

Supplement to

**Z-12R™ DGPS REFERENCE STATION
Manual #630066-01 (Rev A)**

and

**Z-12R™ DGPS REFERENCE STATION
Featuring FISCHER Connectors & RS-422
Manual #630801 (Rev A)**

Covering additional RSIM messages implemented in firmware version RE00

**Prepared by
Ashtech Precision Products
Division of
Magellan Corporation**

**471 El Camino Real
Santa Clara CA 95050**

Z-12R™ DGPS Reference Station Operation and Technical Manual Supplement

Magellan Corporation
Ashtech Precision Products
471 El Camino Real
Santa Clara, CA. 95050-4300

Phone and Fax Numbers

- Main
 - Voice: 408-615-5100
 - Fax: 408-615-5200
- Sales
 - US: 800-922-2401
 - Fax: 408-615-5200
- Europe
 - Voice: 44-0118-931-9600
 - Fax: 44-0118-931-9601
- Support
 - US: 800-229-2400
 - Fax: 408-615-5200

Internet

- Support@ashtech.com
- <http://www.ashtech.com>
- support@ashtech.co.uk



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Introduction:

This supplement is intended to describe new functionality added to the Z-12R™ DGPS family of receivers via firmware version "RE00". Manuals "Z-12R DGPS REFERENCE STATION", part number 630066-01 (Rev A), and "Z-12R DGPS REFERENCE STATION featuring FISCHER connectors & RS-422" part number 630801 (Rev A) should be used in addition to this supplement.

This supplement addresses the addition of RSIM messages 27, 28, 29, and 30. Following the description and format for these messages there is an updated table which contains the Name, Units, Range, Type, and RSIM # used for each new RSIM message as it applies.

New RSIM messages

RSIM #27: EQUIPMENT LOGISTICAL PARAMETERS

USAGE:

- 1) Sent by any device for the purpose of conveying the serial number and firmware versions(s) for remote site equipment such as the RS, IM, or RIM.

FIELD# 1 2 3 4 5
 ^ ^ ^ ^ ^
\$PRCM,27,c---c, c---c, c---c, c---c,... *hh<CR><LF>

WHERE:

- 1 – Device Serial Number
- 2 -- Version for Firmware Module #1
- 3 – Version for Firmware Module #2
- 4 – Version for Firmware Module #3
- 5 – Additional Firmware Modules as required.

NOTES:

- 1) All fields are ASCII Character Strings in accordance with NMEA 0183/IEC1162.

RSIM #28: RS PRR CORRECTIVE ACTION PARAMETERS

USAGE:

- 1) CS sends to RS to set or reset the parameters that control PRN tracking loop resets and the suspension of broadcast corrections.
- 2) CS sends to RS to resume the broadcast of PR Corrections for a given PRN.
- 3) RS sends to CS to report the PRR Corrective Action Parameters.

FIELD # 1 2 3 4 5
 ^ ^ ^ ^ ^

\$PRCM,28,x,x,x,x,x*hh<CR><LF>

WHERE:

- 1 - Reset Iterations
- 2 - Correction Suspension Duration
- 3 - Reset Duration
- 4 - Reset Monitoring Interval
- 5 - PRN#

NOTES:

- 1) This message defines a corrective action (reset) process that the RS performs when it receives an RSIM #20 which indicates that a “PRR Outside Threshold” condition exists.
- 2) Multiple PRN’s may be subject to this reset process simultaneously and independently. Fields 1, 2, 3, and 4 are common to all PRN’s.
- 3) When the RS receives a “ PRR Outside Threshold” via an RSIM #20 for a given satellite, a reset is initiated and a “Do Not Use” flag is broadcast for a length of time equal to the *Reset Duration*.
- 4) The RS will monitor the resets for each PRN over the *Reset Monitoring Interval* in a moving window first-in-first-out method. The indicated number of *Reset Iterations* must be completed within the *Reset Monitoring Interval* for a PRN to be suspended.
- 5) If, before a period of time equal to the *Reset Duration* field has elapsed, additional RSIM #20’s are received indicating a “PRR Outside Threshold” condition for the same PRN, the current reset shall continue with the time remaining in the ongoing reset set to equal the *Reset Duration*. This effectively extends the length of the reset state.
- 6) After the *Reset Duration* expires a “PRR outside threshold” RSIM #20 is received then the RS will process based on the value of *Reset Iterations* and the number of Resets occurring during the *Reset Monitoring Interval*:
 - 0: The RS will never suspend broadcast for the PRN. It will continue executing resets as required.
 - 1-5: The RS will execute the Reset this many times before suspending broadcast for the PRN for an amount of time equal to the *Correction Suspension Duration*.
- 7) If a given PRN number is specified in field 5 the RS will clear the *Correction Resumption Countdown* and *Reset Iteration Count* values to 0; resets in progress are terminated for the given PRN. If the SV had correction broadcast suspended for it, it will resume broadcasting with *Correction Resumption Countdown* set to 0. Fields 1, 2, 3, and 4 always apply to all SV’s.
- 8) When the PRN# is set to 99 in field 5 all suspensions are cancelled and the *Correction Resumption Countdown* and *Reset Iteration Count* for each satellite are set to zero; resets in progress are terminated for all PRN’s.
- 9) When the RS responds to an RSIM #1 query, field 5 shall be NULL.
- 10) When a given PRN sets, the RS will clear to zero the counters associated with the *Reset Duration*, *Reset Iteration*, and *Correction Suspension Duration* for the given PRN.

RSIM 28 Functionality Note:

If during operational use, an RSIM 28 is sent to the Z-12R, the "reset iterations" counter will be handled as follows if field 5 of the RSIM 28 message is left null:

A). If the "reset iterations" counter is increased from its previous setting, then ALL SV's will have their specific "reset iterations" counter increased by the difference of the new value of the "reset iterations" counter minus the old value of the "reset iterations" counter. For purposes of explanation, call this value "delta increase". Those SV's which have been suspended before the RSIM 28 is sent, will remain suspended, however their "reset iterations" counter will be increased from 0 to "delta increase". This is to show that this SV would not be suspended under the current RSIM 28 settings when a user looks at an RSIM 29 for evaluation purposes.

NOTE: If an SV is currently in the "Reset in Progress" condition (see Reset Duration and RSIM 29) when an RSIM 28 is sent and is about to be suspended, the SV WILL BE suspended, with the above functionality followed in terms of what is displayed for the "reset iterations" counter.

B). If the "reset iterations" counter is decreased from its previous setting, then ALL SV's will have their specific "reset iterations" counter decreased by the difference of the old value of the "reset iterations" counter minus the new value of the "reset iterations" counter. For purposes of explanation, call this value "delta decrease". Those SV's which would then have a "reset iterations" counter value of "0" or below will display a "reset iterations" counter of "0" but will NOT be suspended until one more RSIM 20 is sent from the IM. This is to show that under the current RSIM 28 settings this SV would be normally suspended but is not due to a change occurring in the RSIM 28 settings when a user looks at an RSIM 29 for evaluation purposes.

NOTE: If an SV is currently in the "Reset in Progress" condition (see Reset Duration and RSIM29) when a RSIM 28 is sent and the "reset iterations" counter is being set to a value of 0 or less, the "reset iterations" will go to "0" and the SV WILL BE suspended.

FINAL NOTE: It is strongly recommended that if during operational use (currently broadcasting corrections) an RSIM 28 is sent to "readjust" the "reset iterations" counter, the user or CS software in addition should also command a reset of all SV's being guided by this methodology by setting field five of RSIM 28 to "99" (e.g. "RSIM,28,#,#,#,99"). This will reset any SV's currently suspended and set the Corrective Action parameters for all SV's to the settings of the RSIM 28 regardless of their current state.

RSIM #29: PRN BROADCAST STATUS

USAGE:

- 1) RS sends to CS to report the status of all PRN's that are in view.

```
FIELD #   1 2   3   4 5 6 7 8 9 a b c d e f
          ^ ^   ^   ^ ^ ^ ^ ^ ^ ^ ^ ^ ^ ^
$PRCM,29,x,x,hmmss.ss,x,a,x,x,x,a,x,x,x,a,x,x*hh<CR><LF>
```

WHERE:

- 1 - Total Number of Messages
- 2 - Message #
- 3 - UTC Time Observed
- 4 - PRN Number of SV Being Tracked
- 5 - Correction Broadcast Status:
 - B = Broadcasting corrections
 - S = Suspended
 - R = Reset in Progress
 - O = Other
- 6 - Correction Resumption Countdown
- 7 - Reset Iteration Countdown
- 8 - PRN Number of SV Being Tracked
- 9 - Correction Broadcast Status:
 - B = Broadcasting corrections
 - S = Suspended
 - R = Reset in Progress
 - O = Other
- a - Correction Resumption Countdown
- b - Reset Iteration Countdown
- c - PRN Number of SV Being Tracked
- d - Correction Broadcast Status:
 - B = Broadcasting corrections
 - S = Suspended
 - R = Reset in Progress
 - O = Other
- e - Correction Resumption Countdown
- f - Reset Iteration Countdown

NOTES:

- 1) Composite message, sent in groups of 3 PRN's.

RSIM #30: PRN BROADCAST SUSPENSION ALARM

USAGE:

- 1) RS sends to the CS when the broadcast of corrections for a given PRN is suspended.

FIELD # 1 2
 ^ ^

\$PRCM,30,hhmmss.ss,x*hh<CR><LF>

WHERE:

- 1 - UTC Time Observed
- 2 - PRN#

TABLE 1 (SUPPLEMENT) - LIST OF VARIABLES

NAME	UNITS	RANGE	TYPE	RSIM#
Correction Broadcast Status		B,S,R,O	Fixed Alpha	29
Correction Resumption Countdown	Hours, Minutes, Seconds	000000 - 090000	Fixed/Variable Length Time	29
Correction Suspension Duration	Hours	1 – 9	Fixed Length Integer	28
Device Serial Number		0-12	Variable Length String	27
Message #		1-20	Fixed Length Integer	29
PRN #		1-32 or 99 for #28 only	Variable Length Integer	28, 30
PRN Number of SV Being Tracked		1-32	Variable Length Integer	29
Reset Duration	Seconds	0 - 999	Variable Length Integer	28
Reset Iteration Countdown		0-5	Fixed Length Integer	29
Reset Iterations		0-5	Fixed Length Integer	28
Reset Monitoring Interval	Hours	1-9	Fixed Length Integer	28
Total Number of Messages		1-20	Fixed Length Integer	29
UTC Time Observed	hours, minutes, seconds	000000.00-235959.99	Fixed/ Variable Length Time	29, 30
Version of Firmware Module		1-20	Variable Length String	27