

Operating Manual

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TC Generator Option

GPS Receiver (built-in)

Alpermann+Velte

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Operating Manual GPS Receiver (built-in)

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GPS receiver

The GPS receiver is built into the Time Code generator. An active antenna is connected via a 50 Ω cable at a SMA female connector. It's built-in pre-amplifier is supplied via the same cable. No passive antenna must be connected, as this normally causes a DC short circuit.

When the unit is powered off, the real time continues counting battery-powered with the accuracy of the x'tal (see technical data). So when the unit is powered on, a time information will be available immediately. With the first synchronous reception of the GPS receiver (under normal conditions of reception this will take 10 minutes approx.) a switch-over to GPS time is made. This time is transferred to the timecode generator with an accuracy of $\pm 2\mu\text{s}$ (jitter) approx. for the seconds pulse ($\pm 20\mu\text{s}$ for the serial telegram). If then a GPS reception failure occurs, the time will continue counting with an accuracy of $1\mu\text{s}$ per second (10^{-6}). The only pre-condition is that the temperature-compensated x'tal has meanwhile reached the operating temperature.

The switch-over for Daylight Saving Time will be made automatically. The only time supplied by GPS is the world time UTC (Universal Time Coordinated), i.e. the receiver does not supply any information about the moments of time for the switch-over. Therefore, this time is defined according to the current valid legal provision regarding the Central European Time (CET/CEST), i.e. the last Sunday of March resp. October at 1:00 UTC. If such switch-over is not required, the receiver may be switched via internal dip-switch to UTC.

Specifications

Antenna input	1575,42 MHz (L1 band), -130 dBW to -163 dBW
Connector	SMA female, 50 Ω
Antenna type	active
Power supply pre-amplifier	5 V DC, 100 mA max., short circuit proof
Time from power-on to first synchronous reception	10 minutes approx.
Battery	3 V lithium, working life: 10 years
Date validity	until 31.12.2017
Accuracy (of P_SEC leading edge):	
in free-running mode	at delivery adjusted to <2ppm/25°C at 15-35°C: <4ppm at 10-40°: <8ppm at 5-45°: <20ppm aging (first year): <3ppm
jitter at synchronous reception	$\pm 2\mu\text{s}$ (2ppm)
in free-running mode after first synchronous reception	$\pm 1\mu\text{s}$ (1ppm)

Configuration

The GPS receiver may be configured via an 8-fold DIP switch. With standard delivery all switches are set to „off“.

Switch								Setting
1	2	3	4	5	6	7	8	
off	off							2400 Baud
off	on							4800 Baud
on	off							9600 Baud
on	on							19200 Baud
		off	off					Data format 7E2
		off	on					Data format 7E1
		on	off					Data format 7N2
		on	on					Data format 8N1
				off				Receiver supplies CET / CEST
				on				Receiver supplies UTC
					off			GPS configuration from ROM
					on			GPS configuration from RAM
						off		P_SEC = pos. pulse 135ms approx.
						on		P_SEC = modulation 100ms / 200ms
							x	reserved

Antenna: mounting, connecting and technical data

The GPS receiver is connected to the antenna with a 50 Ω coax cable. The receiver has a SMA male connector, the connection at the antenna depends on the type of the antenna. Only an active antenna should be connected, its built-in pre-amplifier is supplied via the same cable.

We recommend that the cable should be as short as possible. The shorter the cable, the less the attenuation and the more likely the chance to receive signals from a sufficient number of satellites even under unfavourable reception conditions. Cables that are too long should be shortened if possible. The cable should not be coiled up (to a ring e.g.), since this will act like a stop filter for the GPS antenna signals. Instead, lay the cable like a string, i.e. as straight as possible.

The antenna is designed for outdoor mounting. Install antenna in horizontal direction, the antenna should “see” a maximum of the sky.

Antenna of type: M/A-COM ANP-C-114-4

Attention: discontinued product (01/2002).

Connect the cable to the antenna with a TNC connector (female at antenna). The TNC connector has a rubber protection against atmospheric exposure. The antenna cable is part of the standard accessory: cable RG 58, length = 10m.

Example of cable types available:

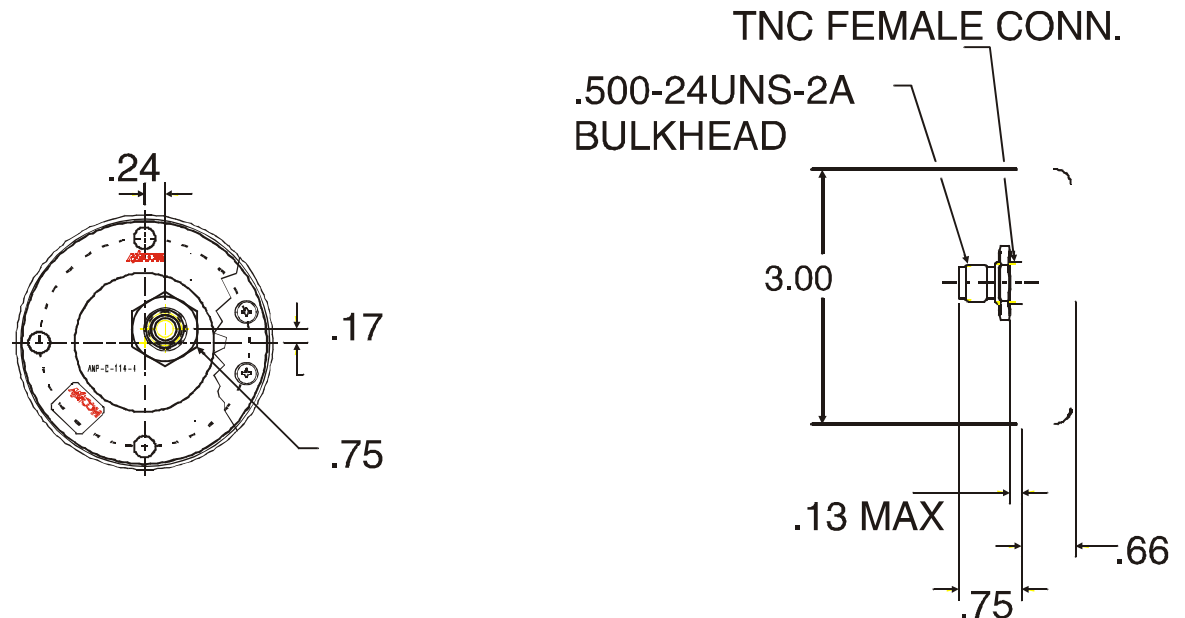
Cable	Length
RG 58	7,5 m (typ.) to 10 m (max.)
RG 400	10 m (typ.) to 15 m (max.)

Specifications

Frequency	1575 MHz \pm 2 MHz
Gain, Zenith	3.5 dBic
Gain, +10°	-3.0 dBic
Amplifier gain	26 dB
Amplifier noise figure	2.5 dB (typ.)
Power supply	5 V DC, 25 mA typ
Housing colour	white
Operating temperature	-40°C to +85°C
Weight	150 g (max.)

Mechanical Data

Mount the antenna using the screwed joint underneath.



All figures in inches

Antenna of type: planTec navigation 60 magnet

This antenna's cable is permanently connected and sealed to the side of the antenna. Type of cable = RG 174 with length \approx 10m.

Technical data

Frequency range	1575,42MHz
VSWR	< 1,5 typ
Gain with integrated amplifier	25dB typ
Power supply	5V DC 2,5mA typ, 30mA max
Color of housing	Anthracite
Operating temperature	-40°C - +85°C
Weight	\approx 50g

Mechanical

Magnetic mounting at metallic surfaces.

Ø	72mm
Height	15mm



Antenna of type: planTec navigation roof

This antenna's cable is permanently connected and sealed to the bottom of the antenna. Type of cable = RG 174 with length \approx 10m.

Technical data

Frequency range	1575,42MHz
VSWR	< 1,5 typ
Gain with integrated amplifier	25dB typ
Power supply	5V DC 25mA typ, 30mA max
Color of housing	black
Operating temperature	-40°C - +85°C
Weight	\approx 50g

Mechanical

The antenna is mounted by using its centred M16 screw thread.

The antenna has two different moisture seals:

- A seal around the circumference of the antenna.
- Around the screw thread via use of the smaller O-Ring.

Ø	95mm
Antenna height without screw thread	16mm
Length of the screw thread	15mm



Options with Special Software

The internal dip-switch SW8 selects between the standard version or the software with special features:
SW8 = off = standard version,
SW8 = on = special features.

With SW8 = on the switches SW1 - SW7 now get a new meaning. With SW1 - SW7 the version of the special software is selected. The following versions are available and have features which are different to the standard version:

Switches 1 - 7 (8 = on)	No.	Features
off off off off off off off	0	"Ankara" 1. The second's pulse P_SEC is modulated according to the standard version with SW7 = on. This signal may be the input of an Analogue Clock Distribution Amplifier. 2. The time zone will be UTC + 2 hours (normal time) or UTC + 3 hours at Daylight Saving Time (DST). Switching the DST is defined according to the current valid legal provision regarding the Central European Time (CET/CEST). This is the current local time of Ankara, Turkey.
on off off off off off off	1	"Moscow" 1. The second's pulse P_SEC is modulated according to the standard version with SW7 = on. This signal may be the input of an Analogue Clock Distribution Amplifier. 2. The time zone will be UTC + 3 hours (normal time) or UTC + 4 hours at Daylight Saving Time (DST). Switching the DST is defined according to the current valid legal provision regarding the Central European Time (CET/CEST). This is the current local time of Moscow, Russia.
off on off off off off off	2	"Tbilisi" 1. The second's pulse P_SEC is modulated according to the standard version with SW7 = on. This signal may be the input of an Analogue Clock Distribution Amplifier. 2. The time zone will be UTC + 4 hours (normal time) or UTC + 5 hours at Daylight Saving Time (DST). Switching the DST is defined according to the current valid legal provision regarding the Central European Time (CET/CEST). This is the current local time of Tbilisi, Georgia.
on on off off off off off	3	"GM TTT", internal use only. 1. The time zone will be UTC. 2. If no reception is possible, the real time clock can be set via the serial interface.

Switches 1 - 7 (8 = on)	No.	Features
off off on off off off off	4	<p>"GM TTT DCF", internal use only.</p> <ol style="list-style-type: none"> 1. The second's pulse P_SEC is modulated according to the standard version with SW7 = on. 2. If no reception is possible, the real time clock can be set via the serial interface. 3. The time zone will be UTC.
on off on off off off off	5	<p>"Ankara / UTC"</p> <ol style="list-style-type: none"> 1. The second's pulse P_SEC is modulated according to the standard version with SW7 = on. This signal may be the input of an Analogue Clock Distribution Amplifier. 2. The time zone of the second's pulse P_SEC will be UTC + 2 hours (normal time) or UTC + 3 hours at Daylight Saving Time (DST). Switching the DST is defined according to the current valid legal provision regarding the Central European Time (CET/CEST). This is the current local time of Ankara, Turkey. 3. The timezone of the serial interface is UTC.
off on on off off off off	6	<p>"Moscow / UTC"</p> <ol style="list-style-type: none"> 1. The second's pulse P_SEC is modulated according to the standard version with SW7 = on. This signal may be the input of an Analogue Clock Distribution Amplifier. 2. The time zone of the second's pulse P_SEC will be UTC + 3 hours (normal time) or UTC + 4 hours at Daylight Saving Time (DST). Switching the DST is defined according to the current valid legal provision regarding the Central European Time (CET/CEST). This is the current local time of Moscow, Russia. 3. The timezone of the serial interface is UTC.
on on on off off off off	7	<p>"Tbilisi / UTC"</p> <ol style="list-style-type: none"> 1. The second's pulse P_SEC is modulated according to the standard version with SW7 = on. This signal may be the input of an Analogue Clock Distribution Amplifier. 2. The time zone of the second's pulse P_SEC will be UTC + 4 hours (normal time) or UTC + 5 hours at Daylight Saving Time (DST). Switching the DST is defined according to the current valid legal provision regarding the Central European Time (CET/CEST). This is the current local time of Tbilisi, Georgia. 3. The timezone of the serial interface is UTC.