA5 7 = TS_DATA6 8 = TS_DATA7 9 = TS_PST 10 = TS_DV 11 = TS_CLK 12 = GND Note all signals 1.8V
J19	Serial Data / CTRL	Molex Picoblade (through hole)	6 way 1 = CTRL_TX_RS232 (PCB output) 2 = CTRL_RX_RS232 (PCB Input) 3 = GND 4 = DATA_TX_RS232 (PCB Output) 5 = DATA_RX_RS232 (PCB Input) 6 = GND
J20	External Power/LED	Molex Picoblade (through hole)	6 way 1=3.3V 2=LED1 3=3.3V 4=LED2 5=GND 6=GND

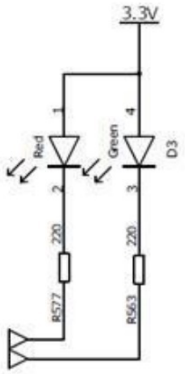
Picoblade Hole Size

For OEMs removing the picoblades, the picoblade hole diameter is 0.5mm

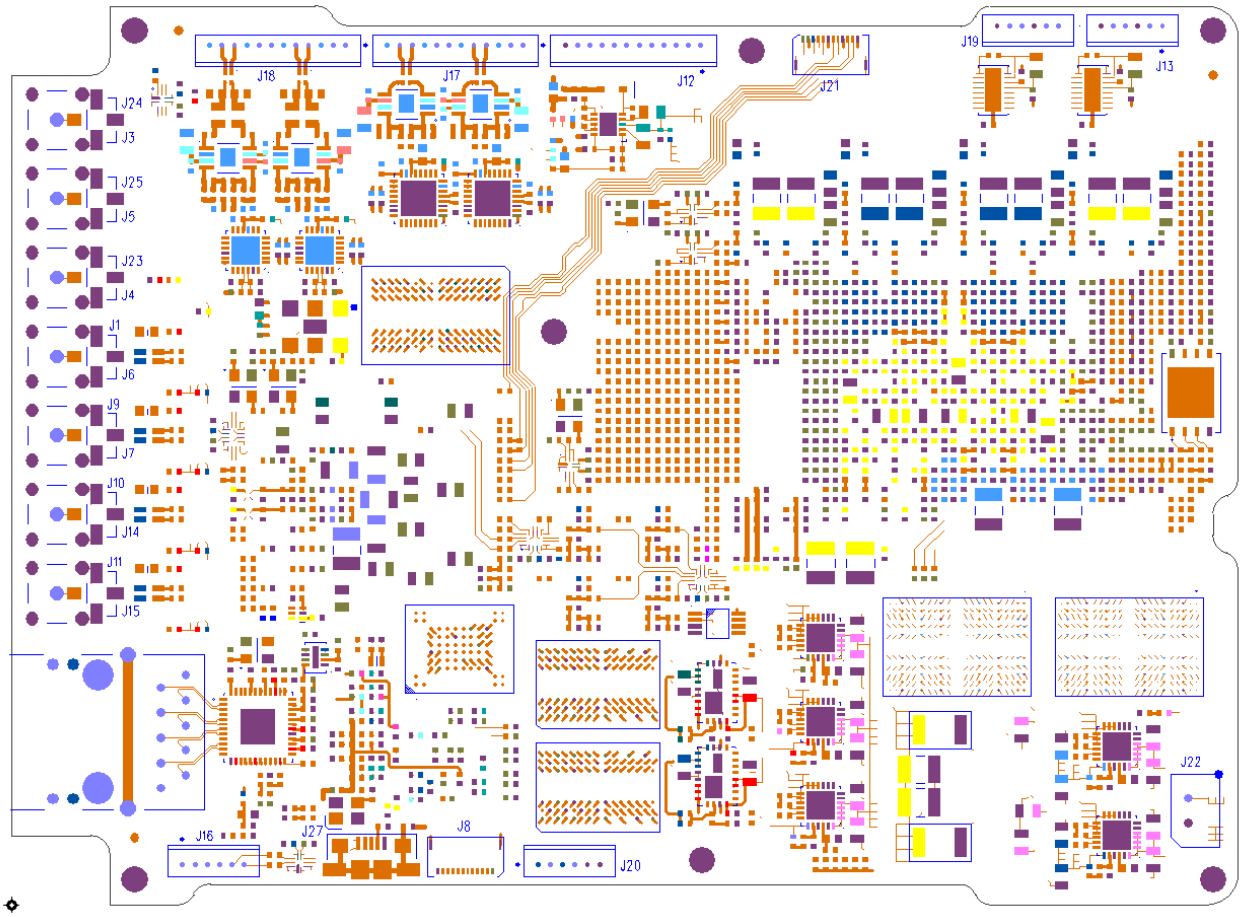
Ethernet LEDS

LED1 is the LINK indicator, LED0 is the ACTIVITY indicator.

The signals LED0 and LED1 are active low, so expect a connection to the cathode as per example below, where the pins on J16 are effectively on the LED side of the 220R resistors. The LEDs can be driven directly and there are 220R resistors already on the board.



3.3V is available on J20, pins 1 and 3.



UPDATING SOFTWARE

Web Update

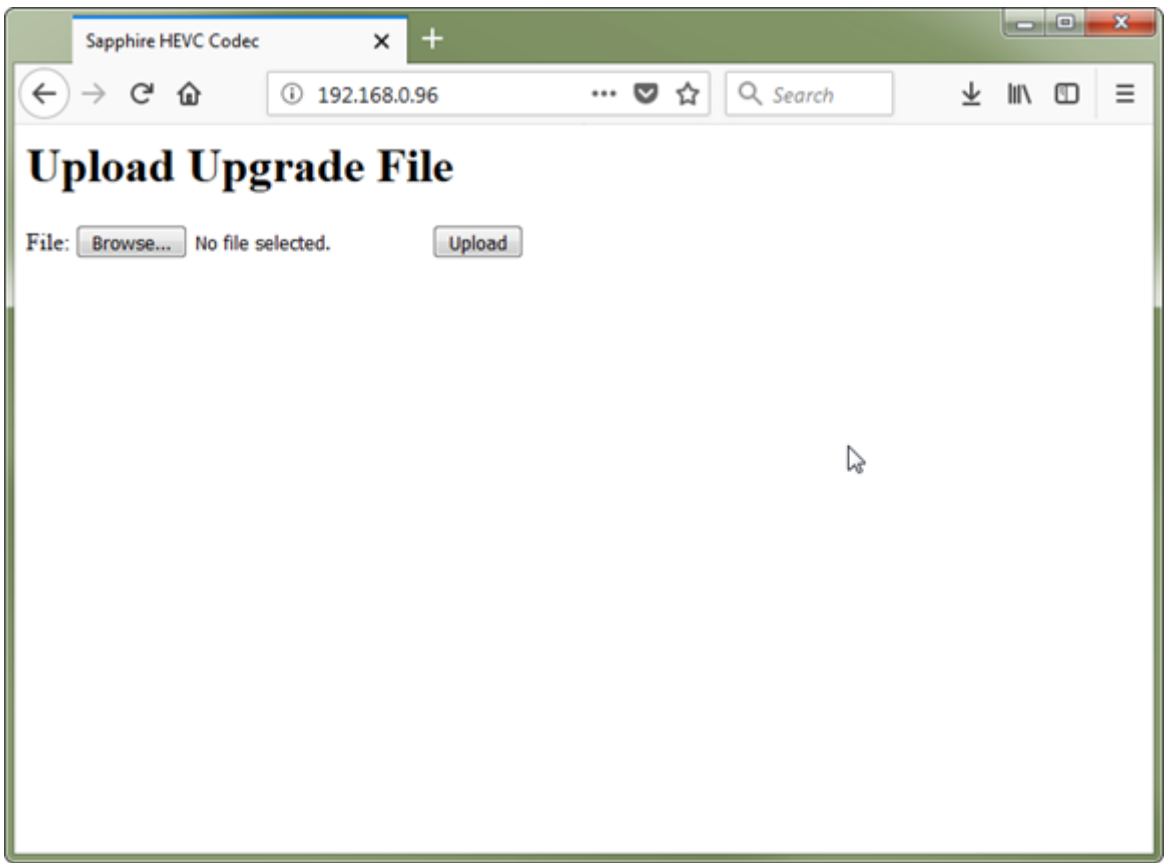
For PCBs with version 1.1 software or higher a web update of code is possible.
To carry out a web update follow the procedure below.

Note that as of version 1.2 there is an outstanding issue with the web server, which can at times respond with a “Server unavailable” page/message. Normally power cycling the unit is sufficient to resolve it so try this if you encounter this issue.

As of version 1.4.6 you can also upload a new license file using the web interface.

After downloading the file to the unit, when you see the transfer completed page, please power cycle and wait approx. 10 minutes for the upgrade to complete. This is mostly due to the codec chip firmware update.

1) Enter the IP address of the B110, web browser should show:

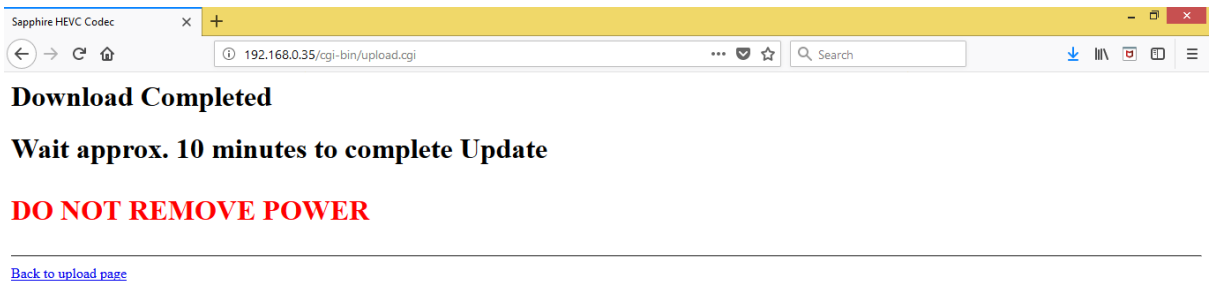


2) Click on Browse

3) Select the release tar file (e.g. B110_vx.y.tar)

4) Click Upload.

5) The file upload can take 3-4 minutes, and if recognised as a valid upgrade file the web browser should show this:



6) Follow instructions being careful not to repower for 10 minutes until update is complete.

7) Repower

8) On boot up the unit will be operating the new firmware

SCP Update

For PCBs with version 1.5 software or higher an update via SCP is possible. The upgrade file should be copied (and renamed) to the PCB in the location **/var/tmp/b110_update.tar**, to do this you must also have configured and/or know the IP address of the PCB.

Copying the upgrade can be done either via a command line application or graphical interface such as WinSCP. When connecting to the unit the user name is just **user**, and there's no password required.

Via a linux terminal you could type the below command (with the correct IP and file path):
scp b110_update_v1.5.tar user@192.168.0.10:/var/tmp/b110_update.tar

Uploading a new license can be done using the same method but the end file path must be **/var/tmp/b110_license.lic**.

Upgrading B130 Front Panel Code

The B110 upgrade also includes new software for the front panel controller. Once the main update has completed, the front panel should go back to normal operation. Please press at the same time the smaller left side “cancel” button and the right joystick towards the “left”. This should trigger an update to the front panel code a message is shown before rebooting.

In later versions of software you may be prompted to upgrade the code automatically after the upgrade or next power cycle. Please just press enter when requested.

ABOUT BROADCAST WIRELESS SYSTEMS

Broadcast Wireless Systems is a UK company founded to provide specialist provision and support of RF systems to the world-wide Broadcast industry. Our staff have many years of experience in this area, having previously worked for DTC/Cobham, Link Research, Tandberg/Ericsson, Vislink and the BBC.

Operating from our offices in Southampton, UK, and Dubai, UAE, we aim to offer:

- Sales of 'best-in-class' wireless systems from a variety of manufacturers, enabling us to exactly meet customer requirements
- 24/7/365 service and after-sales support
- Development of bespoke products to meet specialist requirements
- High-level Systems Integration and turn-key Project Management – we take 100% responsibility for the design, integration and support for all components in the systems we supply