

Electus Distribution Reference Data Sheet: AUSTTV.PDF

AUSTRALIA'S ANALOG (PAL) TV BROADCASTING

(For channel frequencies see table at right)

| | |
|---|--|
| Channel width | 7MHz (vestigial sideband transmission) |
| Vision carrier | 1.25MHz above lower frequency edge of channel |
| Primary sound carrier | 5.4996MHz above vision carrier |
| Secondary sound carrier | 242.1875kHz above primary sound carrier |
| Vision modulation | Negative amplitude modulation |
| Lines per picture | 625 lines, interlaced 2:1 (aspect ratio 4:3) |
| Line frequency | 15,625Hz |
| Field frequency | 50Hz |
| Colour subcarrier frequency | 4.43361875MHz |
| Horizontal sync pulse amplitude | 100% carrier amplitude |
| Back porch | Line blanking interval (front porch + synch pulse) |
| Line blanking interval | 11.8 - 12.3µs |
| Black and blanking levels | 76% peak carrier level |
| White level | 20% peak carrier level |
| Pre-equalisation pulse interval | 2.5H |
| Post-equalisation pulse interval | 2.5H |
| Field sync pulse interval | 2.5H |
| Field blanking interval | 2.5 + 12µs |
| Ratio peak sound carrier to peak vision carrier | Single sound carrier systems: -10dB Dual (stereo) primary carrier: -13dB Dual carrier secondary: -20dB |
| Sound modulation | FM |
| Sound deviation | +/-50kHz |
| Audio pre-emphasis | 50µs |

| Australian Television Broadcasting Bands and Channels | | | | | | |
|---|---------------------|----|---------------|---------------|---------------|---------------|
| VHF | | | UHF | | | |
| Band I | | | Band IV | | | |
| 0 | 45 - 52 MHz | 27 | 520 - 526 MHz | 47 | 659 - 666 MHz | |
| 1 | 56 - 63 MHz | 28 | 526 - 533 MHz | 48 | 666 - 673 MHz | |
| 2 | 63 - 70 MHz | 29 | 533 - 540 MHz | 49 | 673 - 680 MHz | |
| Band II | | | Band V | | | |
| 3 | 85 - 92 MHz | 30 | 540 - 547 MHz | 50 | 680 - 687 MHz | |
| 4 | 94 - 101 MHz | 31 | 547 - 554 MHz | 51 | 687 - 694 MHz | |
| 5 | 101 - 108 MHz | 32 | 554 - 561 MHz | 52 | 694 - 701 MHz | |
| Band III | | | 33 | 561 - 568 MHz | 53 | 701 - 708 MHz |
| 5A | 137 - 144 MHz | 34 | 568 - 575 MHz | 54 | 708 - 715 MHz | |
| 6 | 174 - 181 MHz | 35 | 575 - 582 MHz | 55 | 715 - 722 MHz | |
| 7 | 181 - 188 MHz | 36 | 582 - 589 MHz | 56 | 722 - 729 MHz | |
| 8 | 188 - 195 MHz | 37 | 589 - 596 MHz | 57 | 729 - 736 MHz | |
| 9 | 195 - 202 MHz | 38 | 596 - 603 MHz | 58 | 736 - 743 MHz | |
| 9A | 202 - 209 MHz | 39 | 603 - 610 MHz | 59 | 743 - 750 MHz | |
| 10 | 208 - 215 MHz (old) | 40 | 610 - 617 MHz | 60 | 750 - 757 MHz | |
| | 209 - 216 MHz (new) | 41 | 617 - 624 MHz | 61 | 757 - 764 MHz | |
| 11 | 215 - 222 MHz (old) | 42 | 624 - 631 MHz | 62 | 764 - 771 MHz | |
| | 216 - 223 MHz (new) | 43 | 631 - 638 MHz | 63 | 771 - 778 MHz | |
| 12 | 223 - 230 MHz | 44 | 638 - 645 MHz | 64 | 778 - 785 MHz | |
| | | 45 | 645 - 652 MHz | 65 | 785 - 792 MHz | |
| | | 46 | 652 - 659 MHz | 66 | 792 - 799 MHz | |
| | | | | 67 | 799 - 806 MHz | |
| | | | | 68 | 806 - 813 MHz | |
| | | | | 69 | 813 - 820 MHz | |

Notes: Channels in Bands I and II, and channel 5A are not being considered for DTV services. Channels 9A and 12 have been added, and channels 10 and 11 moved up by 1 MHz to accommodate channel 9A. Channel 27 is currently only 6MHz wide and may be either increased to 7MHz or used for datacasting. Channels 68-69 may be re-allocated for non-broadcasting purposes when DTV is fully established, and will be avoided.

AUSTRALIA'S NEW DIGITAL TV BROADCASTING

Digital terrestrial TV broadcasting (DTV) began in metropolitan areas of Australia on January 1, 2001, and will begin in regional areas between 2001 and January 1, 2004. All existing analog (PAL) broadcasting is scheduled to be shut down in 2008.

Existing TV broadcasters are being loaned additional channels during the overlap period, to enable them to simulcast in both analog and digital formats. After the simulcast period they will return the unneeded spectrum to the Commonwealth. The channels that are being loaned to the various broadcasters for digital simulcasting have not been fully assigned by the Australian Broadcasting Authority as yet, but those that have been announced to date are shown in the table below. No new commercial television broadcasters will be allowed until December 2006.

TV broadcasters are being required to broadcast DTV in both high definition (HDTV) and standard definition (SDTV) formats. They must broadcast an SDTV signal at all times, and within two years of commencement must also provide at least 20 hours per week of HDTV (although the SBS will be allowed to use 'upconverted' material to achieve this quota). Television broadcasters will not be allowed to use their digital spectrum for multichannelling (the provision of multiple separate SDTV programs), or pay TV. However they will be

allowed to use 'spare' capacity for datacasting, if they pay a separate fee for doing so. Australia's DTV system is based on the European DVB-T standard, adapted to our conditions and requirements. In addition to Australia, DVB-T has been selected by most European countries (including the UK) as well as India.

The video information will be encoded using the MPEG-2 system, with compression coding up to the Main Profile at High Level (MP@HL). The audio information can be encoded using either the MPEG Layer II (Musicam) or Dolby Digital (formerly AC-3) perceptual sound compression systems.

A number of image formats are allowed for both HDTV and SDTV video transmission, but the most popular are expected to be:

HDTV

720 lines of 1280 pixels with 25Hz progressive scanning ('720p')

1080 lines of 1920 pixels with 50Hz interlaced scanning ('1080i')

SDTV

576 lines of 720 pixels, with 50Hz interlaced scanning ('576i')

Note that HDTV is normally transmitted in 16:9 widescreen format, whereas SDTV may be in either 16:9 or standard 4:3 aspect ratio.

It may be worth mentioning that the 576i SDTV format is almost identical to the video recorded on DVD movie discs. As the sound on most DVDs is also Dolby Digital, with up to 5.1 channels of surround sound, DVDs therefore give a very close simulation of the picture and sound quality to be expected from SDTV digital broadcasting.

In the DVB-T system the MPEG-2 digital bitstream, containing 188-byte 'packets' of video, audio and other information is transmitted using a modulation system known as Coded Orthogonal Frequency Division Multiplexing (COFDM), which can employ either 1705 (known as '2k') or 6817 ('8k') separate carrier frequencies, and either QPSK (quadrature phase-shift keying), 16-QAM or 64-QAM (16 or 64 levels of quadrature amplitude modulation), each with a range of coding rates and 'guard interval' values.

In order to achieve simultaneous SDTV and HDTV broadcasting, with the accompanying audio channels and other accompanying information, a digital bitstream rate of approximately 20Mb/s (megabits per second) is needed. With the 7MHz channel width available in Australia, this can be achieved using DVB-T's COFDM system using 64-QAM modulation, rate 2/3 coding and a 1/16 guard interval — which could therefore be a typical format. The COFDM system offers improved protection against multipath distortion compared with the American ASSTC modulation system, and also allows single-frequency networks (SFNs) — multiple transmitters broadcasting the same signal on the same frequency, with overlapping service areas to ensure good coverage. It also allows DTV transmissions in channels immediately adjacent to analog (PAL) TV transmissions, with no significant interference.

| Australian Digital TV Broadcasting: Channel Assignments | | | | | | | | | | |
|---|------|------|--------|------|-----|------|-----|------|-----|------|
| AREA | AN. | DIG. | AN. | DIG. | AN. | DIG. | AN. | DIG. | AN. | DIG. |
| Sydney | ABN | ATN | TCN | TEN | SBS | CTV | | | | |
| | 2 | 12 | 7 | 6 | 9 | 8 | 10 | 11 | 28 | 34 |
| Melbourne | ABV | HSV | GTV | ATV | SBS | CTV | | | | |
| | 2 | 12 | 7 | 6 | 9 | 8 | 10 | 11 | 28 | 29 |
| Brisbane | ABQ | BTQ | QTQ | TVQ | SBS | CTV | | | | |
| | 2 | 12 | 7 | 6 | 9 | 8 | 10 | 11 | 28 | 36 |
| Adelaide | ABS | SAS | NWS | ADS | SBS | CTV | | | | |
| | 2 | 12 | 7 | 6 | 9 | 8 | 10 | 11 | 28 | 30 |
| Hobart | ABD | TVT | TNT | | SBS | | | | | |
| | 2 | 8 | 6 | 7 | 31 | 10 | | | 28 | 9A |
| Darwin | ABD | NTD | TND | | SBS | | | | | |
| | 6 | 30 | 8 | 31 | 34 | 32 | | | 28 | 29 |
| Perth | ABW | TWV | STW | NEW | SBS | CTV | | | | |
| | 2 | 12 | 7 | 6 | 9 | 8 | 10 | 11 | 28 | 29 |
| Newcastle | NBN | ABHN | NEN | NRN | SBS | | | | | |
| | 3 | 36 | 5A, 48 | 37 | 54 | 53 | 57 | 51 | 45 | 38 |
| Wollongong | ABWN | WIN | CTC | CBN | SBS | | | | | |
| | 56 | 51 | 59 | 36 | 62 | 37 | 65 | 38 | 53 | 54 |
| Canberra | ABC | CTC | WIN | CBN | SBS | | | | | |
| | 9 | 9A | 7 | 6 | 31 | 11 | 34 | 12 | 28 | 30 |
| Toowoomba | ABQ | STQ | TNQ | RTQ | SBS | | | | | |
| | 56 | 55 | 59 | 58 | 62 | 61 | 65 | 64 | 53 | 52 |

*Digital transmission of community TV services will be in spectrum allocated for provision of datacasting services
NOTE: Channels 10, 11 being moved up by 1MHz to allow new channels 9A (202-209MHz) & 12 (223 - 230MHz)

(Copyright © Electus Distribution, 2001)