

- Display with built-in GPS receiver
- DC input for GPS receiver separated
- Output of time/date as serial data and as coded seconds pulses
- Optional: Master output to connect analogue clocks

GPS D25 R/G/Y 6

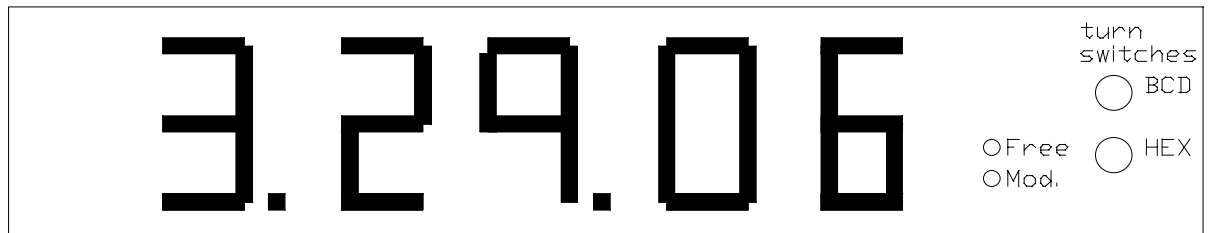


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A1 Safety Instructions

- General rules:** Only use the device as directed in a dry atmosphere. Treat the GPS D25 R/G/Y 6 with the same care as other studio devices. Please follow the advice in the following operators manual.
- Damages in transit:** If the device shows obvious damages from transit the shipper in question must be notified and the dealer must be informed.
- Positioning:** Position device only where sufficient air circulation can be maintained. Extreme temperatures, dust, humidity, shocks and strong electromagnetic fields must be avoided.
- Maintenance:** Use a moist soft textured fabric cloth when cleaning the housing. Do not use polish or any other cleaning agents.
- Repairs:** The GPS D25 R/G/Y 6 does not require any extra maintenance. There are no user serviceable parts inside the device. Repairs should be sent to an authorized service partner.
- EMC:** The EMC regulations are observed only under the following condition: use high quality shielded cables at data inputs and outputs.

A2 Copyright

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A3 CE-DECLARATION

We,

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declare under our sole responsibility that the unit

GPS D25 R/G/Y 6

meets the intent of the following directives, standards and specifications:

89/336/EEC Electromagnetic Compatibility

EN 50081-1 Emissions

- EN 55022
- EN 55103-1

EN 50082-1 Immunity

- EN 55024
- EN 55103-2

System Description

Overview

GPS D25 R/G/Y 6 are displays (7-segment LEDs) of 25mm digit height. R or G or Y responds to the colour of the LEDs: R = red, G = green, Y = yellow. Digit 6 stands for a 6-digit display.

The **brightness** of the LEDs is adjustable by using the **BCD turn switch** located at the front: 0=1, 2, 3, 4, 5, 6, 7=8=9.

After power-on the display will show the revision number (e.g. '5.9 TH'), any built-in options and the selected operating mode. To select the **operating mode** use **HEX turn switch** at the front. Select e.g. mode = 4 to display the time of the GPS receiver.

Mode	Description
0...3	reserved
4	Time of the GPS receiver = time of the receiver or of the free-running clock
5	Date of the GPS receiver = date of the receiver or of the free-running clock
6...7	reserved
8	Time/date of the last synchronisation of the receiver
9	Status information of the GPS receiver
A...F	reserved

After a change of the mode with the HEX turn switch the display indicates the new mode for a moment, e.g.: 'Mode 5'.

The built-in GPS receiver

The display has a built-in GPS receiver. An active antenna is connected via a 50 Ω cable at a SMA female connector. Its built-in pre-amplifier is supplied via the same cable. No passive antenna must be connected, as this normally causes a DC short circuit. The time received is output via DSUB female connector every second as a serial telegram.

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 output connector 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 its 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 Co-ordinated), 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.

Three LED's indicate the operational status of the receiver:

LED	Color	Function
MOD	green	Flashing with every internal transmission of a data telegram.
FREE	red	Lights up if the receiver is operating in the free-running mode. Will go out if a sufficient number of satellites has been detected to ensure synchronisation.

In addition the FREE-LED indicates with a blinking in five-second intervals the exact status of synchronization.

LED FREE	Reception status	Satellites in reception
Blinks continuously	no synchronization since switch-on	none
Blinks with brief interruptions in five-second intervals	no synchronization since switch-on	number of interruptions corresponds to number of satellites in reception
Switched-off, but blinks briefly in five-second intervals	real-time information was received but reception is not possible at the moment	four times blinking means: no satellites in reception. Every less blink means: one more satellite in reception
Switched-off	synchronous	at least four

Specifications of the GPS receiver

Antenna input	1575,42 MHz (L1 band), -130 dbW to -163 dbW
Antenna 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	± 2μs (2ppm)
in free-running mode after first synchronous reception	± 1μs (1ppm)

Configuration

The GPS receiver may be configured via an 8-fold internal dip-switch. With standard delivery all switches are set to "off" except switch 7 = "on".

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:

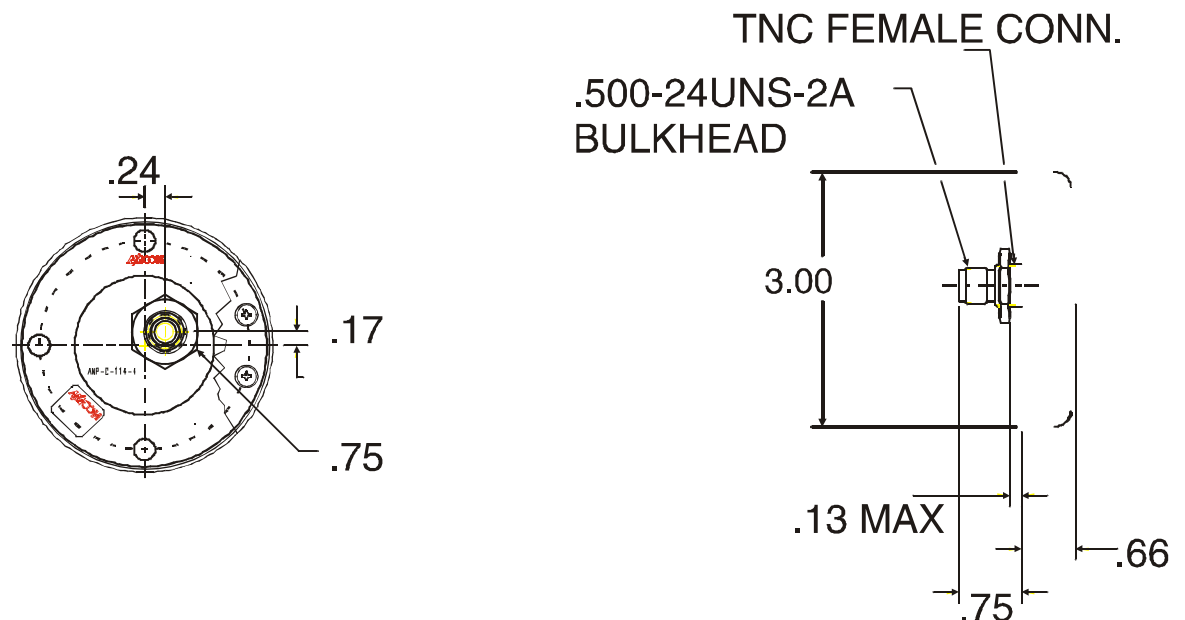
Cable	Length
RG 58	7,5 m (typ.) to 10 m (max.)
RG 400	10 m (typ.) to 15 m (max.)

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.

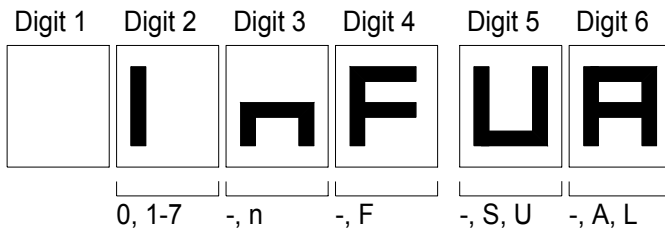
∅	95mm
Antenna height without screw thread	16mm
Length of the screw thread	15mm



Displaying time, date and status information

Four stages of the HEX turn switch are reserved to display data from the GPS receiver:

- Mode 4 Displays the time of the GPS receiver.
- Mode 5 Displays the date of the GPS receiver.
- Mode 8 Display shows the moment when the GPS at last has been synchronised (receives valid time/date from the antenna signal). The display switches every 5 seconds between time and date indication. The time counts upwards if the GPS receiver currently stays in sync. Otherwise the time stops, the receiver clock is in free run mode since the displayed time. Showing only bars means no synchronisation has been made since last power-on.
- Mode 9 Displays status information:



- Digit 2: **1-7** = current day-of-week, 1 = Monday.
0 = receiver does not transfer a day-of-week status.
- Digit 3: **-** = GPS antenna signal found,
n = no GPS antenna signal found.
- Digit 4: **-** = receiver clock synchronised,
F = receiver clock not synchronised, free running.
- Digit 5: **-** = time zone CET (Central European Time),
S = time zone CEST (Central European Summer Time),
U = time zone UTC.
- Digit 6: **-** = no announcement of a time change-over,
A = announcement of a Daylight Savings Time change-over, one hour before the changing occurs,
L = announcement of a leap second, one hour before the changing occurs.

Optional: MASTER output and connecting slave analogue clocks

The MASTER output supplies the slave analogue clock with power as well as with time data. The time data are transmitted with coded seconds pulses, in compliance with the coding scheme of DCF77 German radio telegram. The data bits are transmitted every second, at the change of the minute the seconds pulse will be suppressed. Screwing posts at the slave analogue clock serve as connectors, making an easy loop-through to a next slave clock possible.

A 9-pin DSUB female connector MASTER is mounted at the rear panel of GPS D25 R/G/Y 6. Below the pin assignment and a wiring example:

KSO	DSUB9M	open ends (to screwing posts)
	V+ 1	V+ (1)
	V- 2	V- (2)
	SIGNAL 7	SIGNAL (3)
	GND 8	GND (4)
Connection of an index clock (slave) to a master output	Twist the V+/V- and SIGNAL/GND signals. Pins not specified should not be used. Example: 2-pair twisted cable.	

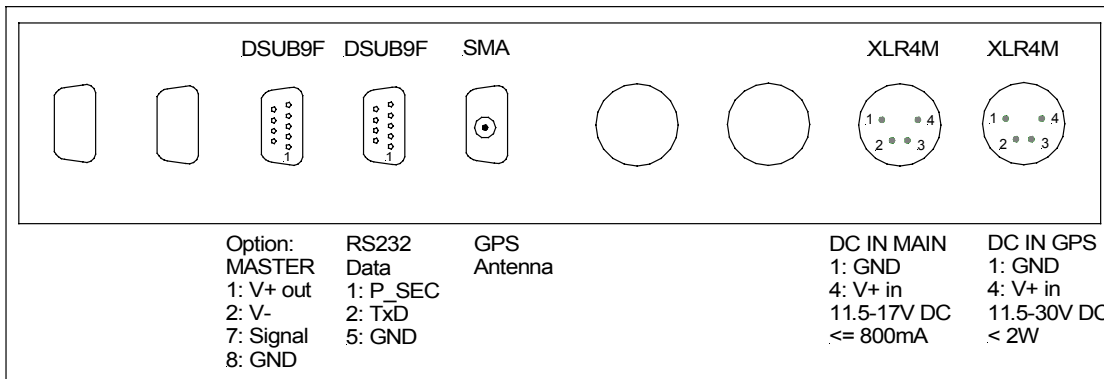
Cable lengths:

Every slave analogue clock requires $\leq 11\text{mA}$ at $\geq 6\text{V}$. To calculate the maximum cable length, output voltage, cross section, specific resistance and number of clocks have to be involved. For radial arrangement of copper cables with a cross section of $0,22\text{mm}^2$ and a output voltage of 12V , the following cable lengths are possible for every lane:

no. of clocks	1	2	5	10	20	30
length m	3500	1750	700	350	175	117

The maximum number of clocks is limited by a 300mA fuse.

Rear and technical data of the display



DC IN MAIN: Power supply for the whole unit = display + GPS receiver + MASTER

DC IN GPS: Power supply for GPS receiver

The power supply via DC IN GPS will be disconnected by a relay if the power supply at DC IN MAIN is connected.

RS232 TxD: Data output (time, date, status), standard format = 2400/7/E/2, format depends on internal DIP switch settings.

RS232 P_SEC: Coded seconds pulses, positive pulses, coding scheme is in compliance with DCF77.

Dimensions: 214 (W) x 43 (H) x 140 (D) mm (1/2 19", 1U)

Weight: 1.5kg approx.

Operating temperature: 5°C to 40°C

Admiss. ambient humidity: 35% to 85%, non-condensing