

CHANNEL LISTING  
G/N 100 EVENT RECORDER  
4A2A02 NO. 15 S/C 103 AND SUBS

| CH | MEAS. NO. | NAME                | WORD | BIT |
|----|-----------|---------------------|------|-----|
| 01 |           |                     |      |     |
| 02 | CG1523    | +28V CMC OP Level   |      |     |
| 03 | CG1513    | +28V IMU STBY Level |      |     |
| 04 | CG1500    | +28V IMU OP Level   |      |     |
| 05 | CG1533    | +28V OPTX OP Level  |      |     |
| 06 | CG1512    | +28V IMU STBY NP    |      |     |
| 07 | CG1502    | +28V IMU OP NP      |      |     |
| 08 | CG1072    | +4VDC CDU NP        |      |     |
| 09 | CG1043    | +120VDC PIPA NP     |      |     |
| 10 | CG1522    | +28V CMC OP NP      |      |     |
| 11 | CG1022    | +14V CMC NP         |      |     |
| 12 | CG1032    | +4V CMC NP          |      |     |
| 13 | CG1532    | +28V OPTX OP NP     |      |     |
| 14 | ZG8059    | Coarse Align        | 94   | 4   |
| 15 | ZG8094    | No Attitude         | 90   | 4   |
| 16 | ZG8062    | IMU Cage i          | 97   | 11  |
| 17 | ZG8060    | Zero ICDUS          | 94   | 5   |
| 18 | ZG8061    | IMU ERR CTR         | 94   | 6   |
| 19 | ZG8049    | ABL OPT ER CTR      | 94   | 2   |
| 20 | ZG8031    | BMAG CTR ABL        | 95   | 8   |
| 21 | ZG8064    | ISS TRNON RQST i    | 97   | 14  |
| 22 | ZG8065    | ISS TRNON Comp      | 94   | 15  |
| 23 | ZG8063    | Initialize ISS      | 23   | 6   |
| 24 | ZG8048    | Zero OCDUS          | 94   | 1   |
| 25 | ZG8047    | OPTX Zeroing        | 39   | 3   |
| 26 | ZG9033A   | Zero OPTS i         | 39   | 4   |
|    | ZG9034A   | CMC Control         | 39   | 5   |
| 27 | ZG9033B   | Zero OPTS           | 39   | 4   |
|    | ZG9034B   | CMC Control         | 39   | 5   |
| 28 | ZG9033C   | Zero OPTS           | 39   | 4   |
|    | ZG9034C   | CMC Control i       | 39   | 5   |
| 29 | ZG8023    | +Roll Man Rot i     | 98   | 5   |
| 30 | ZG8024    | -Roll Man Rot i     | 98   | 6   |
| 31 | ZG8019    | +Pitch Man Rot i    | 98   | 1   |
| 32 | ZG8020    | -Pitch Man Rot i    | 98   | 2   |
| 33 | ZG8021    | +Yaw Man Rot i      | 98   | 3   |
| 34 | ZG8022    | -Yaw Man Rot i      | 98   | 4   |
| 35 | ZG8007    | +X Trans i          | 98   | 7   |
| 36 | ZG8008    | -X Trans i          | 98   | 8   |
| 37 | ZG8009    | +Y Trans i          | 98   | 9   |
| 38 | ZG8010    | -Y Trans i          | 98   | 10  |
| 39 | ZG8011    | +Z Trans i          | 98   | 11  |
|    | ZG8012    | -Z Trans i          | 98   | 12  |
| 41 | ZG8054    | +Roll Min Imp i     | 99   | 5   |
| 42 | ZG8055    | -Roll Min Imp i     | 99   | 6   |
| 43 | ZG8050    | +Pitch Min Imp i    | 99   | 1   |
| 44 | ZG8051    | -Pitch Min Imp i    | 99   | 2   |
| 45 | ZG8052    | +Yaw Min Imp i      | 99   | 3   |
| 46 | ZG8053    | -Yaw Min Imp i      | 99   | 4   |
| 47 |           |                     |      |     |
| 49 |           |                     |      |     |
| 50 |           |                     |      |     |

Walter L. Whipple  
Raytheon Company, FC 86  
12214 Lakewood Blvd.  
Downey, California 90241

1.

CHANNEL LISTING (CONT'D)  
G/N 100 EVENT RECORDER  
4A2A02 NO. 15 S/C 103 AND SUBS

Walter L. Whipple  
Raytheon Company, FC 86  
12214 Lakewood Blvd.  
Downey, California 90241

| CH  | MEAS. NO. | NAME                      | WORD | BIT |
|-----|-----------|---------------------------|------|-----|
| 51  |           |                           |      |     |
| 52  |           |                           |      |     |
| 53  |           |                           |      |     |
| 54  |           |                           |      |     |
| 55  | ZG8006    | G/N Control i             | 98   | 15  |
| 56  | ZG9031    | CMC Mode Hold i           | 98   | 13  |
| 57  | ZG9032    | CMC Mode Free i           | 98   | 14  |
| 58  | ZG8032    | LEM Attached i            | 99   | 11  |
| 59  | ZG8002    | TVC Enable                | 94   | 8   |
| 60  | ZG8013    | LIFTOFF i                 | 97   | 5   |
| 61  | ZG8033    | SIVB SEP/ABT i            | 97   | 4   |
| 62  | ZG8005    | SPS Ready i               | 97   | 3   |
| 63  | ZG8003    | Ullage i                  | 97   | 1   |
| 64  | ZG3001    | Engine On                 | 93   | 13  |
| 65  | ZG8004    | SM Separate i             | 97   | 2   |
| 66  | ZG8016    | SAT TAKOVR ABL            | 94   | 9   |
| 67  | ZG8015    | S/C CTL Saturn i          | 97   | 10  |
| 68  | ZG8017    | SAT INJ SEG ST            | 94   | 13  |
| 69  | ZG8018    | SAT Cutoff                | 94   | 14  |
| 70  |           |                           |      |     |
| 71  | CS0150    | Master CAU/Warn           |      |     |
| 72  | ZG8027    | Tracker Fail              | 90   | 8   |
| 73  | ZG8036    | ISS Warning               | 93   | 1   |
| 74  | ZG8066    | ISS CDU Fail i            | 97   | 12  |
|     | ZG8067    | IGN ICDU Fail i           | 23   | 3   |
| 75  | ZG8043    | PIPA Fail i               | 100  | 13  |
|     | ZG8044    | IGN PIPA Fail i           | 23   | 1   |
| 76  | ZG8056    | IMU Fail i                | 97   | 13  |
|     | ZG8057    | IGN IMU Fail i            | 23   | 4   |
| 77  | ZG8045    | OPT CDU Fail i            | 97   | 7   |
|     | ZG8046    | IGN OCDU Fail i           | 39   | 2   |
| 78  | CG5040    | CMC Warning i             |      |     |
| 79  | ZG8038    | OSC Alarm i               | 100  | 15  |
| 80  | ZG8082    | Program Alarm             | 90   | 9   |
| 81  | CG2302    | IMU Heater Current        |      |     |
| 82  | CG2303    | IMU Blower Current        |      |     |
| 83  | ZG8034    | Temp Caution              | 93   | 4   |
| 84  | ZG8035A   | Gimbal Lock               | 90   | 6   |
| 85  | ZG8040    | Enable CMC STBY           | 95   | 11  |
| 86  |           |                           |      |     |
| 87  | CG9016    | S/C Cont. SAT to IU       |      |     |
| 88  | CG9015    | XLumar INJ to IU          |      |     |
| 89  | CG9018    | SIVB Cutoff to IU         |      |     |
| 90  |           |                           |      |     |
| 91  | ZG8041A   | Block Uplink i            | 100  | 10  |
| 92  | ZG8069A   | Uplock (K-K'-K Fail Flag) | 77   | 1   |
| 93  |           |                           |      |     |
| 94  | ZG8068    | Key Release               | 93   | 5   |
| 95  | ZG8081A   | Operator Error            | 93   | 7   |
| 96  | ZG9003    | Uplink Activity           | 93   | 3   |
| 97  | ZG9024    | Computer Activity         | 93   | 2   |
| 98  | ZG8039    | Test Alarms               | 95   | 10  |
| 99  |           |                           |      |     |
| 100 |           |                           |      |     |

NOTES: i = Bit inverted by ACE more than one measurement number  
in a channel indicates boolean "and" function.

NOMINAL CGC DOWNLINK LIST*Sundial D*

NOTE: This list does not apply if words one and two are not as shown.

| <u>WORD NO.</u> | <u>ADDRESS</u> | <u>WORD NAME</u> | <u>WORD NO.</u> | <u>ADDRESS</u> | <u>WORD NAME</u> |
|-----------------|----------------|------------------|-----------------|----------------|------------------|
| 1               | 0413           | 01724            | 51              | 2633           | DRIFTO           |
| 2               | 3671           | 00437            | 52              | 2634           | DRIFTO + 1       |
| 3               | 0037           | PIPAK            | 53              | 2635           | DRIFTI           |
| 4               | 0040           | PIPAY            | 54              | 2636           | DRIFTI + 1       |
| 5               | 0041           | PIPAZ            | 55              | 2637           | DRIFTT           |
| 6               | 0042           | BMAGX            | 56              | 2640           | DRIFTT + 1       |
| 7               | 0043           | BMAGY            | 57              | 2705           | GAZIMUTH         |
| 8               | 0044           | BMAGZ            | 58              | 2706           | GAZIMUTH + 1     |
| 9               | 0152           | PUSHLOC          | 59              | 2623           | ANGZ             |
| 10              | 0153           | PRIORITY         | 60              | 2624           | ANGZ + 1         |
| 11              | 0150           | LOC              | 61              | 2627           | ANGY             |
| 12              | 0151           | BANKSET          | 62              | 2630           | ANGY + 1         |
| 13              | 0405           | DELVX            | 63              | 2631           | ANGX             |
| 14              | 0406           | DELVX + 1        | 64              | 2632           | ANGX + 1         |
| 15              | 0407           | DELVX + 2        | 65              | 2641           | VLAUN            |
| 16              | 0410           | DELVX + 3        | 66              | 2642           | VLAUN + 1        |
| 17              | 0411           | DELVX + 4        | 67              | 2735           | WPLATO           |
| 18              | 0412           | DELVX + 5        | 68              | 2736           | WPLATO + 1       |
| 19              | 1360           | SELFRET          | 69              | 2737           | WPLATI           |
| 20              | 1361           | SMODE            | 70              | 2740           | DPLATI + 1       |
| 21              | 1364           | SFAIL            | 71              | 2741           | WPLATT           |
| 22              | 1365           | ERCOUNT          | 72              | 2742           | WPLATT           |
| 23              | 0361           | IMODES30         | 73              | 2633           | PIPAN            |
| 24              | 0362           | IMODES33         | 74              | 2634           | INTVEC + 1       |
| 25              | 0403           | DESOPIT          | 75              | 2635           | PIPAE            |
| 26              | 0404           | DESOPTS          | 76              | 2636           | INTVEC + 3       |
| 27              | 0032           | CDUX             | 77              | 0342           | UPLOCK           |
| 28              | 0033           | CDUY             | 78              | 0343           | T6LOC            |
| 29              | 0034           | CDUZ             | 79              | 0307           | DSPTAB + 0       |
| 30              | 0035           | CDUT             | 80              | 0310           | DSPTAB + 1       |
| 31              | 0035           | CDUT             | 81              | 0311           | DSPTAB + 2       |
| 32              | 0036           | CDUS             | 82              | 0312           | DSPTAB + 3       |
| 33              | 0061           | STATE            | 83              | 0313           | DSPTAB + 4       |
| 34              | 0062           | STATE + 1        | 84              | 0314           | DSPTAB + 5       |
| 35              | 0063           | STATE + 2        | 85              | 0315           | DSPTAB + 6       |
| 36              | 0064           | STATE + 3        | 86              | 0316           | DSPTAB + 7       |
| 37              | 1362           | REDOCTR          | 87              | 0317           | DSPTAB + 8       |
| 38              | 1363           | FAILREG          | 88              | 0320           | DSPTAB + 9       |
| 39              | 0354           | OPTMODES         | 89              | 0321           | DSPTAB + 10      |
| 40              | 0355           | SWSAMPLE         | 90              | 0322           | DSPTAB + 11      |
| 41              | 0356           | DESOPMOD         | 91              | 0024           | TIME 2           |
| 42              | 0357           | WTOPTION         | 92              | 0025           | TIME 1           |
| 43              | 0363           | IMUCADR          | 93              | 0011           | CHANNEL 11       |
| 44              | 0364           | OPTCADR          | 94              | 0012           | CHANNEL 12       |
| 45              | 0400           | THETAD           | 95              | 0013           | CHANNEL 13       |
| 46              | 0401           | THETAD + 1       | 96              | 0014           | CHANNEL 14       |
| 47              | 0402           | THETAD + 2       | 97              | 0030           | CHANNEL 30       |
| 48              | 0403           | DESOPIT          | 98              | 0031           | CHANNEL 31       |
| 49              | 0365           | MARKSTAT         | 99              | 0032           | CHANNEL 32       |
| 50              | 0366           | TIMESAV          | 100             | 0033           | CHANNEL 33       |

# CHANNEL LISTING

G/N 8 ANALOG  
4A3A02 NO. 26

RECORDER  
S/C 103 AND SUBS

| CH | SW | MEAS. NO. | NAME                             |
|----|----|-----------|----------------------------------|
| 1  | 1  | CG2177    | OGA SERVO ERROR IN PHASE         |
| 1  | 2  | CG2113A   | 1G 1X RESOLVER OUTPUT COS        |
| 1  | 3  | CG3140    | SXT SHAFT TACHOMETER OUTPUT      |
| 1  | 4  |           |                                  |
| 2  | 1  | CG2172A   | OG 1X RESOLVER OUTPUT SIN        |
| 2  | 2  | CG2120    | 1G TORQUE MOTOR CURRENT          |
| 2  | 3  | CG3150    | SXT TRUNNION TACHOMETER OUTPUT   |
| 2  | 4  |           |                                  |
| 3  | 1  | CG2147    | MGA SERVO ERROR IN PHASE         |
| 3  | 2  | CG2220    | IGA CDU FINE ERROR               |
| 3  | 3  | CG3160    | SCT SHAFT TACHOMETER OUTPUT      |
| 3  | 4  |           |                                  |
| 4  | 1  | CG2142A   | MG 1X RESOLVER OUTPUT SIN        |
| 4  | 2  | CG2180    | TORQUE MOTOR CURRENT             |
| 4  | 3  | CG3170    | SCT TRUNNION TACHOMETER OUTPUT   |
| 4  | 4  |           |                                  |
| 5  | 1  | CG2717    | 1GA SERVO ERROR IN PHASE         |
| 5  | 2  | CG2173A   | OG 1X RESOLVER OUTPUT COS        |
| 5  | 3  | CG3117    | SXT SHAFT SERVO ERROR IN PH      |
| 5  | 4  |           |                                  |
| 6  | 1  | CG2112A   | 1G 1X RESOLVER OUTPUT SIN        |
| 6  | 2  | CG2150    | MG TORQUE MOTOR CURRENT          |
| 6  | 3  | CG3118    | SXT TRUNNION SERVO ERROR IN PH   |
| 6  | 4  |           |                                  |
| 7  | 1  | CG2143A   | MG 1X RESOLVER OUTPUT COS        |
| 7  | 2  | CG2280    | OGA CDU FINE ERROR               |
| 7  | 3  | CG3145    | SXT SHAFT MTR CONTROL WINDING    |
| 7  | 4  |           |                                  |
| 8  | 1  | CG1040    | +120 VDC PIPA SUPPLY DC LEVEL    |
| 8  | 2  | CG2250    | MGA CDU FINE ERROR               |
| 8  | 3  | CG3155    | SXT TRUNNION MTR CONTROL WINDING |
| 8  | 4  |           |                                  |

Walter L. Whipple  
Raytheon Company, FC 86  
12214 Lakewood Blvd.  
Downey, California 90241

# CHANNEL LISTING

G/N 8 ANALOG RECORDER  
4ALA03 NO. 14 S/C 103 AND SUBS

| CH | MEAS NO. | NAME                    |
|----|----------|-------------------------|
| 1  | CG1030   | +4V CMC SUPPLY DC LEVEL |
| 2  | CG2221   | IGA CDU COARSE ERROR    |
| 3  | CG2251   | MGA CDU COARSE ERROR    |
| 4  | CG1331   | 3.2KC 28V SUPPLY        |
| 5  | CG2281   | OGA CDU COARSE ERROR    |
| 6  | CG2300A  | PIPA TEMPERATURE        |
| 7  | CG2301A  | IRIG TEMPERATURE*       |

\*Connected only with flight qual. signal conditioner.

# CHANNEL LISTING

G/N 8 ANALOG RECORDER  
4ALA02 NO. 25 S/C 103 AND SUBS

| CH | MEAS NO. | NAME                              |
|----|----------|-----------------------------------|
| 1  | CG2279   | ROLL ATT ERROR CDU DAC OUT        |
| 2  | CG2219   | PITCH ATT ERROR CDU DAC OUT       |
| 3  | CG2249   | YAW ATT ERROR-CDU DAC OUT         |
| 4  | CG3011   | TRUNNION CDU FINE ERROR           |
| 5  | CG3021   | SHAFT CDU FINE ERROR              |
| 6  | CG3721   | SHAFT CDU DAC OUTPUT              |
| 7  | CG3722   | TRUNNION CDU DAC OUTPUT           |
| 8  | XG9050   | HIGH RATE 400 SPS RCRD ASSIGNMENT |

Walter L. Whipple  
Raytheon Company, FC 86  
12214 Lakewood Blvd.  
Downey, California 90241

# XG9050 HIGH RATE SWITCHING MATRIX DATA

| MATRIX<br>CHANNEL | +6 V ON INPUT<br>LINES | C-START<br>INSERT<br>C156 | CRT DISPLAY |
|-------------------|------------------------|---------------------------|-------------|
| OFF               | ADCDEFGHIJ             | 2000000000                | NONE        |
| 01                | A B C D I J            | 2032000000                | CG2117      |
| 02                | A B C D I J            | 2027000000                | CG2120      |
| 03                | A B C D I J            | 2028000000                | CG2147      |
| 06                | E F G H I J            | 2031000000                | CG2150      |
| 07                | E F G H I J            | 2026000000                | CG2177      |
| 08                | A B C D I J            | 2005000000                | CG2180      |
| 10                | A B C D I J            | 2006000000                | CG2219      |
| 11                | A B C D I J            | 2007000000                | CG2249      |
| 12                | E F G H I J            | 2009000000                | CG2279      |
| 13                | E F G H I J            | 2010000000                | CG3117      |
| 14                | E F G H I J            | 2021000000                | CG3118      |
| 15                | E F G H I J            | 2025000000                | CG3140      |
| 18                | A B C D I J            | 2001000000                | CH3666      |
| 19                | A B C D I J            | 2002000000                | CH3667      |
| 22                | E F G H I J            | 2019000000                | CG2250      |
| 23                | E F G H I J            | 2020000000                | CG2220      |
| 28                | E F G H I J            | 2008000000                | CG3150      |
| 29                | A B C D I J            | 2022000000                | CG3011      |
| 30                | E F G H I J            | 2024000000                | CG3021      |
| 35                | E F G H I J            | 2015000000                | CG3160      |
| 36                | E F G H I J            | 2016000000                | CG3170      |
| 37                | E F G H I J            | 2017000000                | CG2280      |

Walter L. Whipple  
Raytheon Company, FC 86  
12214 Lakewood Blvd.  
Downey, California 90241

# Variable imodes 33 Discussion

Location: E memory 361

Primary use: Communication to T4 Rupt

Bits used: 1, 2, 11, 12, 13

Initial Value at Restart: 16000 (Bits 11, 12, 13 On)

| Bit | Set                                                               | Reset                                      | Action                                                                                            |
|-----|-------------------------------------------------------------------|--------------------------------------------|---------------------------------------------------------------------------------------------------|
|     | Begin Lamp test                                                   | End lamp test, restart                     | When set prevents T4 Rupt from turning off OCDU Fail, Gimbal lock, Temp warning, and ISS warning. |
| 2   | Begin gyro torque scale factor test                               | End gyro torque scale factor test, restart | When set prevents T4 Rupt from turning off gyro torque enable relay, channel 14 Bit 6.            |
| 11  | T4 Rupt to CH 3311, restart, end lamp test, error light reset     | T4 Rupt to CH 3311                         | When reset, T4 Rupt generates up telemetry too fast program alarm 1106.                           |
| 12  | T4 Rupt to CH 3312, restart, end lamp test, error light reset     | T4 Rupt to CH 3312                         | When reset, T4 Rupt generates Down telemetry too fast program alarm 1105.                         |
| 13  | T4 Rupt to CH 3313, restart, end lamp test, 10 sec after IMU Zero | T4 Rupt to CH 3312                         | When reset, T4 Rupt generates Down telemetry too fast program alarm 1105.                         |

# Illegal Verb-Noun Combinations

| VERB  | ILLEGAL NOUNS                          | REASON                                       | CURE Oper. Error |
|-------|----------------------------------------|----------------------------------------------|------------------|
| 00    | All                                    | Verb illegal                                 | ELR, New V       |
| 01    | 00,11-14,40-51                         | Nouns illegal                                | ELR, New N       |
| 02    | 00,11-14,40-51                         | Nouns Illegal                                | ELR, New N       |
|       | 01-10,15-17,24-25,27,32-34             | Verb components greater than noun components | ELR, New V or N  |
| 03    | 00,11-14,40-51                         | Nouns illegal                                | ELR, New N       |
|       | 01-10,15-17,24-25,27,32-34,55,57,61-65 | Verb components greater than noun            | ELR, New V or N  |
| 04    | 00,11-14,40-51                         | Nouns illegal                                | ELR, New N       |
|       | 01-10,15-17,24-25,27,32-34             | Verb components greater than noun components | ELR, New V or N  |
| 05    | 00,11-14,40-51                         | Nouns illegal                                | ELR, New N       |
|       | 01-10,15-17,24-25,27,32-34,55,57,61-65 | Verb components greater than noun components | ELR, New V or N  |
| 06    | 00,11-14,40-51                         | Nouns illegal                                | ELR, New N       |
|       | 10,26,31,35-37                         | Decimal V, octalN                            | ELR, New V or N  |
| 07    | 00,11-14,40-51                         | Nouns illegal                                | ELR, New N       |
|       | 55-77                                  | DP decimal display mixed                     | ELR, New V or N  |
| 10    | All                                    | Verb illegal                                 | ELR, New V       |
| 11-17 | Same as Verbs 01-07                    | Except use V34E                              | first            |
| 20    | All                                    | Verb illegal                                 | ELR, New V       |
| 21-26 | Same as Verbs 01-06                    |                                              |                  |
| 27    | 00,11-14,40-51                         | Nouns illegal                                | ELR, New N       |
| 30-37 |                                        | No noun test                                 |                  |
| 40    | 00-17,21-54,56-77                      | Nouns illegal                                | ELR, New N       |
|       | 55                                     | Not programmed                               | ELR, New N       |
| 41    | 00-17,21-54,56-77                      | Nouns illegal                                | ELR, New N       |
| 42-43 |                                        | No noun test                                 |                  |
| 44-46 | All                                    | Illegal verbs                                | ELR, New V       |
| 47-51 |                                        | No noun test                                 |                  |
| 52    | All (MM=02)                            | Prelaunch Align Required                     | ELR, New V       |
| 53    | All                                    | Illegal verb                                 | ELR, New V       |
| 54-62 |                                        | No noun test                                 |                  |
| 63-77 | All                                    | Illegal Verbs                                | ELR, New V       |

NOTE: 8,9 characters illegal for V-N operator error ELR, New V  
 +, - characters illegal for V-N No action None required

Walter L. Whipple  
 Raytheon Company, FC 86  
 12214 Lakewood Blvd.  
 Downey, California 90241