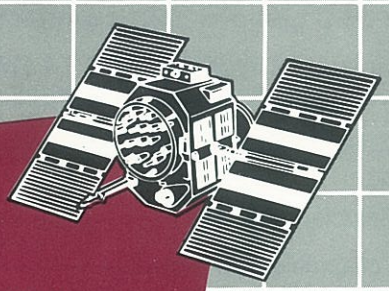
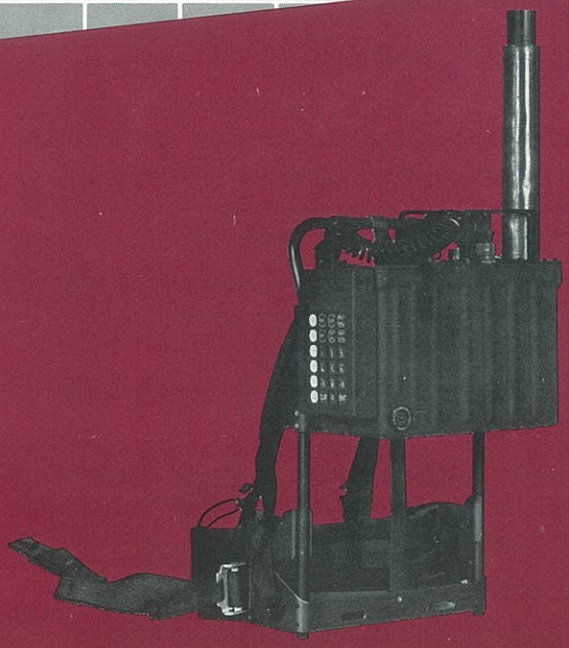
Rockwell International
Collins Government Avionics Division

Product Information Sheet





MANPACK/VEHICULAR CONFIGURATION

The Collins Manpack/Vehicular (M/V) GPS User Equipment (UE) will enhance the navigation and weapons capabilities for foot solders and land vehicles. The Collins system will provide precise 3-dimensional position (P) and velocity (V) as well as coordinated universal time (T) for support of ground-based missions such as tactical reconnaissance, artillary forward observer, ground-based forward air observer, and survey. In addition, the Collins M/V GPS UE will enable precision navigation, coordinated amphibious operations and mechanized maneuvers.

GPS

Global Positioning System

Collins GPS User Equipment — Manpack/Vehicular Configuration

User Applications

Backpack Vehicular - M998 HMMWV, M1009 CUCV
Watercraft - LSV, LCU, CHI, Tag, Page/Sutton
Shelters - S250, S280

System Operation

Operation of the M/V GPS UE will be controlled by the M/V Control Display Unit (CDU). Selectable modes of operation include:

INITIALIZE — the M/V GPS UE is energized and initial estimates of PVT may be entered.

NAVIGATE — the M/V GPS UE is computing estimates of PVT based on GPS satellite measurements.

SURVEY — the M/V GPS UE will utilize knowledge that the system is stationary to allow for increased navigation accuracy and antijam tracking.

STANDBY — the M/V GPS UE will maintain accurate system time to allow for rapid fixes while maintaining only critical functions to increase battery life in the field.

The M/V system operates in the stand-alone configuration. When in the NAVIGATE mode, the system is capable of achieving specified accuracies under full land vehicle dynamics. In the SURVEY mode, the M/V GPS UE uses specific knowledge that the system is stationary to achieve additional accuracy and antijam margins by allowing more time for the navigation filters to converge and by narrowing receiver tracking bandwidths. PVT fix updates are produced once-a-second and are available for CDU display and for output on the instrumentation port.

System Configuration

When used as a Manpack, the system consists of a portable antenna, a M/V receiver/processor, and a M/V CDU. The entire system will operate from a single prime-power battery (BA5590 or BB590 or equivalent) housed within the receiver/processor unit. The system is configured for direct attachment to a standard infantry pack frame. When used on-board a land vehicle, a vehicle power adapter (VPA) and mounting assembly are added to allow the system use of vehicle-generated 28 V dc and to secure the M/V receiver/processor in the designated mounting location.

Fixed Reception Pattern Antenna

- 0 dBiC gain over 160° beamwidth
- Capable of receiving GPS L1 (1575.42 ±10.23 MHz) and L2 (1227.6 ±10.23 MHz) frequencies.
- Mounts directly to M/V GPS receiver/processor housing
- Flexible extender
- Collapsible and stowable
- No additional ground plane required

M/V Receiver/Processor

The M/V receiver/processor is housed as a single unit containing the receiver hardware, system computer, memory containing system software, primary power battery, and stowage for the portable antenna and CDU. By sequencing its single channel to track satellite signals, the unit is able to achieve GPS navigation accuracies while maintaining minimum size and weight.

- 1 channel
- Tracks both the P-Code and the C/A-Code.
- Generic solution in earth-centered-earth-fixed coordinates
- 8-state Kalman filter for stand-alone processing of GPS satellite signals
- Accepts satellite signals at GPS L1 and L2 frequencies
- Temperature stabilized frequency standard
- Accepts primary power from either a battery or vehicle power adapter.
- Digital interface to M/V CDU
- Operational software modules include executive; receiver processing/navigation; waypoint navigation for up to nine stationary waypoints with associated area navigation computations; computation of position in common Military Grid Reference System coordinates or geodetic coordinates (WGS-72 and up to 46 local datums).
- Interfaces: RS-422 serial digital per ICD-GPS-204A KYK-13 Data Encryption Loader per ICD-GPS-204A
- Incorporates anti-spoofing and selective availability performance.

Vehicle Power Adapter

The vehicle power adapter (VPA) is used to provide power conversion and filtering to allow the M/V receiver/processor to utilize host vehicle generated 28 V dc power. In addition, the VPA acts as a cable junction box for remoting the M/V CDU from the receiver/processor location.

- Accepts MIL-STD-1275A compatible power
- Provides primary power for system and charging current for rechargable battery
- Main power circuit breaker

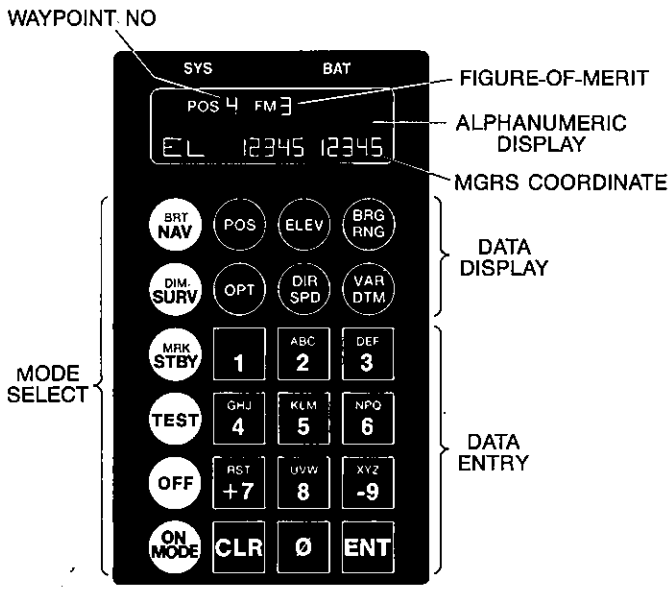
Vehicle Mount

- Provides mounting mechanism for the M/V receiver/processor and the VPA.

Control Display Unit

The GPS M/V CDU provides the medium for operator control of the GPS M/V user equipment and selective display of navigation data. The unit is suitable for handheld operation and can be remoted from the M/V receiver/processor for vehicular application.

- 3.3 feet (1 meter) pendant cable connects directly to M/V receiver/processor. Extension cable may be used for remote application.
- Low power, sunlight readable, liquid crystal, alphanumeric display.
- Night viewing accomplished by integral low power backlighting of display and keyboard. Can be used with night vision goggles.
- Full pushbutton keyboard
- LOW BATTERY and SYSTEM FAULT indicators



System Performance (typical)[1]

Receiver antijam[2]: 40 dB J/S (54 dB J/S in SURVEY mode).

Battery life: 12 hours under continuous operation,
48 hours intermittent (NAVIGATE to STANDBY duty cycle = 1/10).

Reaction time (elapsed time from power on to first accurate solution output): 10.5 minutes.

Time-to-first-fix (elapsed time from completed initialization to first accurate solution output): 5.5 minutes

Mean-time-between-maintenance (MTBM): 1500 hours

Solution update rate: 1 Hz.

Host vehicle dynamics capable of being tracked:	**Accuracies:**
Velocity 25 m/s Acceleration 6 m/s/s	Position 16 m Velocity 0.3 m/s Time 1 ms

Specifications (typical)

PHYSICAL	ANTENNA	VPA[4]	M/V RECEIVER/ PROCESSOR	M/V CDU	VEHICLE MOUNT[4]
Weight	0.7 pound (0.32 kg)	8 pounds (3.6 kg)	15.25 pounds[3] (7.9 kg)	1.25 pounds (0.6 kg)	25 pounds (11.25 kg)
Cooling	N/A	Convection/ Conduction	Convection	Convection	N/A
Power	N/A	50 watts	14 watts (2.4 watts in STANDBY)	0.2 watts	N/A

Environment: Temperature (operating): –40 to +71 °C
Altitude (operating): –300 m to +5000 m MSL

Humidity: 100%

Design Shock: 40 g for 11 ms terminal peak saw tooth

Transit Drop: 24-inch drop on each edge, corner, and face for a total of 26 drops.

Vibration: 1 in double amplitude for 1/2 hour on each of 6 faces

Immersion: 1 meter of water for 2 hours

Input power: 28 V dc

Mean Time Between Failure: 2200 hours

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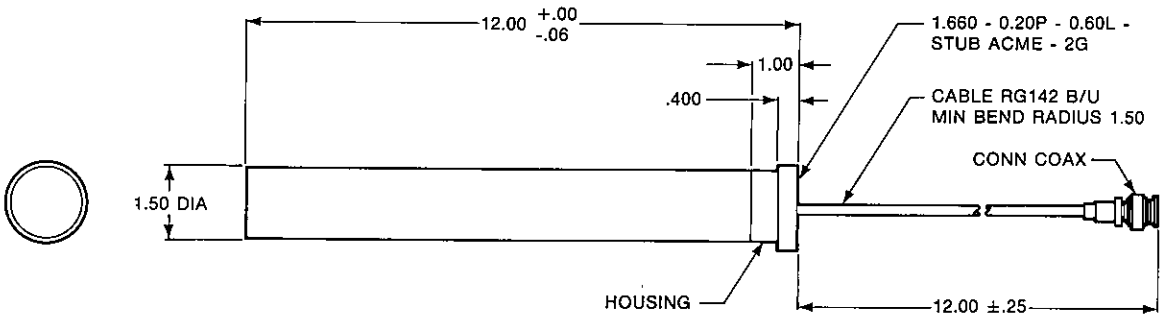
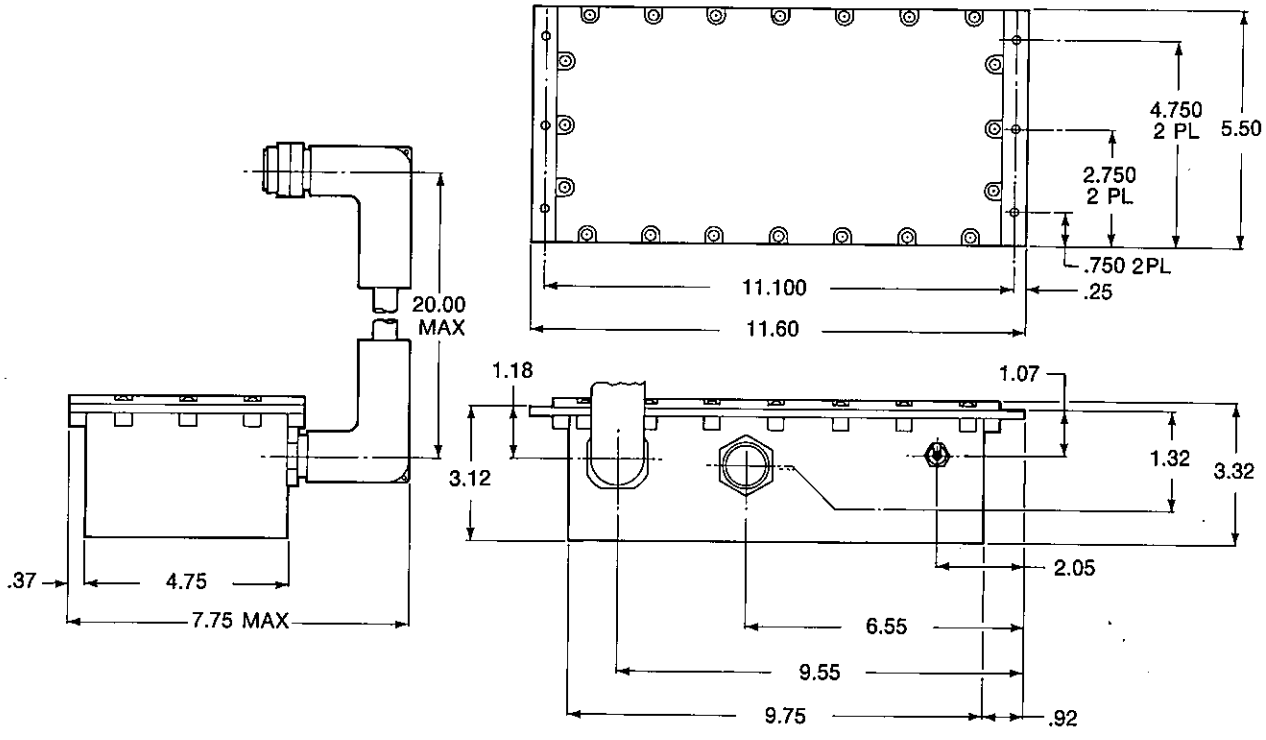
(1) Stand-alone system performance.
(2) Referenced to nominal signal power of –163 dBw.
(3) Including prime power battery.
(4) Vehicular configuration only.

Dimensional Drawings (typical)



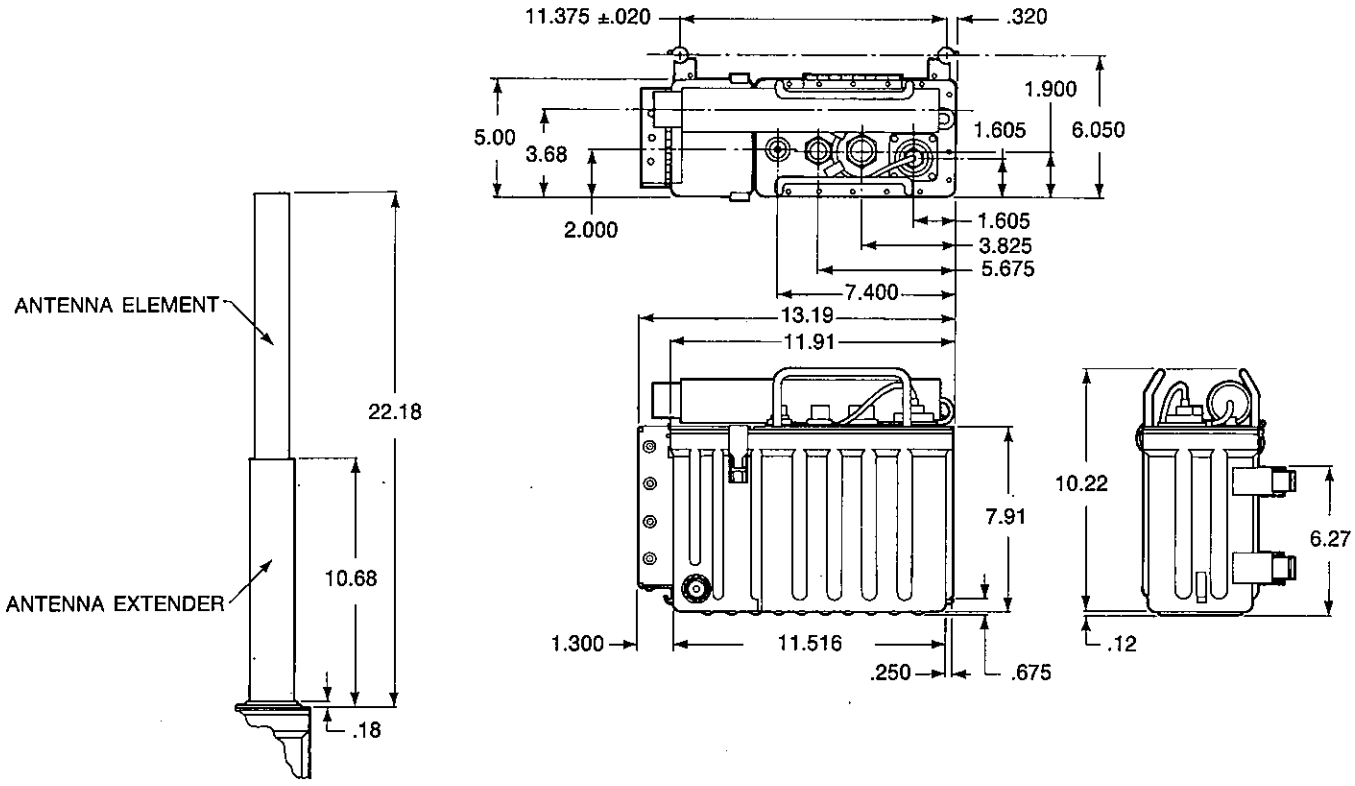
Fixed Reception Pattern Antenna



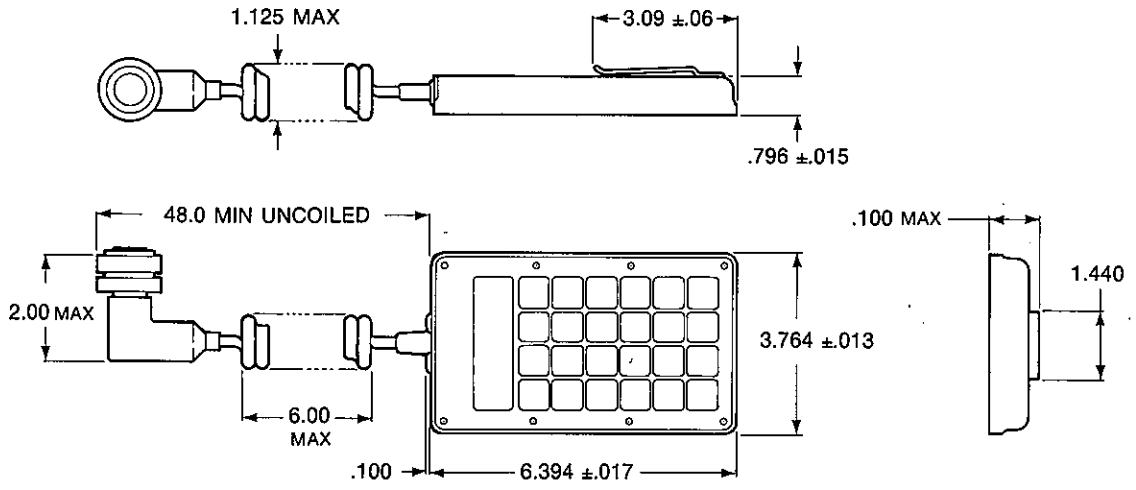
Vehicle Power Adapter

Note: Dimensions are in inches.

Dimensional Drawings (typical)



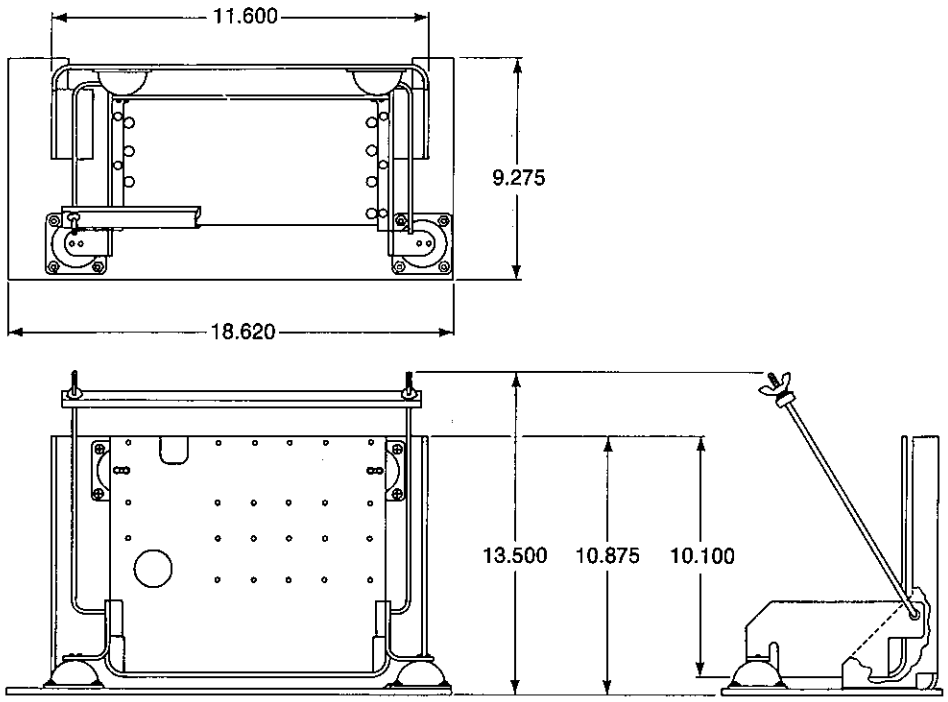
Manpack/Vehicular Receiver/Processor



Manpack/Vehicular Control Display Unit

Note: Dimensions are in inches.

Dimensional Drawings (typical)



Vehicle Mount

Note: Dimensions are in inches.

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