

1. SCOPE

This Operational Practice recommends the method of applying the Time Date Table (TDT) and Time Offset Table (TOT) sections for digital terrestrial television broadcasting in Australia.

2. APPLICATION

Broadcast of the Time and Date Table (TDT) and Time Offset Table (TOT) provides a mechanism for broadcasters to signal the time of events in their broadcast stream and for receivers to display these times in a convenient manner for the viewer.

The TDT carries UTC¹ time and date. This information is given in separate table sections due to the frequent updating of this information. The TOT also provides this information, but importantly also provides information for the local time offset.

3. AUSTRALIAN TIME ZONES

Australia is divided into several timezones that span from +8 hours to +11 hours relative to UTC. From October to March, some Australian states change to daylight saving time creating both a north/south and east/west change in timezones. These are shown in Figure 1 below:

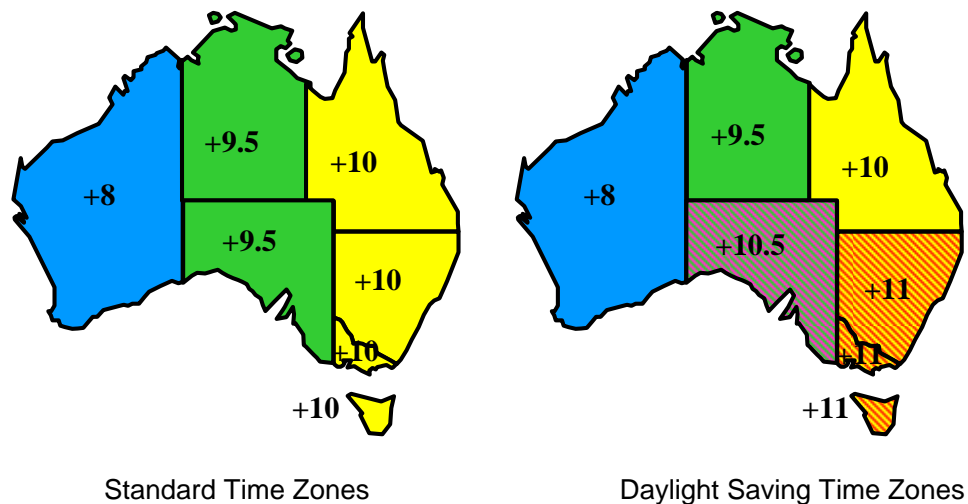


FIGURE 1. Typical Australian Time Zones

Further explanatory detail regarding Australian time zones is available on the Internet at <http://www.australia.gov.au/Time> including the actual date of change for each Australian state.

¹ UTC is Coordinated Universal Time defined in Rec. ITU-R TF.460-5

4. Table Use and Description

4.1 Time and Date Table (TDT)

The syntax and semantics of the Time and Date Table are provided in Section 4.2.7 of Australian Standard *Digital Television – Terrestrial Broadcasting* AS 4599.1 [1] with references to ETSI EN 300 468 [2]. The TDT contains the current time in UTC and date in Modified Julian Date (MJD) format.

Broadcasters must transmit this table in SI of their DVB-T transport stream and ensure that it is derived from a reliable time standard, e.g. global positioning system, to present an accurate UTC time reference to receivers. As Australian broadcasters' DVB-T transmissions are independent of each other, accurate referencing will create a consistent time signal when viewers change from one broadcaster's signal to another.

ETSI TR 101 211 [3] recommends the repetition rate of the TDT table sections to be 30 seconds or less.

4.2 Time Offset Table (TOT)

The syntax and semantics of the Time Offset Table are provided in Section 4.2.7 of Australian Standard *Digital Television – Terrestrial Broadcasting* AS 4599.1 [1] with references to ETSI EN 300 468 [2]. The TOT contains the current time in UTC and date in Modified Julian Date (MJD) format and the `local_time_offset_descriptor` which contains the time offset information. While ETSI EN 300 468 [2] indicates that this table is optional, the Australian practice is for this to be mandatory.

ETSI TR 101 211 [3] recommends the repetition rate of the TOT table sections to be 30 seconds or less.

4.3 Local time offset descriptor

The local time offset descriptor syntax is described in Section 4.2.7 of Australian Standard *Digital Television – Terrestrial Broadcasting* AS 4599.1 [1] and ETSI EN 300 468 [2]. Table 4.5 of AS 4599.1 [1] indicates the Australian coding of the `country_region_id` and is reproduced in Table 1 below.

The `local_time_offset_descriptor` is used to indicate the local time offset and the automatic entry/exit daylight savings time compensation within receivers. The data given in the descriptor will be constant for most of the time, but is updated biannually to mark the change in the transitions to/from daylight savings time.

The `local_time_offset_descriptor` is inserted once in the descriptor loop of the Time Offset Table sections.

Within the `local_time_offset_descriptor` exists a country loop that repeats for every `country_region_id` in which the broadcast is intended to be received, so as to identify each broadcast timezone and the daylight savings time changes.

The descriptor information shall be kept current to indicate at a minimum, the next time of change and applicable time offset.

TABLE 1: Australian Coding of country region id
(also refer Table 4.5 AS 4599.1 [1])

Country_region_id	Description	Australian Postcode Equivalent ²
00 0000	no time zone extension used	
00 0001	reserved	
00 0010	NSW/ACT	2XXX
00 0011	VIC	3XXX
00 0100	QLD	4XXX
00 0101	SA	5XXX
00 0110	WA	6XXX
00 0111	TAS	7XXX
00 1000	NT	08XX
00 1001 – 11 1100	reserved for future use	
11 1101 – 11 1111	reserved	

Example data for the descriptor fields:

country_code: '0100 0001 0101 0101 0101 0011' (AUS)
country_region_id '00 0010' (NSW/ACT)
local_time_offset_polarity '0' (advanced to UTC, east of Greenwich)
local_time_offset '0001000100000000' (Summer: Australian Eastern Daylight Saving Time +11 hours UTC)
'0001000000000000' (Winter: Australian Eastern Standard Time +10 hours UTC)

This is illustrated in the example loop structure in Table 2.

² Included where decoders accept postcode in the user set up menus.

Broadcasters must ensure that the TOT time offset values signal a change at the prescribed times as indicated by government notice. **Note : the actual times entered will be in UTC, not local times.**

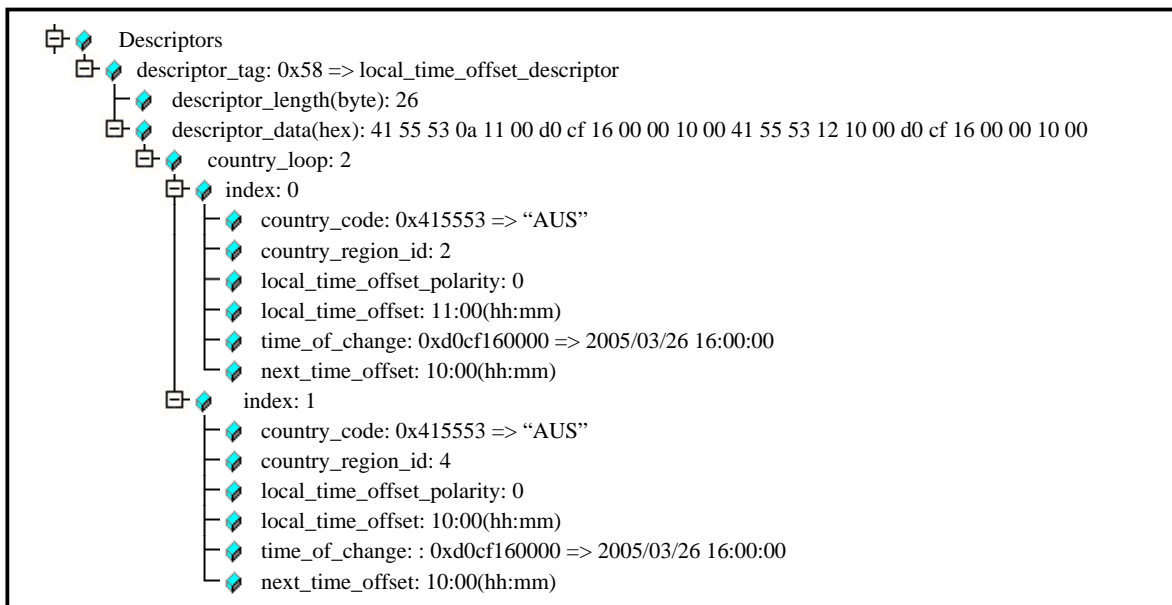
Broadcasters shall include a TOT with a local_time_offset_descriptor containing each country_region_id where the broadcast is intended to be received.

For example:

- *Single timezone coverage* – e.g. broadcasts for the Sydney region need only carry a local_time_offset for the NSW/ACT region.
- *Multiple timezone coverage* – e.g. Broadcasts for the northern NSW regional market which includes the Gold Coast area in southern Queensland should broadcast a TOT which includes both the NSW/ACT and the Queensland country_region_ids.
- *All timezone coverage* – e.g. National broadcasters are not constrained by license areas and hence may broadcast a TOT containing all Australian country_region_ids in each of their DVB-T streams.

For operational reasons, broadcasters may optionally include in their DVB-T streams additional country_region_ids outside of the intended market area.

TABLE 2. Local Time Offset Descriptor -Example Loop Structure



4.4 Event Information Tables (EIT)

Free TV Operational Practice OP44 recommends the method of applying Electronic Service Guide (ESG) program information, for digital terrestrial

television broadcasting in Australia, using the DVB short_event_descriptor and extended_event_descriptor, located in the Event Information Table sections (EIT).

4.5 Receiver Behaviour

It is highly recommended that receivers read the EIT, TDT and TOT to allow the receiver to display to the viewer the correct local time, based on synchronizing to the broadcast UTC time reference and adding the local time offset. In order to determine the correct time the receiver should access:

- the viewer selected country_region_id
- then comparing the current UTC date and time and offset to the selected country_region_id
- comparing the current date and time to the next time of change in the local time offset descriptor for their country_region_id to determine if standard time or daylight savings time should be displayed.

The time related tables may be applied in the following viewable applications to correctly display:

- the current local time on the receiver or TV screen;
- the programme guide in local time;
- timer programming of the video recorder in local time.

If only one country_region_id is transmitted, the receiver should default to use this timezone in the presentation of events to the viewer.

Further information regarding DTV receiver behaviour may be found in Australian Standard AS 4933.1 [4].

5. References

[1]	Australian Standard, Digital television – Terrestrial broadcasting Part 1: Characteristics of digital terrestrial television transmissions	AS4599.1-2007
[2]	Digital Video Broadcasting (DVB);Specification for Service Information (SI) in DVB systems	ETSI EN 300 468 V1.6.1 (2004-11)
[3]	Digital Video Broadcasting (DVB); Guidelines for implementation and usage of Service Information (SI)	ETSI TR 101 211 V1.6.1 (2004-5)
[4]	Australian Standard, Digital television – requirements for receivers Part 1: VHF/UHF DVB-T television broadcasts	AS4933.1 - 2005
