TimeProvider 4100 GNSS Antenna Kits and Accessories

Maximize Performance and Flexibility

Antenna Kits

- GNSS antenna kits
- GNSS splitters
- Lightning protection
- Inline amplifiers

TimeProvider 4100 employs a state-of-the-art multi-constellation GNSS precision timing receiver. Microsemi offers a wide range of antenna installation kits and accessories to tailor the installation to site by site needs.

If you're not sure how to achieve what you want in terms of configuring choices, simply call Microsemi's timing experts and put our expertise to work for you.

Outdoor Antenna Basics

Antenna cables and accessories enable versatile solutions that are easy to achieve. GNSS inline amplifiers installed at the antenna are an easy way to extend cable runs from 225 feet to up to 900 feet depending on cable type. Lightning arrestors provide valuable electrical shock protection to TimeProvider 4100. Antenna cable splitters leverage a single antenna and cable between up to four GNSS receivers.

Ordering antenna components is meant to be a simple task. The most important thing is that you need to have a rough idea of the total cable length needed between TimeProvider 4100 and the mounting location of the antenna. It is okay if extra cable is coiled to the side.

Pre-configured kits are available that include cable, antenna, and related mounting accessories. These kits vary by total cable length and if a lightning arrestor is required or not. For long cable runs (>225 feet), the components are assembled individually.

To assist and simplify, Microsemi has located an Excel-based antenna configurator online (near the link to this datasheet) that helps you determine the exact part numbers you need for your cable length and desired accessories.

The antenna kit (093-15202-001) includes a short adapter cable with BNC(m)-N(f) connectors. All primary antenna cables use N(m) connectors on either end. A single cable is to be used between the adapter cable and the next accessory (lightning arrestor, inline amplifier, or antenna). Lightning arrestors include a 25-foot cable to connect to the next accessory (inline amplifier or antenna).

Note: The TimeProvider 4100 system uses a different antenna and splitter for GPS/GLONASS/Galileo compared to GPS/GLONASS/Galileo/BeiDou support. Please refer to the following antenna and splitter sections for details on the antenna and splitter options to support the BeiDou frequency band.

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Cable and Amplifier Lengths

50-225 ft.
Standard cable

225-450 ft.
Standard cable +
Inline Amplifier

450-900 ft.
Low loss cable +
Inline Amplifier

Antenna Kits and Components

Description	Part Number
Kit: Total length: 50 ft, cable: 50 ft; GPS/GLONASS/Galileo antenna kit	990-15202-050
Kit: Total length: 75 ft, cable: 50 ft; lightning arrestor; cable: 25 ft; GPS/GLONASS/Galileo antenna kit	990-15202-075
Kit: Total length: 100 ft, cable: 100 ft; GPS/GLONASS/Galileo antenna kit	990-15202-100
Kit: Total length:125 ft, cable: 100 ft; lightning arrestor; cable: 25 ft; GPS/GLONASS/Galileo antenna kit	990-15202-125
Kit: Total length: 150 ft, cable: 150 ft; GPS/GLONASS/Galileo antenna kit	990-15202-150
Kit: Total length:175 ft, cable: 150 ft; lightning arrestor; cable: 25 ft; GPS/GLONASS/Galileo antenna kit	990-15202-175
Kit: Total length: 200 ft, cable: 200 ft; GPS/GLONASS/Galileo antenna kit	990-15202-200
Kit: Total length:225 ft, cable: 200 ft; lightning arrestor; cable: 25 ft; GPS/GLONASS/Galileo antenna kit	990-15202-225
250 ft. antenna cable	060-15202-250
350 ft. antenna cable	060-15202-350
450 ft. antenna cable	060-15202-450
500 ft. low loss antenna cable	060-15202-500
750 ft. low loss antenna cable	060-15202-750
900 ft. low loss antenna cable	060-15202-900
Kit: GPS/GLONASS/Galileo antenna; mounting bracket; adapter cable for chassis	093-15202-001
Kit: GPS/GLONASS/Galileo/BeiDou antenna; mounting bracket; adapter cable for chassis	093-15202-006
Inline amplifier with adapter	093-15202-005
Kit: Lightning arrestor with 25 ft. cable	093-15202-002
Kit: Lightning arrestor with 25 ft. low loss cable	093-15202-003
Kit: 1:4 GPS splitter with two 3 ft. cables	093-15202-004
Kit: GPS/GLONASS/Galileo/BeiDou 1:4 splitter with two 3 ft. cables	093-15202-007

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GNSS/GLONASS/Galileo Antenna

The standard antenna used with TimeProvider 4100 is a high-gain (40 dB) GNSS antenna covering the GPS L1, GLONASS G1, Galileo E1, and SBAS (WAAS, EGNOS, and MSAS) frequency band (1575 MHz to 1606 MHz). The antenna has a three-stage low-noise amplifier with a midsection SAW with a tight pre-filter to protect against saturation by high-level sub-harmonics and L Band signals, making it excellent for timing applications. An L-bracket for pole mounting and 3-foot BNC(m) to N(f) cable is also included.

Technical

Specification	Value
1 dB bandwidth	31 MHz
Antenna gain	4.5 dBic
Axial ratio	<4 dB at 1590 MHz, 8 dB typical at band-edges
Filtered LNA frequency bandwidth	1575 MHz to 1606 MHz
Gain	40 dB minimum flatness ±2 dB, 1575 MHz to 1606 MHz

Out-of-Band Rejection

Specification	Value
<1550 MHz	>50 dB
>1640 MHz	>70 dB
VSWR (at LNA output)	<1.5:1
Noise figure	2.5 dB typical
Supply voltage range	2.5 V_{DC} to 16 V_{DC} nominal (12 V_{DC} recommended maximum)
Supply current	20 mA maximum at 85 °C
Mechanical size	66.5 mm diameter × 21 mm height
Operating temp.	–40 °C to 85 °C
Weight	150 g
Environmental	IP67, CE, REACH, and RoHS-compliant
Salt Fog/Spray	MIL-STD-810F Section 509.4

GPS/GLONASS/Galileo/BeiDou Antenna

This wide-band antenna is a precision high gain GNSS antenna covering the BeiDou B1, Galileo E1, GPS L1, GLONASS G1, and SBAS (WAAS, EGNOS, QZSS, and MSAS) frequency band (1557 MHz to 1606 MHz). It provides very circular polarized signal reception through the entire bandwidth of the antenna, thereby providing superior multipath signal rejection. The antenna has a three-stage low-noise amplifier, comprised of one input LNA per feed, a midsection SAW to filter the combined output, and a final output gain stage. An additional pre-filter provides extra strong protection from near frequency and strong harmonic signals. An L-bracket for pole mounting and 3-foot BNC(m) to N(f) cable is also included.

Specification	Value
2 dB bandwidth	47 MHz
Antenna gain (with 100 mm ground plane)	4.25 dBic
Axial ratio	<2 dB typical, 3 dB max
Filtered LNA frequency bandwidth	1559 MHz to 1606 MHz
Gain	40 dB minimum

Out-of-Band Rejection

Specification	Value
<1500 MHz	>50 dB
>1640 MHz	>70 dB
VSWR (at LNA output)	<1.5:1
Noise figure	3 dB typical
Supply voltage range	2.5 V_{DC} to 16 V_{DC} nominal (12 V_{DC} recommended maximum)
Supply current	19 mA maximum at 85 °C
Mechanical size	66.5 mm diameter × 21 mm height
Operating temp.	–40 °C to 85 °C
Weight	150 g
Environmental	IP67, CE, REACH, and RoHS-compliant
Salt Fog/Spray	MIL-STD-810F Section 509.4

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GPS L1 4:1 Active Splitter

The Microsemi Active Splitter allows multiple GPS receivers to share a single antenna. Designed for both manufacturing and position/timing redundancy applications, the GPS L1 Active Splitter provides dependable signals for four GPS receivers.

Features

- Four ports
- High isolation

Benefits

- Cascades conveniently without adding separate amplifiers and bias-tees between splitters
- Delivers precise GPS signals over a wide temperature range and in harsh environmental conditions
- Eliminates feedback and interaction between any GPS system connected to it

Specification	Value
Number of output ports	4
Input/output impedance	50 Ω
VSWR (typical)	Input and output 1.6 at L1
Bandwidth (–3 dB)	L1 (1575.42 MHz) ±20 MHz
Gain (antenna input to any output at L1)	0 dB ±3 dB
Noise figure	5 dB typical, at 25 °C
Port-to-port isolation L1 ±40 MHz	50 dB typical
DC power	4.5 V_{DC} to 13 V_{DC}
Damage threshold	18 V_{DC} either polarity
Operating current	23 mA to 48 mA depending on voltage
Pass through current	450 mA
Group delay	40 ns typical
RF connectors	Female N-type
RoHS 6/6	Not compliant

Complete specifications for this Microsemi model 58536A GPS Splitter can be found on the Microsemi website.

GPS/GLONASS/Galileo/BeiDou Splitter

This L band frequency, RoHS-compliant 4:1 active splitter makes it possible to use a single GPS referencing antenna and cable arrangement for multiple synchronization systems. The antenna DC bias select circuit allows for the active antenna DC input to be applied to any or all RF outputs. One DC voltage will be chosen to power the antenna while other inputs will be switched to DC loads. If the selected DC bias input should fail, the DC bias will automatically switch to another DC input to ensure an uninterrupted supply to the active antenna.

Features

- Four ports
- GPS/GLONASS/Galileo/BeiDou compatible

Benefits

- Amplified to offset splitter losses
- Standard antenna DC bias select
- Cascades conveniently without adding separate amplifiers and bias-tees between splitters

Specification	Value
Number of output ports	4
Input/output impedance	50 Ω
Frequency range	1 GHz to 2 GHz
Noise figure	2 dB max
Port-to-port isolation	30 dB–40 dB
DC power	3.3 V_{DC} to 12 V_{DC}
Operating current	18 mA to 20 mA
Pass through current	250 mA
Group delay, L1	5 ns
RF connectors	Female N-type
RoHS 6/6	Compliant
Gain	0 dB ±2 dB

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GNSS Inline Amplifier

Cable length is a common cause for signal loss between the GNSS antenna and the GNSS receiver. As with any electromagnetic radio wave, GNSS signals become attenuated as they pass through an electrical cable. The amount of signal loss depends on the length and type of cable used. The inline amplifier attaches the antenna and the antenna cable. It uses the same power as the antenna and does not require extra wiring.

Features

- Extended cable length up to 900 ft depending on the cable type
- Fits inline with antenna cable
- No external power source needed
- Simple installation

Specification	Value
Nominal gain	25 dB 4/0 dB typical
Pass band ripple	±2 dB
Impedance	50 Ω
Noise figure	2 dB typical.
Bandwidth	1.2 GHz to 1.8 GHz
Input VSWR	1.5 typical/2 maximum
Output VSWR	1.5 typical/2 maximum
Reverse isolation	>35 dB
Output 1 dB	–10 dB
Output IP3	5 dBm

Mechanical and Environmental

Specification	Value
Mechanical size	2.32" length × 0.787" diameter
Connector	N-Type
Operating temp.	–40 °C to 85 °C
Environmental	RoHS, REACH, and IP67

GNSS Lightning Arrestor

Lightning does not have to strike the antenna to significantly damage the antenna or the GNSS receiver. Damage is often due to the effects of a lightning strike on a nearby structure, not a direct strike on the antenna itself. Since lightning strikes may induce damaging voltages in the antenna system when striking nearby objects, attempt to locate the antenna away from lightning rods, towers, and other structures that attract lightning. Also, locate the GNSS antenna lower than any nearby structures that are likely to attract a strike.

Specification	Value
Type	DC pass
Mount type	Bulkhead mount
PIM rated	N
Standards	CE-compliant, RoHS-compliant
Connector	N
Surge side connector	Bi-directional N
Protected side connector	Bi-directional N
Frequency range	dc to 5 GHz
Turn on voltage	150 V_{DC} (spark over)
RF power	25 W
VSWR	≤1.2 dB to 1
Insertion loss	≤0.1 dB
Protocol/Application	Gas tube, DC pass RF coaxial protection for DC to 5 GHz

The lightning arrestor also ships with 25 ft of either standard or low loss cable.

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