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PROJECT TECHNICAL REPORT

TASK E-9D

COMMUNICATIONS SIMULATION PROGRAM

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ABSTRACT

The Communications Simulation Program (CØMSIM) mathematically simulates the various Apollo S-band CSM/LM/MSFN communication links by permitting the user to specify a sequence of "black boxes" which define a particular communication link. A data tape is generated by this program which may be used with the TRWPLT general plotting program or which may be saved so that future reports and plots can be produced without having to repeat calculations.

The CØMSIM program is written in FØRTRAN V for use on the SRU 1108 EXEC II computing system.

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1. PROBLEM DESCRIPTION

The Apollo S-band Communication System is designed to provide tracking and communications between the Manned Space Flight Network (MSFN) ground stations and the Command Service Module (CSM) and/or the Lunar Module (LM) during the earth orbital and lunar phases of the mission.

The CØMSIM program simulates the following Apollo S-band communication links:

CSM and LM Uplink Communications

The MSFN ground stations transmit to the spacecrafts on a phase modulated carrier. The information includes combinations of the following:

1) Pseudo-random-noise ranging
2) Phase-shift keying (PSK) updata FM on a 70 KHz subcarrier
3) Voice FM on 30 KHz subcarrier

CSM S-Band Downlink Communications

The CSM S-band transmission to the MSFN ground stations includes a phase modulated and frequency modulated carrier. When the carrier is phase modulated, the information modulated on the carrier includes combinations of the following:

1) Pseudo-random-noise ranging
2) 51.2 or 1.6 kbps PCM data PM on 1.024 MHz subcarrier
3) Voice FM on 1.25 MHz subcarrier
4) Backup voice PM on carrier
5) Key AM on 512 KHz subcarrier

The information on the frequency modulated carrier includes the following combinations:

1) 1:1 Playback of:

   Voice FM on carrier
   51.2 kbps PCM data PM on 1.024 MHz subcarrier

2) 32:1 Playback of:

   Voice FM on carrier
   1.6 kbps PCM data PM on 1.024 MHz subcarrier

3) 32:1 Playback of:

   LM 1.6 kbps split phase PCM data FM on carrier

CSM S-Band Downlink Communications (Continued)

4) Television FM on carrier
5) Real-time scientific data FM on 95, 125, and 165 KHz subcarriers

LM S-Band Downlink Communications

The LM S-band transmission to the MSFN ground stations includes a phase modulated or frequency modulated carrier. When the carrier is phase modulated, the information modulated on the carrier includes combinations of the following:

1) Pseudo-random-noise ranging
2) 51.2 or 1.6 kbps PCM data PM on 1.024 MHz subcarrier
3) Voice and hardline biomed FM on 1.25 MHz subcarrier
4) Voice, hardline biomed and Extravehicular Mobility Unit (EMU) signals FM on 1.25 MHz subcarrier
5) Biomed PM on carrier
6) Backup voice PM on carrier
7) Key AM on 512 KHz subcarrier

The LM S-band transmission to the MSFN ground station when the carrier is frequency modulated has combinations of the following information:

1) Voice, EMU, and biomed FM on a 1.25 MHz subcarrier
2) 51.2 or 1.6 kbps PCM data PM on 1.024 subcarrier
3) Television FM on carrier

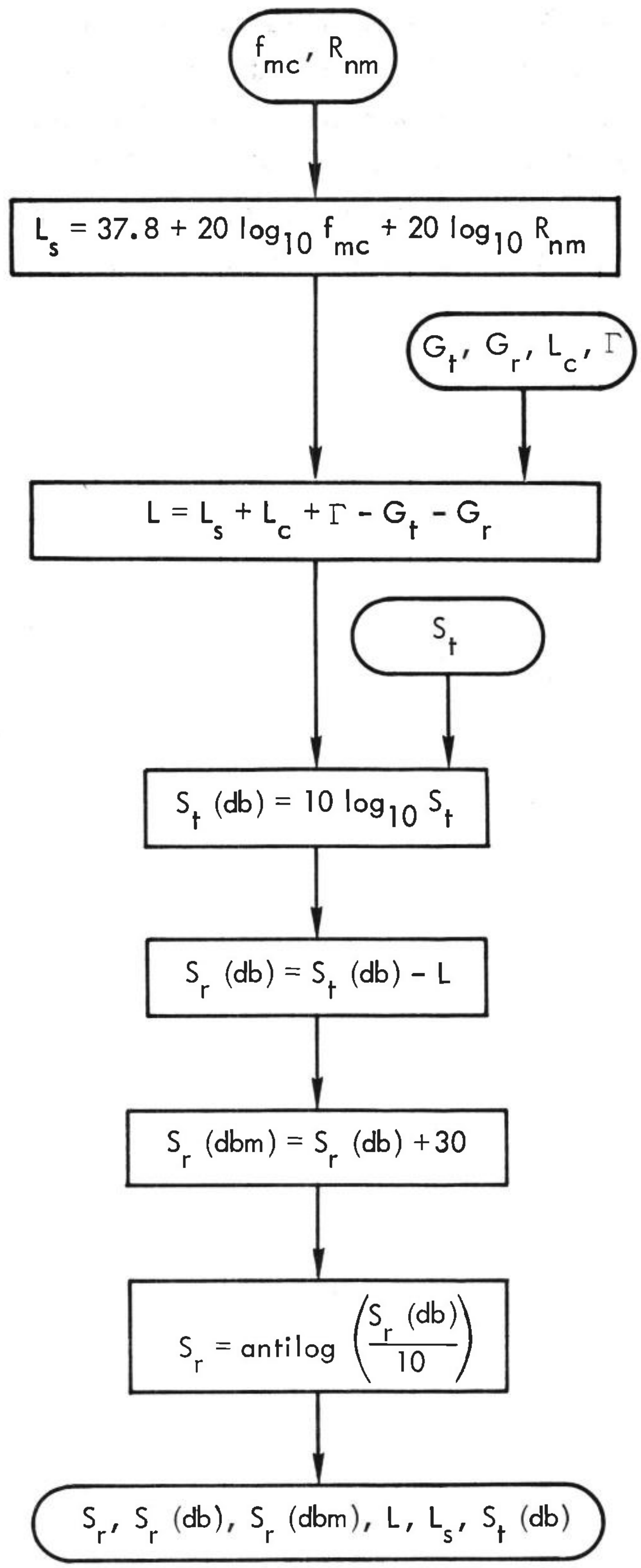
In order to simulate, mathematically, the various Apollo S-band CSM/LM/MSFN communication links we first define a number of computational "black boxes" called blocks. Each CØMSIM block performs a particular communication calculation, requiring specified parameters as input and generating certain other parameters as output. By proper sequencing of the CØMSIM blocks we may simulate each of the Apollo S-band communication links.

A detailed description of the CØMSIM input and output is given in Chapters 2 and 3 of this manual. A detailed description of the TRWPLT general plotting program input is given in the TRWPLT User's Manual.

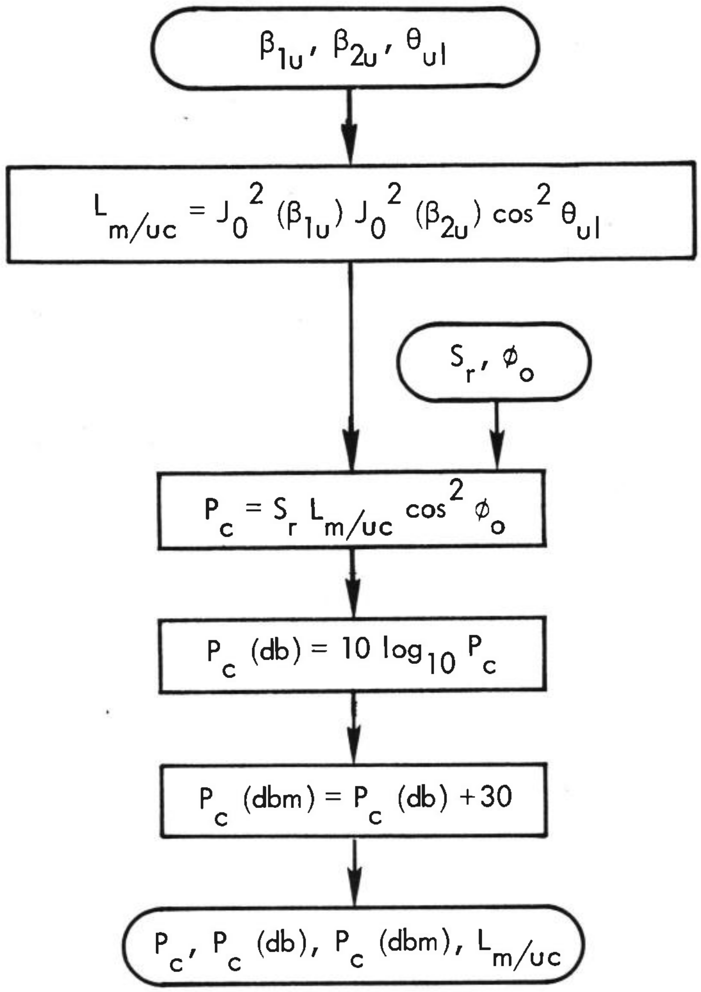
1.1 CØMSIM BLOCKS

Presently the CØMSIM program contains thirty-five functioning blocks, which are described below. In addition to these thirty-five blocks, fifteen "dummy" blocks have been inserted to provide for ease in future expansion of the program. An additional calculation, for finite transmitted signal-to-noise ratio, may be "attached" to certain of these fifty CØMSIM blocks as described in Section 2.

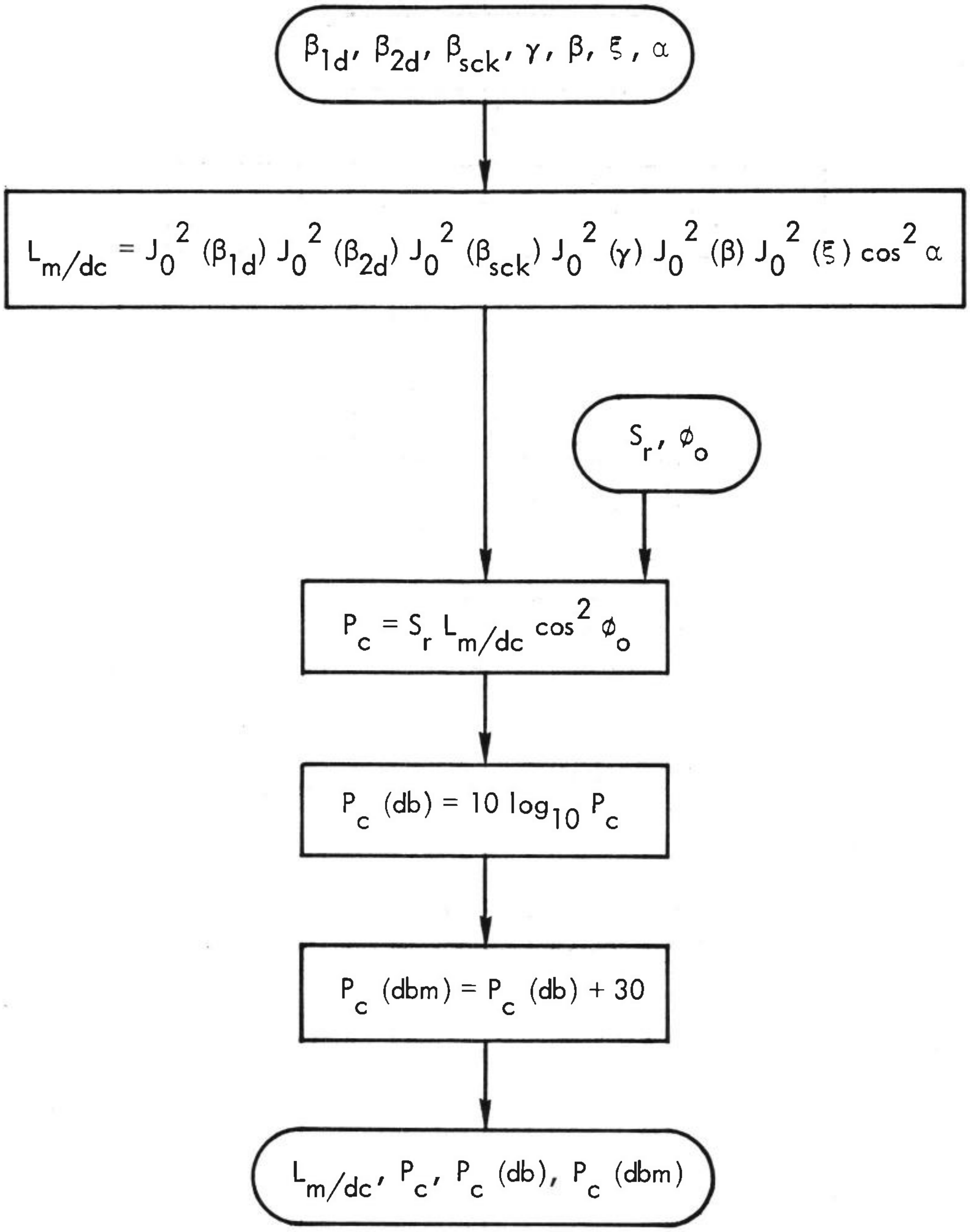
1.1.1 Block No. 1 — Received Signal Level Calculation



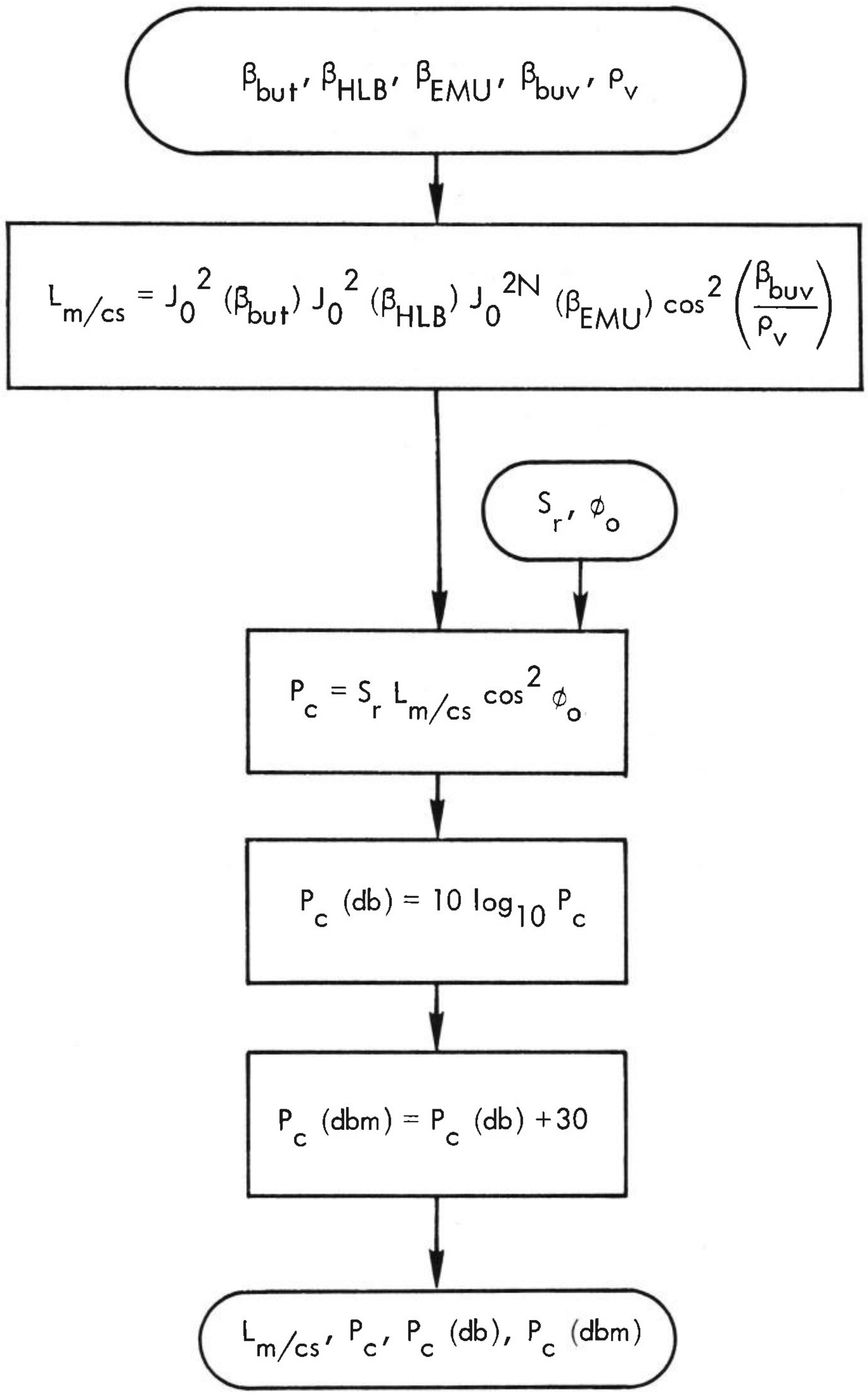
1.1.2 Block No. 2 — Uplink Carrier Power Calculation



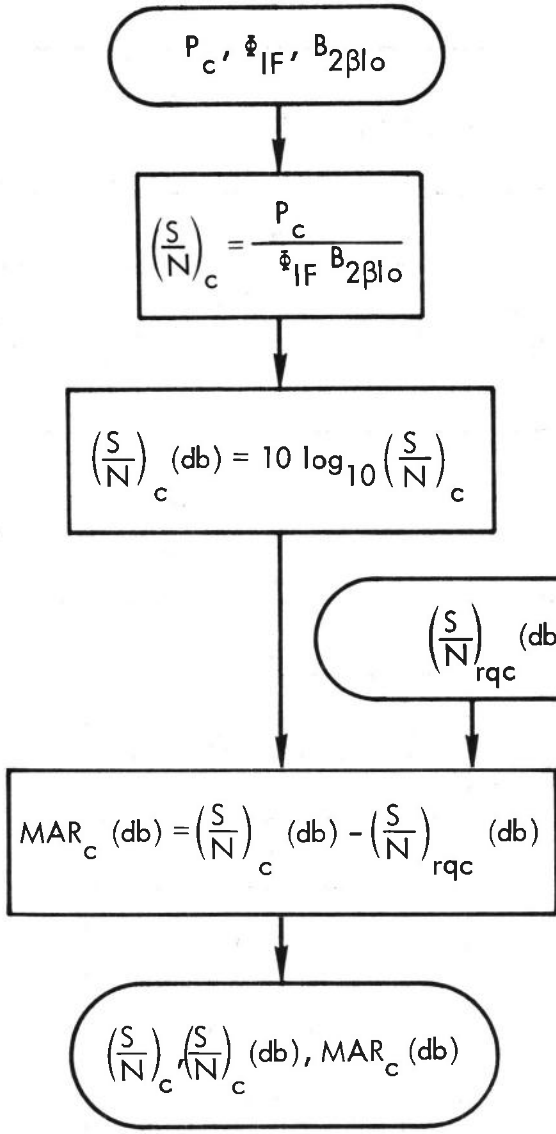
1.1.3 Block No. 3 — Downlink Carrier Power Calculation



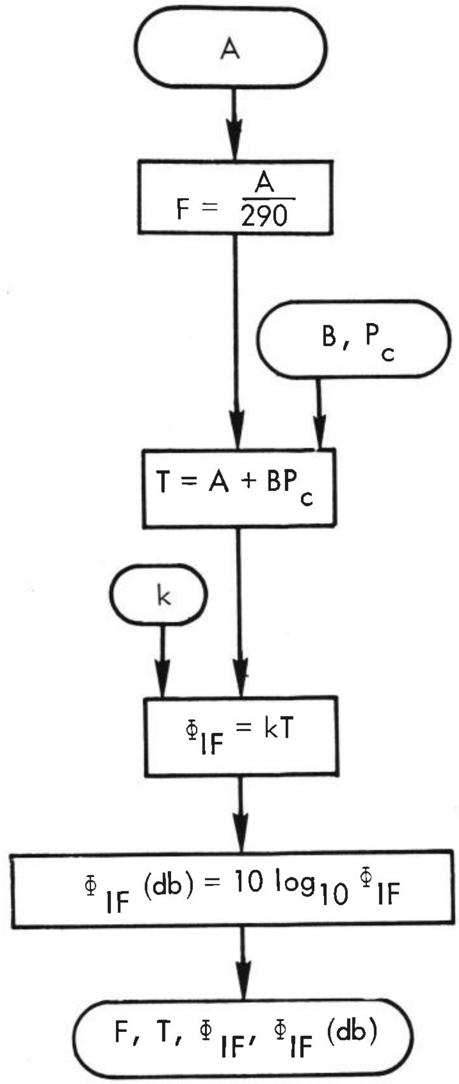
1.1.4 Block No. 4 — Carrier Power with Voice and Biomed Subcarriers on the Carrier Calculation



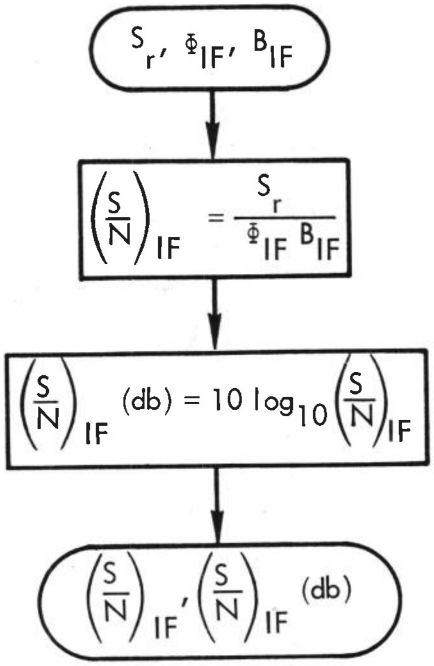
1.1.5 Block No. 5 — Carrier SNR in Loop Filter Calculation



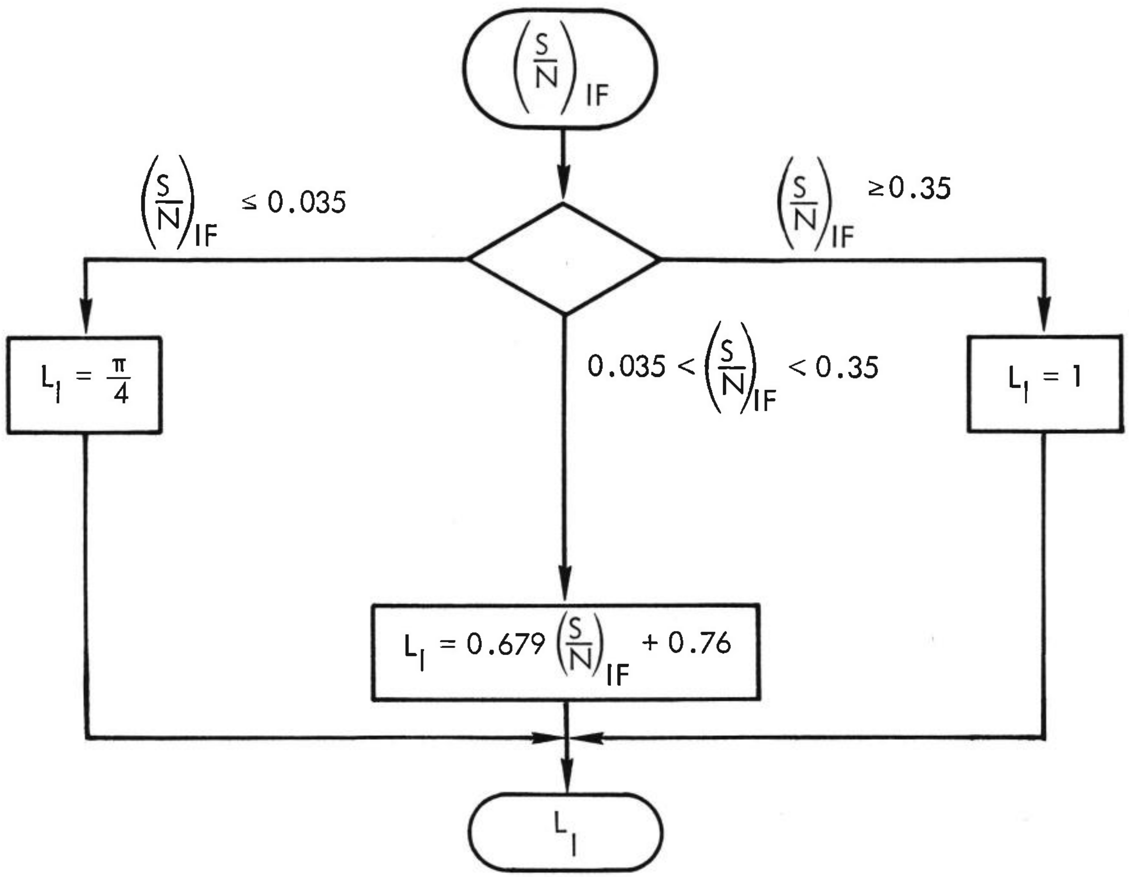
1.1.6 Block No. 6 — Noise Spectral Density Calculation



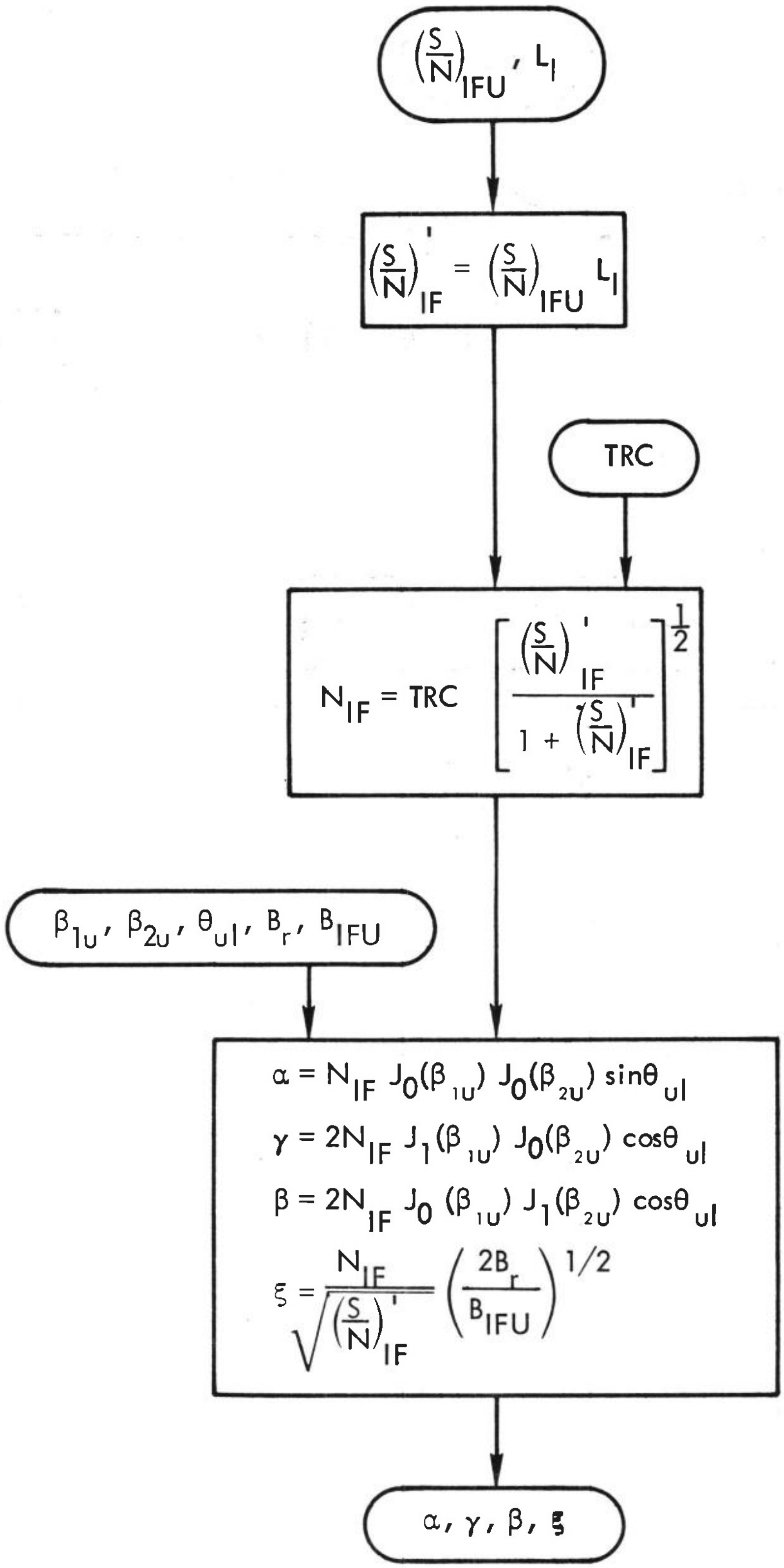
1.1.7 Block No. 7 — IF SNR Calculation



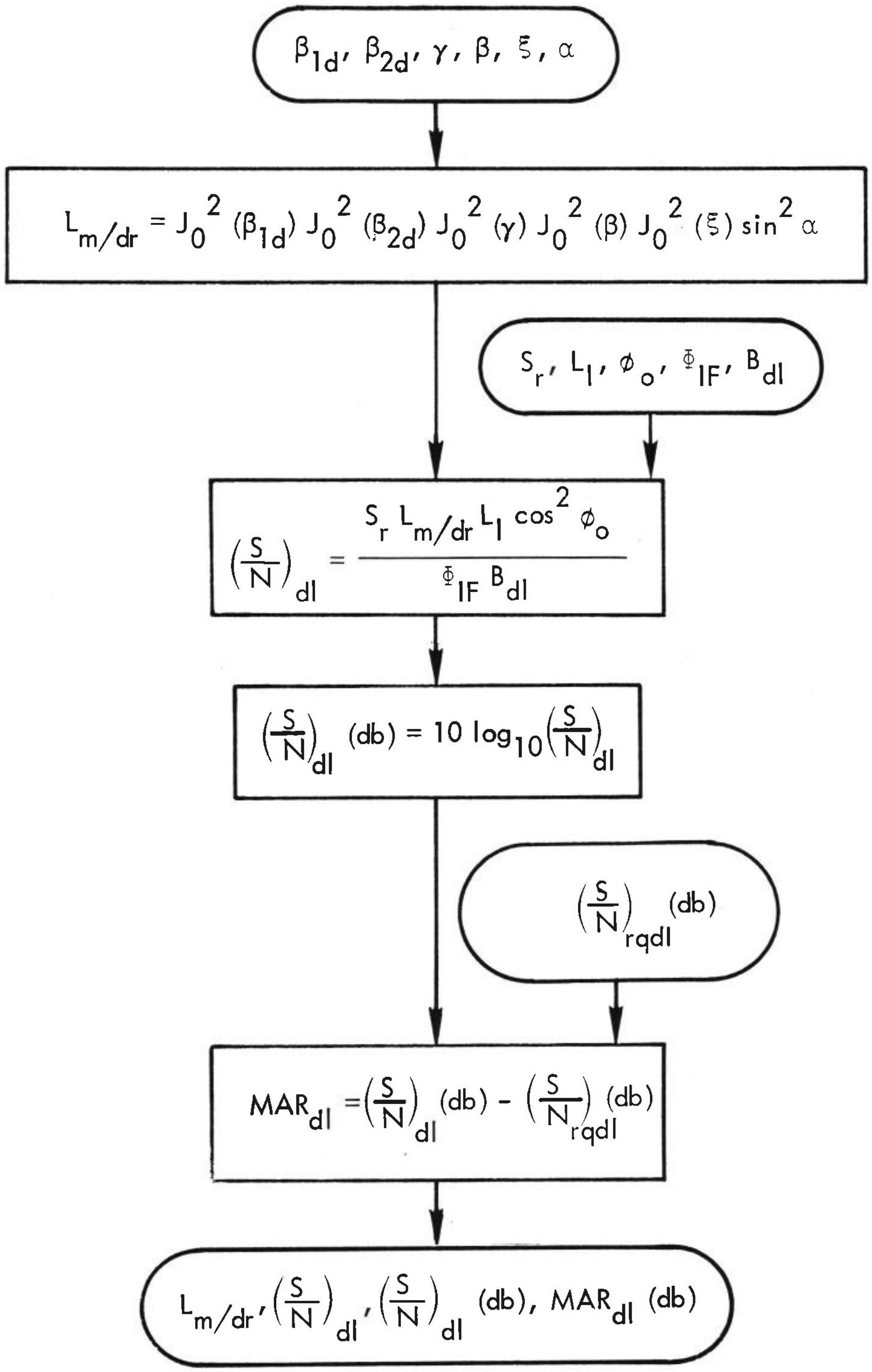
1.1.8 Block No. 8 — Limiter Loss Calculation



1.1.9 Block No. 9 — Transponder Constants Calculation



1.1.10 Block No. 10 — Downlink PRN SNR Calculation



1.1.11 Block No. 11 — Updata Subcarrier SNR in Predetection Bandwidth Calculation

$\beta_{2u}, \beta_{1u}, \theta_{ul}$

$$L_{m/ut} = 2J_1^2(\beta_{2u})\, J_0^2(\beta_{1u}) \cos^2\theta_{ul}$$

$S_r, L_l, \phi_o, B_{sctu}, \Phi_{IF}$

$$\left(\frac{S}{N}\right)_{teu} = \frac{S_r\, L_{m/ut}\, L_l \cos^2\phi_o}{2B_{sctu}\left[\frac{\Phi_{IF}}{2} + \frac{S_r}{10^6} L_l\, J_0^2(\beta_{1u})\, J_0^2(\beta_{2u}) \sin^2\theta_{ul}\right]}$$

$$\left(\frac{S}{N}\right)_{teu} (db) = 10 \log_{10} \left(\frac{S}{N}\right)_{teu}$$

$\left(\frac{S}{N}\right)_{rstu}$ (db)

$$MAR_{sctu}\ (db) = \left(\frac{S}{N}\right)_{teu} (db) - \left(\frac{S}{N}\right)_{rstu} (db)$$

$$MAR_{ber}\ (db) = MAR_{sctu}\ (db)$$

$L_{m/ut}$, $\left(\frac{S}{N}\right)_{teu}$, $\left(\frac{S}{N}\right)_{teu}$ (db), MAR_{sctu} (db), MAR_{ber} (db)

1.1.12 Block No. 12 — Updata SNR in Postdetection Bandwidth Calculation

$$\rho_t,\ K,\ \Delta f_{tu},\ B_{tu},\ B_{sctu},\ \left(\frac{S}{N}\right)_{teu}$$

$$\left(\frac{S}{N}\right)'_{tu} = 3\rho_t^{\,2} K \left(\frac{\Delta f_{tu}}{B_{tu}}\right)^2 \left(\frac{B_{sctu}}{B_{tu}}\right) \left(\frac{S}{N}\right)_{teu}$$

$$D_{tu} = \sqrt{3}\, K \left(\frac{B_{sctu}}{B_{tu}}\right)^2 \left(\frac{S}{N}\right)_{teu} \left(1 - \mathrm{erf}\sqrt{\left(\frac{S}{N}\right)_{teu}}\right) + 1$$

$$D_{tu}\ (\mathrm{db}) = 10 \log_{10} D_{tu}$$

$$\left(\frac{S}{N}\right)_{tu} = \frac{\left(\frac{S}{N}\right)'_{tu}}{D_{tu}}$$

$$\left(\frac{S}{N}\right)_{tu} (\mathrm{db}) = 10 \log_{10} \left(\frac{S}{N}\right)_{tu}$$

$$\left(\frac{S}{N}\right)_{rqtu} (\mathrm{db})$$

$$MAR_{sctu}(\mathrm{db}) = \left(\frac{S}{N}\right)_{tu} (\mathrm{db}) - \left(\frac{S}{N}\right)_{rqtu} (\mathrm{db})$$

$$MAR_{ber}\ (\mathrm{db}) = MAR_{sctu}(\mathrm{db})$$

$$D_{tu},\ D_{tu}\ (\mathrm{db}),\ \left(\frac{S}{N}\right)_{tu},\ \left(\frac{S}{N}\right)_{tu} (\mathrm{db}),\ MAR_{sctu}\ (\mathrm{db})\ MAR_{ber}\ (\mathrm{db})$$

1.1.13 Block No. 13 — Downlink PM Mode High Bit Rate TLM SNR in Predetection Bandwidth Calculation

$\beta_{1d},\ \beta_{2d},\ \beta,\ \gamma,\ \xi,\ \alpha$

$$L_{m/hdt} = 2\, J_1^{\,2}(\beta_{2d})\, J_0^{\,2}(\beta_{1d})\, J_0^{\,2}(\beta)\, J_0^{\,2}(\gamma)\, J_0^{\,2}(\xi)\cos^2\alpha$$

$S_r,\ L_l,\ \phi_o,\ B_{sctd},\ \Phi_{IF}$

$$\left(\frac{S}{N}\right)_{td} = \frac{S_r\, L_{m/hdt}\, L_l \cos^2\phi_o}{B_{sctd}\,\Phi_{IF} + S_r\, J_0^{\,2}(\beta_{1d})\, J_1^{\,2}(\beta_{2d})\, J_0^{\,2}(\xi)\cos^2\alpha\left[J_1^{\,2}(\gamma)\, J_1^{\,2}(\beta) + J_2^{\,2}(\gamma)\, J_2^{\,2}(\beta)\right]}$$

$$\left(\frac{S}{N}\right)_{td}(db) = 10\log_{10}\left(\frac{S}{N}\right)_{td}$$

$\left(\frac{S}{N}\right)_{rstd}(db)$

$$MAR_{std}(db) = \left(\frac{S}{N}\right)_{td}(db) - \left(\frac{S}{N}\right)_{rstd}(db)$$

$$MAR_{ber}(db) = MAR_{std}(db)$$

$L_{m/hdt},\ \left(\frac{S}{N}\right)_{td},\ \left(\frac{S}{N}\right)_{td}(db),\ MAR_{std}(db),\ MAR_{ber}(db)$

1.1.14 Block No. 14 — Downlink PM Mode Low Bit Rate TLM SNR in Predetection Bandwidth Calculation

$\beta_{1d}, \beta_{2d}, \beta, \xi, \gamma, \alpha$

$$L_{m/ldt} = 2\,J_1^{\,2}(\beta_{2d})\,J_0^{\,2}(\beta_{1d})\,J_0^{\,2}(\beta)\,J_0^{\,2}(\xi)\,J_0^{\,2}(\gamma)\cos^2\alpha$$

$S_r, L_l, \phi_o, B_{sctd}, \Phi_{IF}$

$$\left(\frac{S}{N}\right)_{td} = \frac{S_r\,L_{m/ldt}\,L_l\cos^2\phi_o}{B_{sctd}\,\Phi_{IF}}$$

$$\left(\frac{S}{N}\right)_{td}(db) = 10\log_{10}\left(\frac{S}{N}\right)_{td}$$

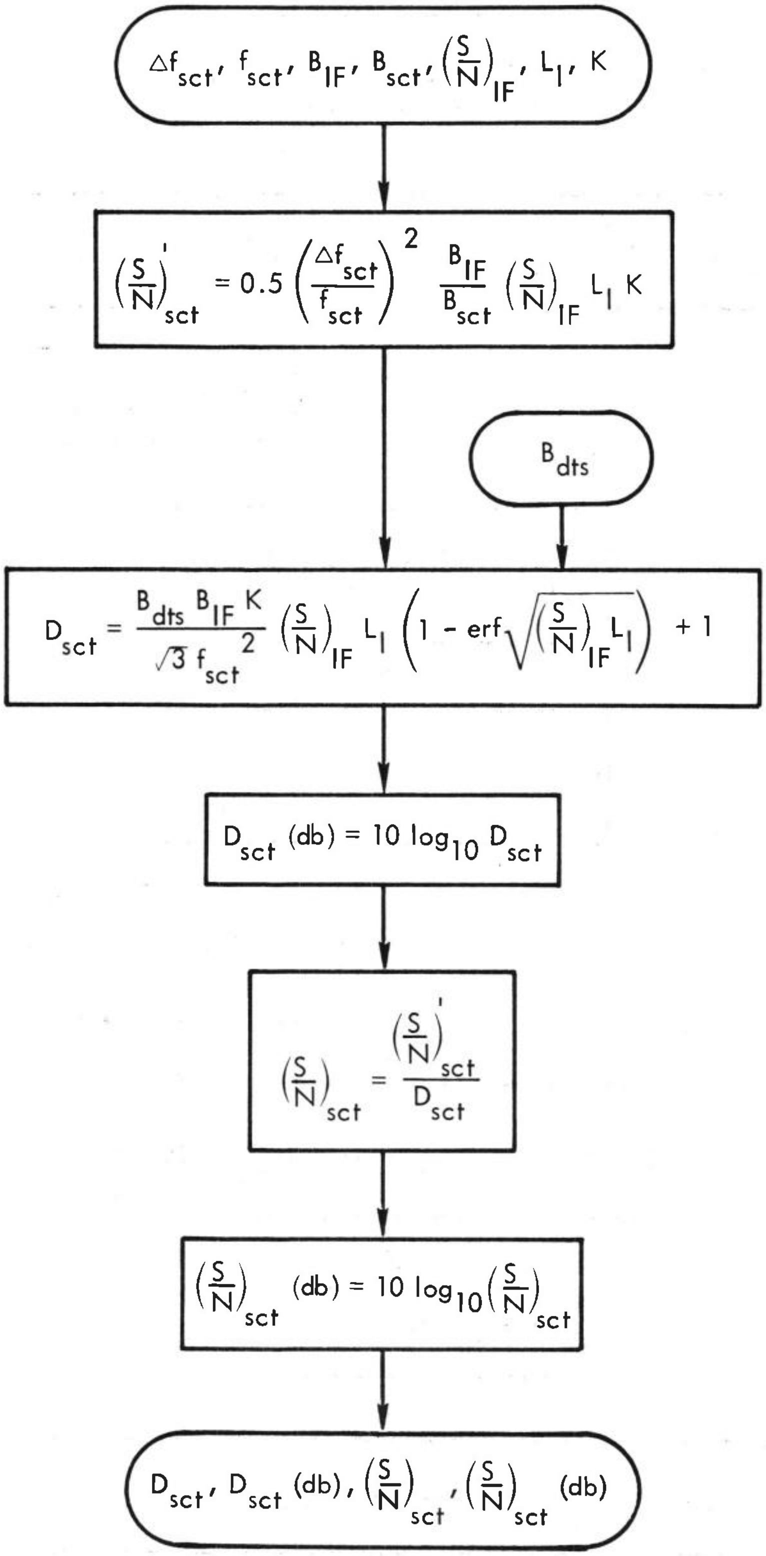
$\left(\frac{S}{N}\right)_{rstd}(db)$

$$MAR_{std}(db) = \left(\frac{S}{N}\right)_{td}(db) - \left(\frac{S}{N}\right)_{rstd}(db)$$

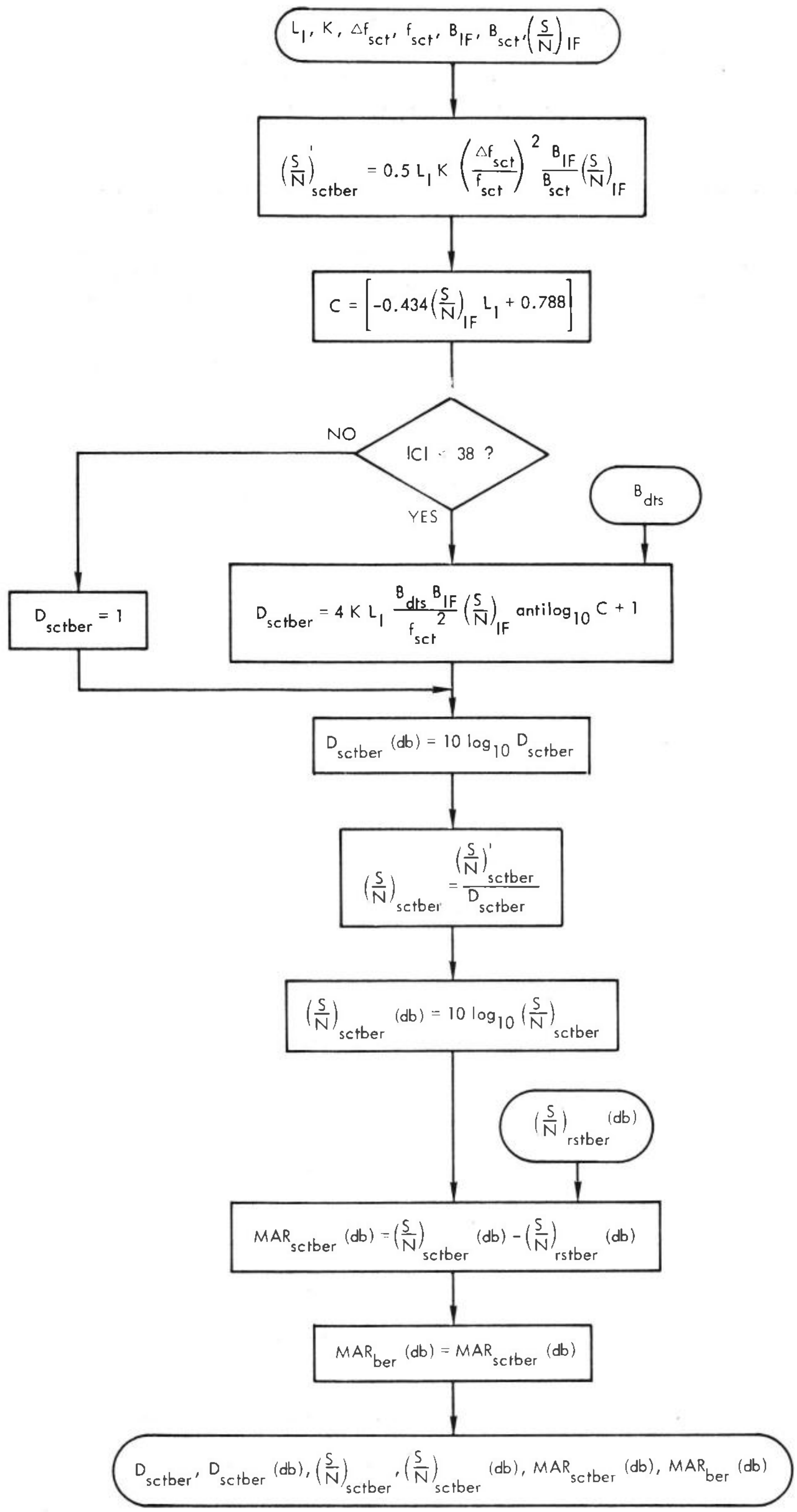
$$MAR_{ber}(db) = MAR_{std}(db)$$

$L_{m/ldt}, \left(\frac{S}{N}\right)_{td}, \left(\frac{S}{N}\right)_{td}(db), MAR_{std}(db), MAR_{ber}(db)$

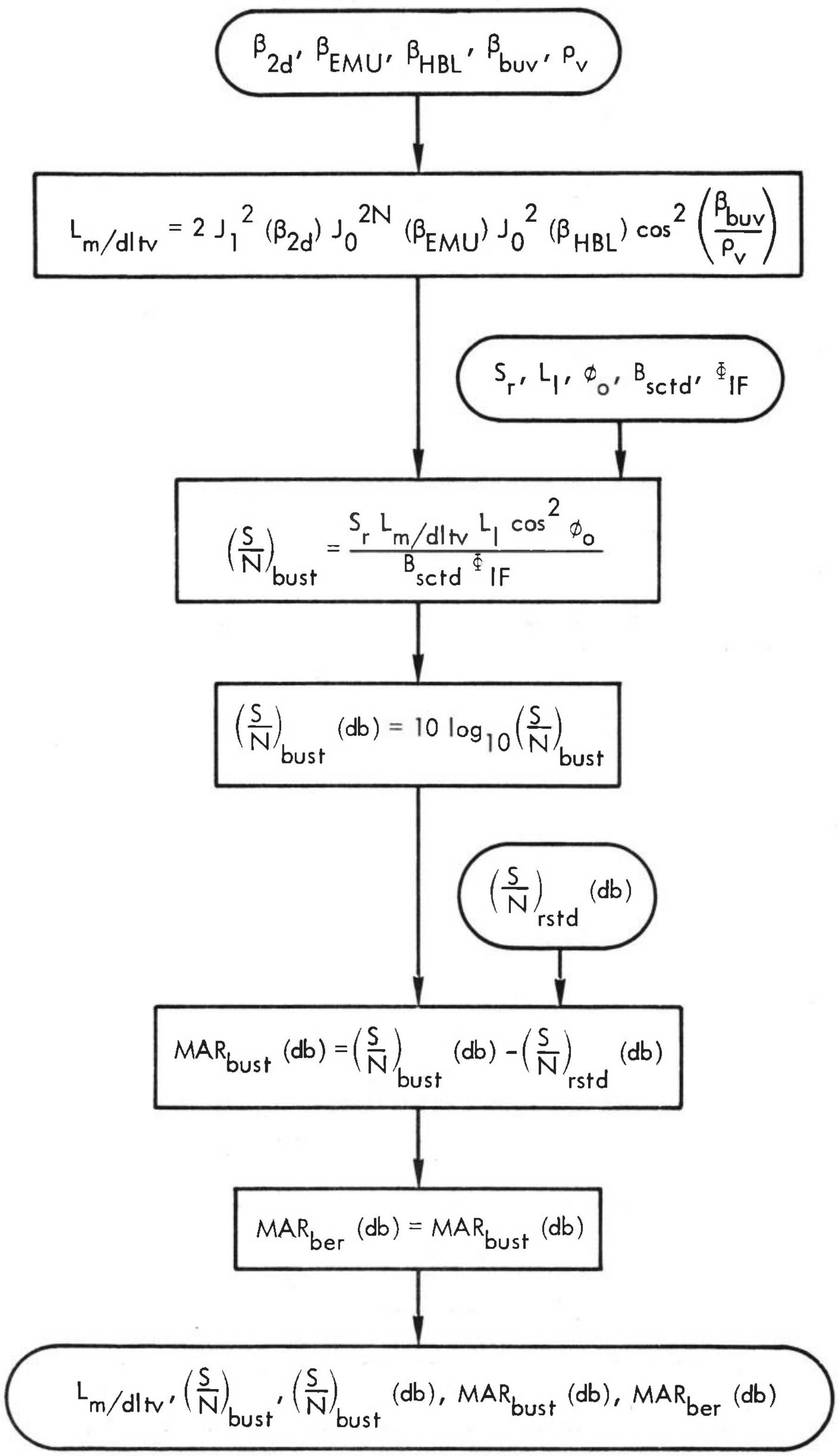
1.1.15 Block No. 15 — Downlink FM Mode TLM Subcarrier SNR in Predetection Bandwidth Calculation



1.1.16 Block No. 16 — Downlink FM Mode TLM Subcarrier SNR in Predetection Bandwidth (BER) Calculation



1.1.17 Block No. 17 — Downlink Low Bit Rate TLM SNR in Predetection Bandwidth with Voice on Carrier Calculation



1.1.18 Block No. 18 — Split-Phase TLM SNR in Postdetection Bandwidth Calculation

ρ_{spt}, K, Δf_{spt}, B_{spt}, B_{espt}, $\left(\frac{S}{N}\right)_{IF}$

$$\left(\frac{S}{N}\right)'_{spt} = 3\rho_{spt}^2 K \left(\frac{\Delta f_{spt}}{B_{spt}}\right)^2 \left(\frac{B_{espt}}{B_{spt}}\right) \left(\frac{S}{N}\right)_{IF}$$

B_{dsp}

$$D_{spt} = \frac{\sqrt{3}\, B_{dsp}\, B_{espt}\, K}{B_{spt}^2} \left(\frac{S}{N}\right)_{IF} \left(1 - \operatorname{erf}\sqrt{\left(\frac{S}{N}\right)_{IF}}\right) + 1$$

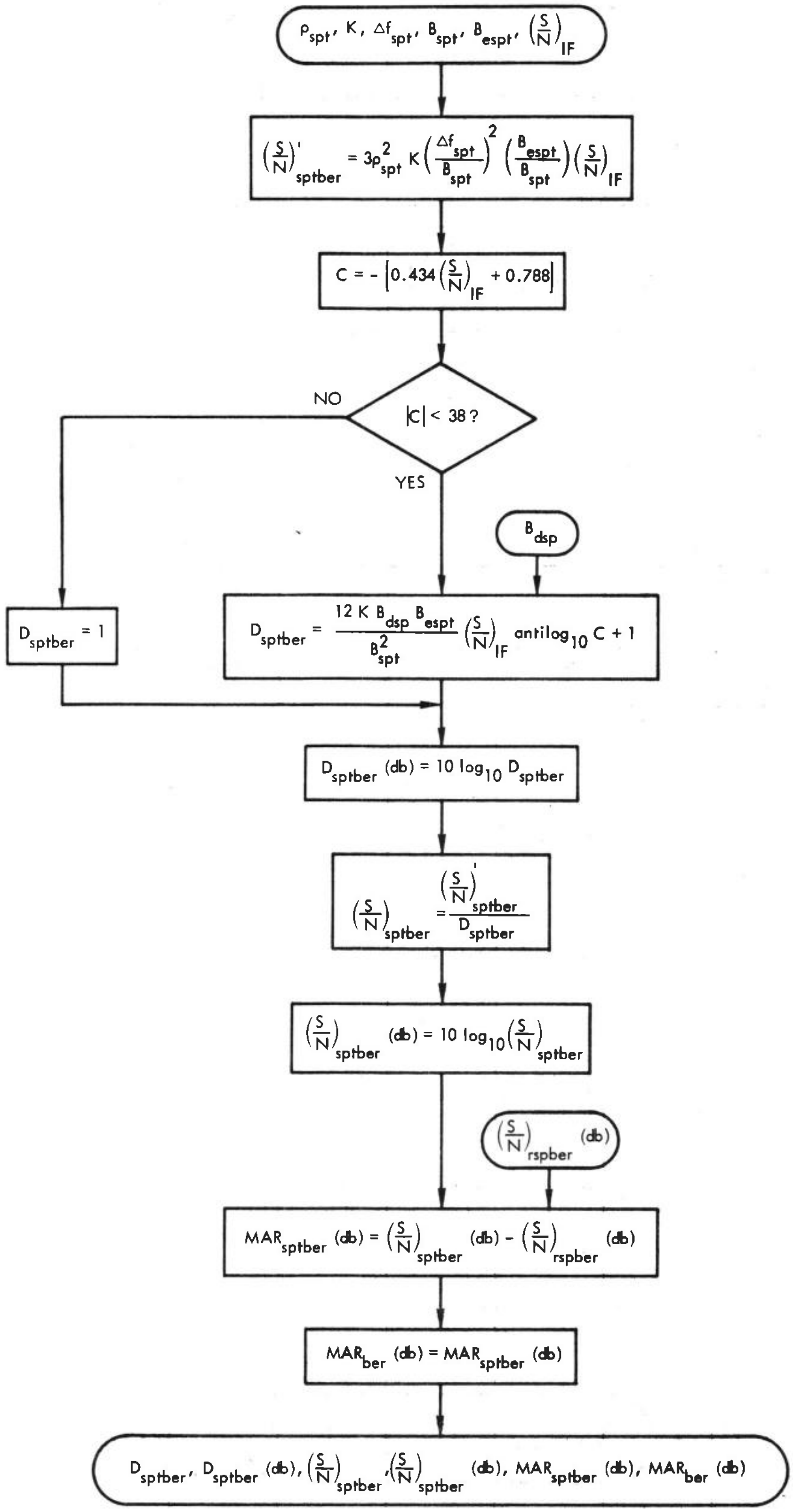
$$D_{spt}\,(db) = 10 \log_{10} D_{spt}$$

$$\left(\frac{S}{N}\right)_{spt} = \frac{\left(\frac{S}{N}\right)'_{spt}}{D_{spt}}$$

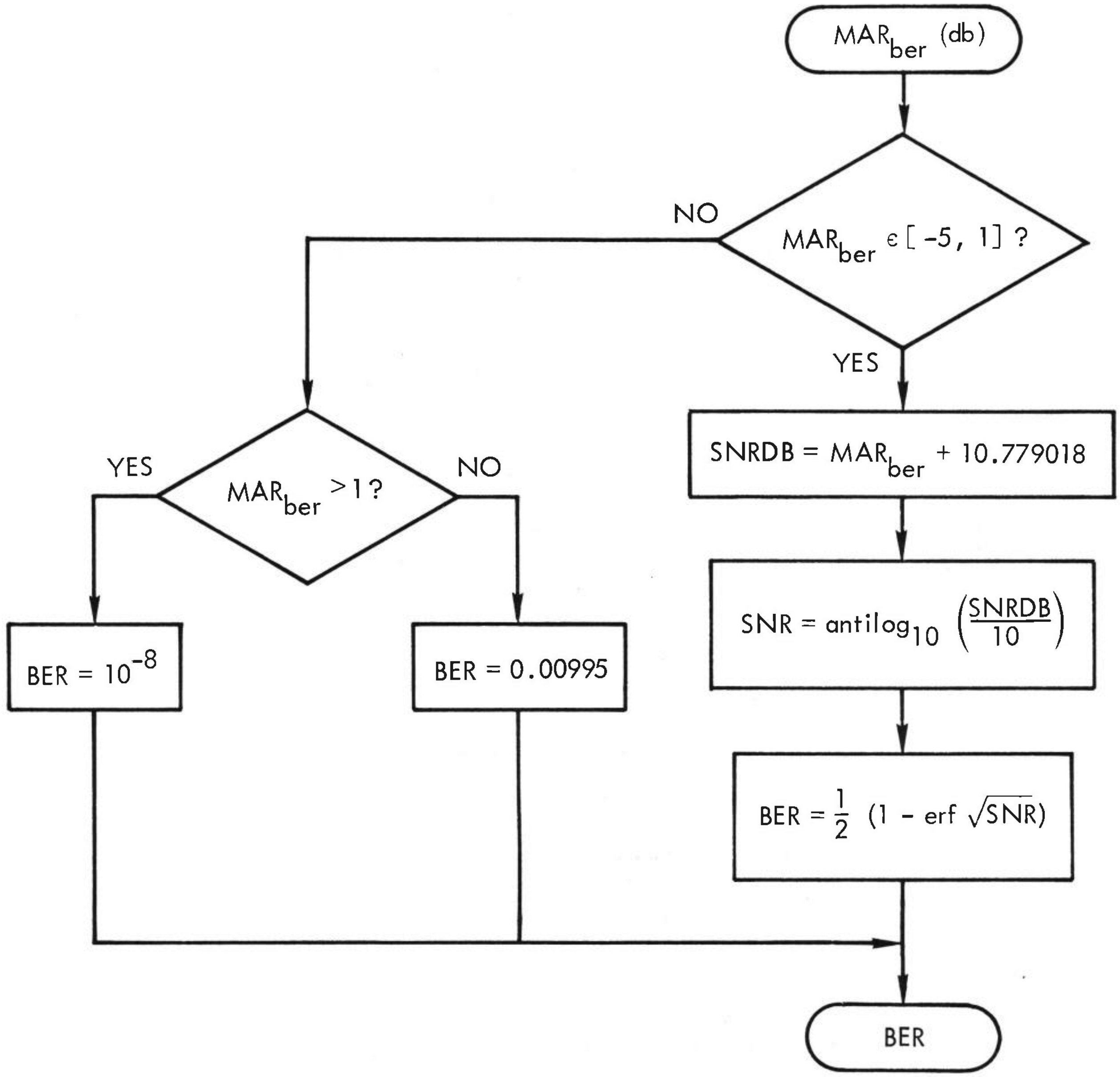
$$\left(\frac{S}{N}\right)_{spt}(db) = 10 \log_{10} \left(\frac{S}{N}\right)_{spt}$$

D_{spt}, $D_{spt}\,(db)$, $\left(\frac{S}{N}\right)_{spt}$, $\left(\frac{S}{N}\right)_{spt}(db)$

1.1.19 Block No. 19 — Split-Phase TLM SNR in Postdetection Bandwidth (BER) Calculation



1.1.20 Block No. 20 — Probability of Bit Error Rate Calculation



1.1.21 Block No. 21 — Uplink PM Mode Voice Subcarrier SNR in Predetection Bandwidth Calculation

$$\beta_{1u},\ \beta_{2u},\ \theta_{ul}$$

$$L_{m/upv} = 2\, J_1^2(\beta_{1u})\, J_0^2(\beta_{2u}) \cos^2 \theta_{ul}$$

$$S_r,\ L_l,\ \phi_o\ B_{scvu},\ \Phi_{IF}$$

$$\left(\frac{S}{N}\right)_{scvu} = \frac{S_r\, L_{m/upv}\, L_l \cos^2 \phi_o}{2B_{scvu}\left[\frac{\Phi_{IF}}{2} + \frac{S_r}{10^6} L_l \sin^2 \theta_{ul}\, J_0^2(\beta_{1u})\, J_0^2(\beta_{2u})\right]}$$

$$\left(\frac{S}{N}\right)_{scvu} (db) = 10 \log_{10} \left(\frac{S}{N}\right)_{scvu}$$

$$\left(\frac{S}{N}\right)_{rsvu} (db)$$

$$MAR_{scvu}\ (db) = \left(\frac{S}{N}\right)_{scvu} (db) - \left(\frac{S}{N}\right)_{rsvu} (db)$$

$$L_{m/upv},\ \left(\frac{S}{N}\right)_{scvu},\ \left(\frac{S}{N}\right)_{scvu} (db),\ MAR_{scvu}\ (db)$$

1.1.22 Block No. 22 — Uplink Voice in Postdetection Bandwidth Calculation

$$\rho_v,\ K,\ \Delta f_{vu},\ B_{vu},\ B_{scvu},\ \left(\frac{S}{N}\right)_{scvu}$$

$$\left(\frac{S}{N}\right)'_{vu} = 3\rho_v^{\,2} K \left(\frac{\Delta f_{vu}}{B_{vu}}\right)^2 \left(\frac{B_{scvu}}{B_{vu}}\right) \left(\frac{S}{N}\right)_{scvu}$$

$$D_{vu} = \sqrt{3}\, K \left(\frac{B_{scvu}}{B_{vu}}\right)^2 \left(\frac{S}{N}\right)_{scvu} \left(1 - \mathrm{erf}\sqrt{\left(\frac{S}{N}\right)_{scvu}}\right) + 1$$

$$D_{vu}\ (\mathrm{db}) = 10 \log_{10} D_{vu}$$

$$\left(\frac{S}{N}\right)_{vu} = \frac{\left(\frac{S}{N}\right)'_{vu}}{D_{vu}}$$

$$\left(\frac{S}{N}\right)_{vu} (\mathrm{db}) = 10 \log_{10} \left(\frac{S}{N}\right)_{vu}$$

$$\left(\frac{S}{N}\right)_{rqvu} (\mathrm{db})$$

$$MAR_{vu}\ (\mathrm{db}) = \left(\frac{S}{N}\right)_{vu} (\mathrm{db}) - \left(\frac{S}{N}\right)_{rqvu} (\mathrm{db})$$

$$\left(\frac{S}{N}\right)'_{vu},\ D_{vu},\ D_{vu}\ (\mathrm{db}),\ \left(\frac{S}{N}\right)_{vu},\ \left(\frac{S}{N}\right)_{vu} (\mathrm{db}),\ MAR_{vu}\ (\mathrm{db})$$

1.1.23 Block No. 23 — Downlink PM Mode Voice Subcarrier SNR in Predetection Bandwidth Calculation

$\beta_{1d}, \beta_{2d}, \gamma, \beta, \xi, \alpha$

$$L_{m/dpv} = 2\,J_1^2(\beta_{1d})\,J_0^2(\beta_{2d})\,J_0^2(\gamma)\,J_0^2(\beta)\,J_0^2(\xi)\cos^2\alpha$$

$S_r, L_l, \phi_o, B_{scvd}, \Phi_{IF}$

$$\left(\frac{S}{N}\right)_{scvd} = \frac{S_r\,L_{m/dpv}\,L_l\cos^2\phi_o}{B_{scvd}\,\Phi_{IF}}$$

$$\left(\frac{S}{N}\right)_{scv} = \left(\frac{S}{N}\right)_{scvd}$$

$$\left(\frac{S}{N}\right)_{scvd}(db) = 10\log_{10}\left(\frac{S}{N}\right)_{scvd}$$

$\left(\frac{S}{N}\right)_{rsvd}(db)$

$$MAR_{scvd}\,(db) = \left(\frac{S}{N}\right)_{scvd}(db) - \left(\frac{S}{N}\right)_{rsvd}(db)$$

$L_{m/dpv}, \left(\frac{S}{N}\right)_{scv}, \left(\frac{S}{N}\right)_{scvd}, \left(\frac{S}{N}\right)_{scvd}(db), MAR_{scvd}\,(db)$

1.1.24 Block No. 24 — Downlink FM Mode Voice Subcarrier SNR in Predetection Bandwidth Calculation

$\Delta f_{scv},\ f_{scv},\ B_{IF},\ B_{scv},\ \left(\frac{S}{N}\right)_{IF},\ L_I,\ K$

$$\left(\frac{S}{N}\right)'_{scv} = 0.5 \left(\frac{\Delta f_{scv}}{f_{scv}}\right)^2 \frac{B_{IF}}{B_{scv}} \left(\frac{S}{N}\right)_{IF} L_I\, K$$

B_{dvs}

$$D_{scv} = \frac{B_{dvs}\, B_{IF}\, K}{\sqrt{3}\, f_{scv}^{\,2}} \left(\frac{S}{N}\right)_{IF} L_I \left(1 - \mathrm{erf}\sqrt{\left(\frac{S}{N}\right)_{IF} L_I}\right) + 1$$

$$D_{scv}\,(\mathrm{db}) = 10 \log_{10} D_{scv}$$

$$\left(\frac{S}{N}\right)_{scv} = \frac{\left(\frac{S}{N}\right)'_{scv}}{D_{scv}}$$

$$\left(\frac{S}{N}\right)_{scv}(\mathrm{db}) = 10 \log_{10} \left(\frac{S}{N}\right)_{scv}$$

$\left(\frac{S}{N}\right)_{rqsv}(\mathrm{db})$

$$MAR_{scv} = \left(\frac{S}{N}\right)_{scv}(\mathrm{db}) - \left(\frac{S}{N}\right)_{rqsv}(\mathrm{db})$$

$D_{scv},\ D_{scv}\,(\mathrm{db}),\ \left(\frac{S}{N}\right)_{scv},\ \left(\frac{S}{N}\right)_{scv}(\mathrm{db}),\ MAR_{scv}\,(\mathrm{db})$

1.1.25 Block No. 25 — Downlink FM Mode Voice SNR in Postdetection Bandwidth Calculation

$$\rho_v,\ \Delta f_v,\ B_v,\ B_{scv},\ \left(\frac{S}{N}\right)_{scv},\ K$$

$$\left(\frac{S}{N}\right)'_v = 3\rho_v^2 \left(\frac{\Delta f_v}{B_v}\right)^2 \left(\frac{B_{scv}}{B_v}\right)\left(\frac{S}{N}\right)_{scv} K$$

$$B_d$$

$$D_v = \frac{\sqrt{3}\ B_d B_{scv} K}{B_v^2}\left(\frac{S}{N}\right)_{scv}\left(1 - \mathrm{erf}\sqrt{\left(\frac{S}{N}\right)_{scv}}\right) + 1$$

$$D_v\ (\mathrm{db}) = 10 \log_{10} D_v$$

$$\left(\frac{S}{N}\right)_v = \frac{\left(\frac{S}{N}\right)'_v}{D_v}$$

$$\left(\frac{S}{N}\right)_v (\mathrm{db}) = 10 \log_{10} \left(\frac{S}{N}\right)_v$$

$$\left(\frac{S}{N}\right)_{rqv} (\mathrm{db})$$

$$MAR_v\ (\mathrm{db}) = \left(\frac{S}{N}\right)_v (\mathrm{db}) - \left(\frac{S}{N}\right)_{rqv} (\mathrm{db})$$

$$\left(\frac{S}{N}\right)_{rqvu} (\mathrm{db})$$

$$MAR_{vu}\ (\mathrm{db}) = \left(\frac{S}{N}\right)_v (\mathrm{db}) - \left(\frac{S}{N}\right)_{rqvu} (\mathrm{db})$$

$$D_v,\ D_v\ (\mathrm{db}),\ \left(\frac{S}{N}\right)_v,\ \left(\frac{S}{N}\right)_v (\mathrm{db}),\ MAR_v\ (\mathrm{db}),\ MAR_{vu}\ (\mathrm{db})$$

1.1.26 Block No. 26 — Backup Voice SNR in Postdetection Bandwidth Calculation

$\beta_{2d}, \beta_{EMU}, \beta_{HLB}, \beta_{buv}, \rho_v$

$$L_{m/bv} = J_0^{\,2}(\beta_{2d})\, J_0^{\,2N}(\beta_{EMU})\, J_0^{\,2}(\beta_{HLB}) \sin^2\left(\frac{\beta_{buv}}{\rho_v}\right)$$

$S_r, B_{buvd}, \Phi_{IF}, \phi_o$

$$\left(\frac{S}{N}\right)_{buvd} = \frac{S_r\, L_{m/bv} \cos^2 \phi_o}{B_{buvd}\, \Phi_{IF}}$$

$$\left(\frac{S}{N}\right)_{buvd} (db) = 10 \log_{10} \left(\frac{S}{N}\right)_{buvd}$$

$\left(\frac{S}{N}\right)_{rbuvd} (db)$

$$MAR_{buvd}\ (db) = \left(\frac{S}{N}\right)_{buvd} (db) - \left(\frac{S}{N}\right)_{rbuvd} (db)$$

$L_{m/bv}, \left(\frac{S}{N}\right)_{buvd}, \left(\frac{S}{N}\right)_{buvd} (db), MAR_{buvd}\ (db)$

1.1.27 Block No. 27 — Playback Voice SNR in Postdetection Bandwidth Calculation

$$K,\ \rho_{pbv},\ \Delta f_{pbv},\ B_{pbv},\ B_{epbv},\ \left(\frac{S}{N}\right)_{IF}$$

$$\left(\frac{S}{N}\right)'_{pbv} = 3\,K\rho_{pbv}^{\ 2}\left(\frac{\Delta f_{pbv}}{B_{pbv}}\right)^2\left(\frac{B_{epbv}}{B_{pbv}}\right)$$

$$B_{dpbv}$$

$$D_{pbv} = \frac{\sqrt{3}\,B_{dpbv}\,B_{epbv}\,K}{B_{pbv}^{\ 2}}\left(\frac{S}{N}\right)_{IF}\left(1 - \mathrm{erf}\sqrt{\left(\frac{S}{N}\right)_{IF}}\right) + 1$$

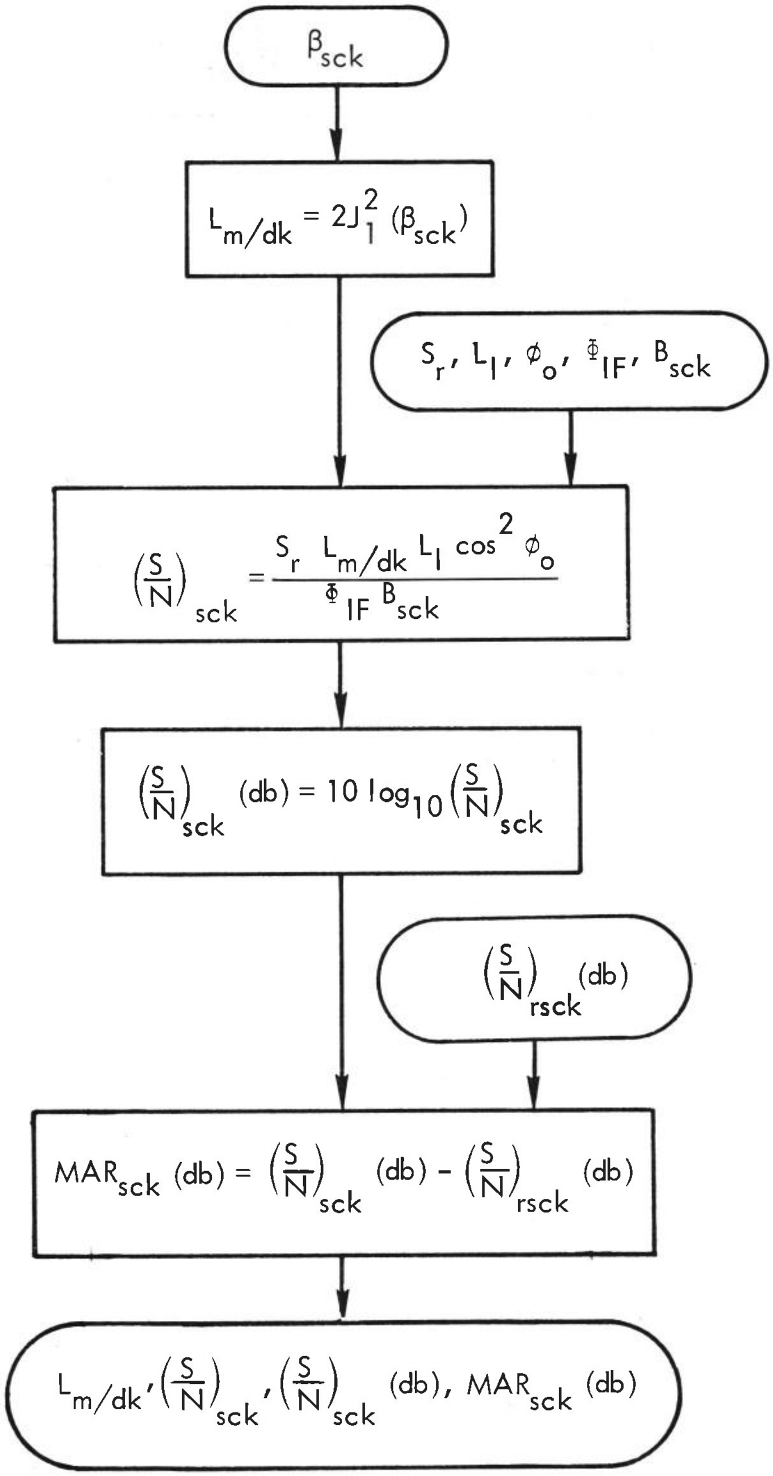
$$D_{pbv}\ (db) = 10\log_{10} D_{pbv}$$

$$\left(\frac{S}{N}\right)_{pbv} = \frac{\left(\frac{S}{N}\right)'_{pbv}}{D_{pbv}}$$

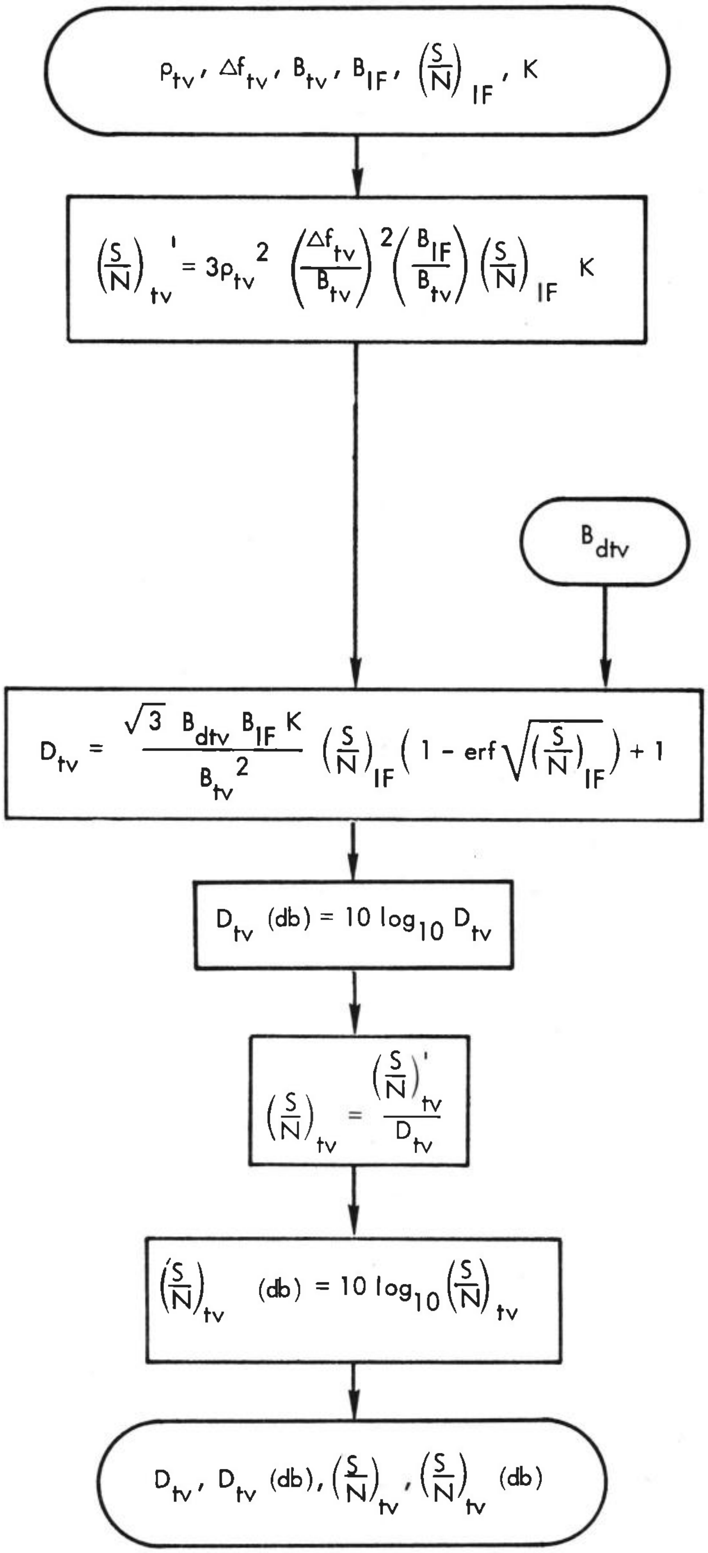
$$\left(\frac{S}{N}\right)_{pbv}(db) = 10\log_{10}\left(\frac{S}{N}\right)_{pbv}$$

$$D_{pbv},\ D_{pbv}\ (db),\ \left(\frac{S}{N}\right)_{pbv},\ \left(\frac{S}{N}\right)_{pbv}(db)$$

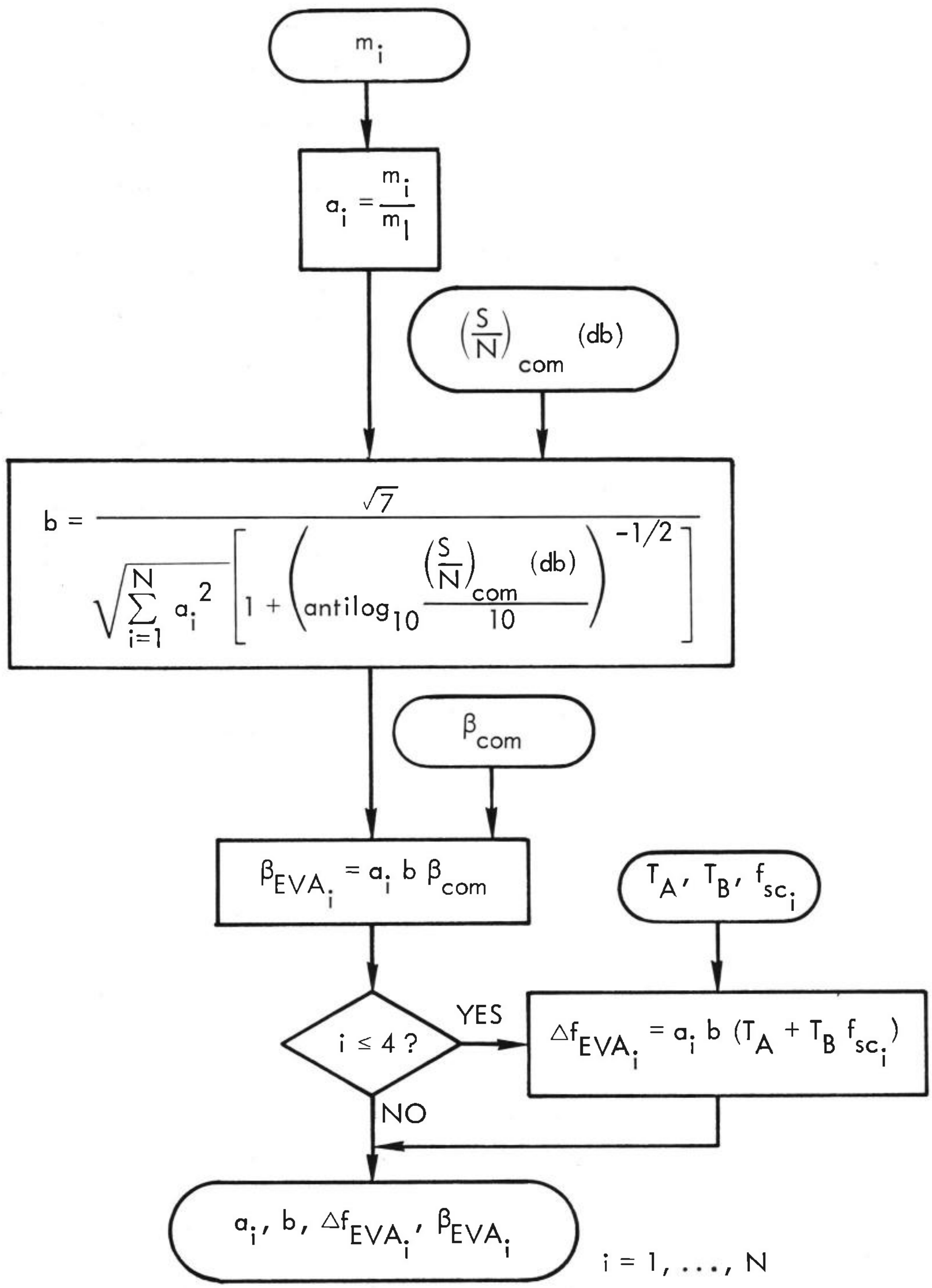
1.1.28 Block No. 28 — Downlink Keying SNR in Predetection Bandwidth Calculation



1.1.29 Block No. 29 — Television SNR in Postdetection Bandwidth Calculation



1.1.30 Block No. 30 — EVA Modulation Constants Calculation



1.1.31 Block No. 31 — EVA Subcarrier SNR in Predetection Bandwidth (No Modulation) Calculation

$$f_{sc_i},\ B_{scv},\ B_{scb_i},\ \left(\frac{S}{N}\right)_{scv},\ K,\ \Delta f_{EVA_i}$$

$$\left(\frac{S}{N}\right)'_{scb_i} = 0.5\left(\frac{\Delta f_{EVA_i}}{f_{sc_i}}\right)^2 \frac{B_{scv}}{B_{scb_i}} \left(\frac{S}{N}\right)_{scv} K$$

$$B_{db_i}$$

$$D_{scb_i} = \frac{B_{db_i} B_{scv} K}{\sqrt{3}\, f^2_{sc_i}} \left(\frac{S}{N}\right)_{scv} \left(1 - \mathrm{erf}\sqrt{\left(\frac{S}{N}\right)_{scv}}\right) + 1$$

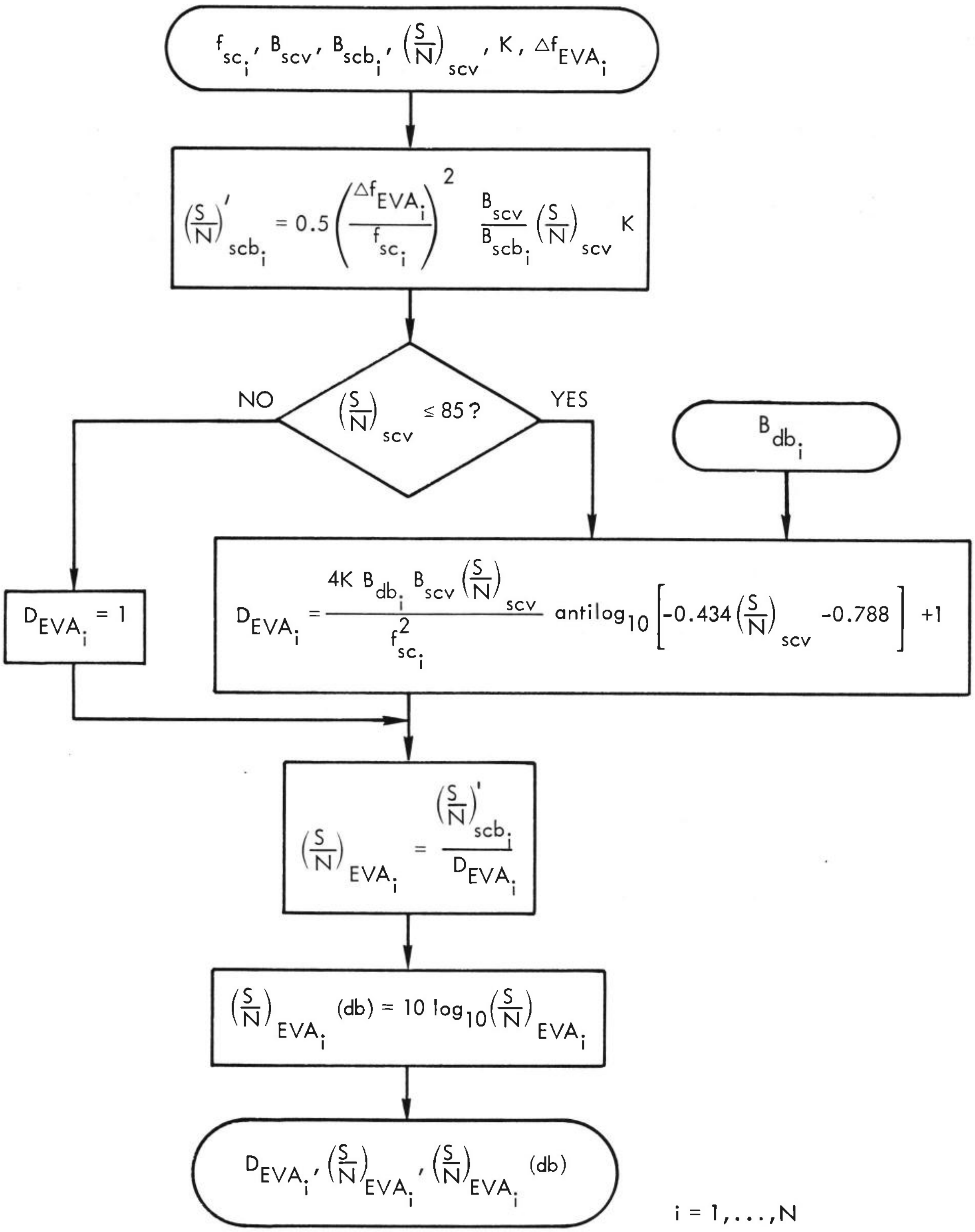
$$D_{scb_i}\ (db) = 10 \log_{10} D_{scb_i}$$

$$\left(\frac{S}{N}\right)_{scb_i} = \frac{\left(\frac{S}{N}\right)'_{scb_i}}{D_{scb_i}}$$

$$\left(\frac{S}{N}\right)_{scb_i} (db) = 10 \log_{10} \left(\frac{S}{N}\right)_{scb_i}$$

$$D_{scb_i},\ D_{scb_i}\ (db),\ \left(\frac{S}{N}\right)_{scb_i},\ \left(\frac{S}{N}\right)_{scb_i} (db) \qquad i = 1, \ldots, N$$

1.1.32 Block No. 32 — EVA Subcarrier SNR in Predetection Bandwidth (with Modulation) Calculation



$i = 1, \ldots, N$

1.1.33 Block No. 33 — EVA Subcarrier SNR in Predetection Bandwidth with Voice on Carrier Calculation

$\beta_{EVA_i}, \beta_{but}, \beta_{buv}, \rho_v$

$$L_{m/EVA_i} = 2\,J_1^{\,2}\left(\beta_{EVA_i}\right)\left[\prod_{j=1}^{N} J_0^{\,2}\left(\beta_{EVA_j}\right)\right] J_0^{\,2}\left(\beta_{but}\right)\cos^2\left(\frac{\beta_{buv}}{\rho_v}\right)$$

$S_r, L_l, \phi_o, B_{EMU_i}, \Phi_{IF}$

$$\left(\frac{S}{N}\right)_{EMU_i} = \frac{S_r\,L_{m/EVA_i}\,L_l\,\cos^2\phi_o}{J_0^{\,2}\left(\beta_{EVA_i}\right) B_{EMU_i}\,\Phi_{IF}}$$

$$\left(\frac{S}{N}\right)_{EMU_i}(db) = 10\log_{10}\left(\frac{S}{N}\right)_{EMU_i}$$

$L_{m/EVA_i}, \left(\frac{S}{N}\right)_{EMU_i}, \left(\frac{S}{N}\right)_{EMU_i}(db)$

$i = 1, \ldots, N$

1.1.34 Block No. 34 — EVA Biomed SNR in Postdetection Bandwidth Calculation

$$\rho_{b_i},\ \Delta f_{b_i},\ B_{b_i},\ B_{scb_i},\ \left(\frac{S}{N}\right)_{scb_i},\ K_b$$

$$\left(\frac{S}{N}\right)'_{b_i} = 3\,\rho_{b_i}^2 \left(\frac{\Delta f_{b_i}}{B_{b_i}}\right)^2 \left(\frac{B_{scb_i}}{B_{b_i}}\right) \left(\frac{S}{N}\right)_{scb_i} K_b$$

$$B_{d_i}$$

$$D_{b_i} = \frac{\sqrt{3}\, B_{d_i}\, B_{scb_i}\, K_b}{B_{b_i}^2} \left(\frac{S}{N}\right)_{scb_i} \left(1 - \operatorname{erf} \sqrt{\left(\frac{S}{N}\right)_{scb_i}}\right) + 1$$

$$\left(\frac{S}{N}\right)_{b_i} = \frac{\left(\frac{S}{N}\right)'_{b_i}}{D_{b_i}}$$

$$\left(\frac{S}{N}\right)_{b_i} (db) = 10 \log_{10} \left(\frac{S}{N}\right)_{b_i}$$

$$\left(\frac{S}{N}\right)_{b_i},\ \left(\frac{S}{N}\right)_{b_i} (db)$$

$i = 1, \ldots, N$

1.1.35 Block No. 35 — HLB Subcarrier SNR in Predetection Bandwidth with Voice on Carrier Calculation

$\beta_{HLB}, \beta_{EMU}, \beta_{but}, \beta_{buv}, \rho_v$

$$L_{m/b} = 2\, J_1^{\,2}(\beta_{HLB})\, J_0^{\,2N}(\beta_{EMU})\, J_0^{\,2}(\beta_{but})\, \cos^2\left(\frac{\beta_{buv}}{\rho_v}\right)$$

$S_r, L_l, \phi_o, B_{HLB}, \Phi_{IF}$

$$\left(\frac{S}{N}\right)_{HLB} = \frac{S_r L_{m/b} L_l \cos^2 \phi_o}{B_{HLB}\Phi_{IF}}$$

$$\left(\frac{S}{N}\right)_{HLB} (db) = 10 \log_{10}\left(\frac{S}{N}\right)_{HLB}$$

$L_{m/b}, \left(\frac{S}{N}\right)_{HLB}, \left(\frac{S}{N}\right)_{HLB} (db)$

1.1.36 Finite Transmitted Signal-to-Noise Ratio Calculation

$$\left(\frac{S}{N}\right)_{max} (db)$$

$$\left(\frac{S}{N}\right)_{max} = \text{antilog}_{10} \frac{\left(\frac{S}{N}\right)_{max} (db)}{10}$$

$$\left(\frac{S}{N}\right)_{input}$$

$$\left(\frac{S}{N}\right)_{H} = \max\left[\left(\frac{S}{N}\right)_{input}, \left(\frac{S}{N}\right)_{max}\right]$$

$$\left(\frac{S}{N}\right)_{L} = \min\left[\left(\frac{S}{N}\right)_{input}, \left(\frac{S}{N}\right)_{max}\right]$$

$$\left(\frac{S}{N}\right)_{input} (db)$$

$$\left(\frac{S}{N}\right)_{L} (db) = \min\left[\left(\frac{S}{N}\right)_{input} (db), \left(\frac{S}{N}\right)_{max} (db)\right]$$

$$C_{SNR}$$

$$\left(\frac{S}{N}\right)_{output} (db) = \left(\frac{S}{N}\right)_{L} (db) - 10 \log_{10}\left[\frac{\left(\frac{S}{N}\right)_{L} + C_{SNR}}{\left(\frac{S}{N}\right)_{H}} + 1\right]$$

$$\left(\frac{S}{N}\right)_{output} (db)$$

1.2 CØMSIM PARAMETERS

Each symbol appearing as an input or output to any of the above CØMSIM blocks is called a parameter and is identified by two natural numbers less than 801 called parameter numbers. We adopt the following conventions regarding CØMSIM parameter numbers:

(i) The parameter numbers 1,...,300 are reserved for static parameters, i.e. parameters which must be input by the user in order to be used by CØMSIM.

(ii) The parameter numbers 301,...,500 are reserved for interm parameters, i.e. parameters which must be input by the user for certain sequences of CØMSIM blocks but will be generated by CØMSIM for certain other block sequences.

(iii) The parameter numbers 501,...,800 are reserved for output parameters, i.e. parameters which may not be input by the user. These parameters can be assigned a value only when computed by the proper CØMSIM block sequence.

(iv) Odd parameter numbers are reserved for downlink parameter values and even parameter numbers are reserved for uplink parameter values. In general, 2N-1 represents the downlink value of a certain parameter and 2N represents the corresponding uplink value of that parameter.

In addition to parameter numbers, each CØMSIM parameter is also identified by a name, constructed of from one to six alphabetic characters, called a computer mnemonic. The CØMSIM computer mnemonic associated with a particular parameter is the actual name used to represent that symbol in the FØRTRAN program. The user requires these symbols when tracing through error walkbacks which may be generated by improper data input. Table 2-3 of the CØMSIM Programmer's Manual provides the user with a cross reference between the CØMSIM parameter numbers and computer mnemonics. We list below each of the CØMSIM parameters and their corresponding computer mnemonics.

1.2.1 CØMSIM Parameters vs. Computer Mnemonics

CØMSIM Parameter	Description	Computer Mnemonic	Block(s) Used
A	Noise Spectral Density Constant A	A	6
B	Noise Spectral Density Constant B	B	6
B_{b_1}	FM Biomed Postdetection Noise Bandwidth - Channel 1	BB	34
B_{b_2}	FM Biomed Postdetection Noise Bandwidth - Channel 2	BB	34
B_{b_3}	FM Biomed Postdetection Noise Bandwidth - Channel 3	BB	34
B_{b_4}	FM Biomed Postdetection Noise Bandwidth - Channel 4	BB	34
B_{buvd}	Back-up Voice Postdetection Noise BW	BBE	26
$B_{2\beta lo}$	PM Mode Carrier Loop Noise BW	BC	5
B_{d_1}	Biomed Effective Baseband Click Bandwidths - Channel 1	BD	34
B_{d_2}	Biomed Effective Baseband Click Bandwidths - Channel 2	BD	34
B_{d_3}	Biomed Effective Baseband Click Bandwidths - Channel 3	BD	34
B_{d_4}	Biomed Effective Baseband Click Bandwidths - Channel 4	BD	34
B_{EMU_1}	Biomed Pred Noise BW with Voice on Carrier for Sub. No. 1	BEE	33
B_{EMU_2}	Biomed Pred Noise BW with Voice on Carrier for Sub. No. 2	BEE	33
B_{EMU_3}	Biomed Pred Noise BW with Voice on Carrier for Sub. No. 3	BEE	33
B_{EMU_4}	Biomed Pred Noise BW with Voice on Carrier for Sub. No. 4	BEE	33

CØMSIM Parameter	Description	Computer Mnemonic	Block(s) Used
B_{EMU_5}	Biomed Pred Noise BW with Voice on Carrier for Sub. No. 5	BEE	33
B_{EMU_6}	Biomed Pred Noise BW with Voice on Carrier for Sub. No. 6	BEE	33
B_{EMU_7}	Biomed Pred Noise BW with Voice on Carrier for Sub. No. 7	BEE	33
B_{EMU_8}	Biomed Pred Noise BW with Voice on Carrier for Sub. No. 8	BEE	33
B_{HLB}	HLB Pred Noise BW with Voice on Carrier	BHE	35
B_{IF}	IF Noise Bandwidth	BIF	7,9,15,16,24,29
B_{sck}	Emergency Key Predetection Noise BW	BKE	28
B_d	Voice Effective Baseband Click Bandwidth	BLF	25
B_{db_1}	Biomed Effective Click Bandwidth Sub. No. 1	BLM	31,32
B_{db_2}	Biomed Effective Click Bandwidth Sub. No. 2	BLM	31,32
B_{db_3}	Biomed Effective Click Bandwidth Sub. No. 3	BLM	31,32
B_{db_4}	Biomed Effective Click Bandwidth Sub. No. 4	BLM	31,32
B_{dpbv}	Playback Voice Effective Click Bandwidth	BLPBV	27
B_{dsp}	Split Phase TLM Effective Click Bandwidth	BLTP	18,19
B_{dtv}	Television Effective Click Bandwidth	BLX	29
B_{scb_1}	Biomed Subcarrier Pred Noise BW for Sub. No. 1	BMSF	31,32,34
B_{scb_2}	Biomed Subcarrier Pred Noise BW for Sub. No. 2	BMSF	31,32,34

CØMSIM Parameter	Description	Computer Mnemonic	Block(s) Used
B_{scb_3}	Biomed Subcarrier Pred Noise BW for Sub. No. 3	BMSF	31,32,34
B_{scb_4}	Biomed Subcarrier Pred Noise BW for Sub. No. 4	BMSF	31,32,34
B_{epbv}	Playback Voice Predetection Noise BW	BPBVE	27
B_{pbv}	Playback Voice Postdetection Noise BW	BPBVO	27
B_{dl}	PRN Ranging Bandwidth	BPK	10
B_r	Transponder Video Bandwidth	BR	9
B_{sctu}	PM Mode PCM Telemetry Pre-detection Noise BW	BTE	11,12
B_{sctd}	PM Mode PCM Telemetry Pre-detection Noise BW	BTE	13,14,17
B_{sct}	FM Mode PCM Telemetry Pre-detection Noise BW	BTEF	15, 16
B_{tu}	Updata Postdetection Noise BW	BTO	12
B_{espt}	Split Phase TLM Predetection Noise BW	BTPE	18, 19
B_{spt}	Split Phase TLM Postdetection Noise BW	BTPO	18, 19
B_{scvu}	PM Mode Voice Predetection Noise BW	BVE	21, 22
B_{scvd}	PM Mode Voice Predetection Noise BW	BVE	23
B_{scv}	FM Mode Voice Predetection Noise BW	BVEF	24,25,31,32
B_{vu}	PM Mode Voice Postdetection Noise BW	BVO	22
B_v	FM Mode Voice Postdetection Noise BW	BVOF	25
B_{dts}	TLM Subcarrier Effective Click Bandwidth	BWTSF	15, 16

CØMSIM Parameter	Description	Computer Mnemonic	Block(s) Used
B_{dvs}	Voice Subcarrier Effective Click Bandwidth	BWVSF	24
B_{tv}	Television Postdetection Noise BW	BXE	29
f_{sc_1}	Biomed Subcarrier Center Frequency for Sub. No. 1	CMSF	30-32
f_{sc_2}	Biomed Subcarrier Center Frequency for Sub. No. 2	CMSF	30-32
f_{sc_3}	Biomed Subcarrier Center Frequency for Sub. No. 3	CMSF	30-32
f_{sc_4}	Biomed Subcarrier Center Frequency for Sub. No. 4	CMSF	30-32
f_{sct}	FM Mode PCM TLM Subcarrier Center Frequency	CTSF	15, 16
f_{scv}	FM Mode Voice Subcarrier Center Frequency	CVSF	24
Δf_{b_1}	FM Biomed Subcarrier Frequency Deviation Sub. 1	DELFB	34
Δf_{b_2}	FM Biomed Subcarrier Frequency Deviation Sub. 2	DELFB	34
Δf_{b_3}	FM Biomed Subcarrier Frequency Deviation Sub. 3	DELFB	34
Δf_{b_4}	FM Biomed Subcarrier Frequency Deviation Sub. 4	DELFB	34
ΔR	Delta Range Increment	DELNM	
ΔS	Delta Received Signal Level Increment	DELSR	
K	Voice Degradation Due to Non-Rect Output BW	DFK	22,24,25,31,32
K	Playback Voice Degrad Factor Due to Non-Rect Output BW	DFKPBV	27
K	PCM TLM Degrad Factor Due to Non-Rect Output BW	DFKT	12, 15, 16

CØMSIM Parameter	Description	Computer Mnemonic	Blocks(s) Used
K	Split Phase TLM Degrad Factor Due to Non-Rect Output BW	DFKTP	18, 19
K	Television Degrad Factor Due to Non-Rect Output BW	DFKX	29
f_{mc}	Transmitting Frequency	FMC	1
Δf_{pbv}	Playback Voice Frequency Deviation of Carrier	FPBV	27
Δf_{sct}	FM Mode PCM TLM Subcarrier Frequency Deviation of Carrier	FTF	15, 16
Δf_{spt}	Split Phase Telemetry Frequency Deviation of Carrier	FTP	18, 19
Δf_{tu}	Updata Subcarrier Frequency Deviation of Carrier	FTS	12
Δf_{scv}	Voice Subcarrier Frequency Deviation of Carrier	FVF	24
Δf_{vu}	Upvoice Subcarrier Frequency Deviation of Carrier	FVS	22
Δf_{v}	Frequency Deviation of Voice Subcarrier	FVSF	25
Δf_{tv}	Television Frequency Deviation of Carrier	FXF	29
Γ	Losses Due to Spacecraft Attitude	GAMMA	1
G_r	Receiver Antenna Gain	GR	1
G_t	Transmitter Antenna Gain	GT	1
k	Boltzmann's Constant	K	6
K_b	Biomed Degradation Due to Non-Rect Output Bandwidth	KB	34
L_c	Circuit Losses	LC	1
m_1	Modulation Level Channel 1	MODLEV	30
m_2	Modulation Level Channel 2	MODLEV	30

CØMSIM Parameter	Description	Computer Mnemonic	Block(s) Used
m_3	Modulation Level Channel 3	MODLEV	30
m_4	Modulation Level Channel 4	MODLEV	30
m_5	Modulation Level Channel 5	MODLEV	30
m_6	Modulation Level Channel 6	MODLEV	30
m_7	Modulation Level Channel 7	MODLEV	30
m_8	Modulation Level Channel 8	MODLEV	30
N	Number of EVA Subcarriers with Voice on Carrier	NEMU	4, 17, 26, 30-35
β_{buv}	Back-up Voice Phase Deviation	PBE	4,17,26,33,35
β_{com}	Composit Phase Deviation	PDEV	30
β_{EMU}	EVA Phase Deviation with Voice on Carrier	PE	4,17,26,35
β_{HLB}	HLB Phase Deviation with Voice on Carrier	PH	4,17,26,35
ϕ_o	Static Phase Error in Carrier Loop	PHIO	2-4, 10,11,13,14 17,21,23,26,28, 33,35
β_{sck}	Emergency Key Phase Deviation of Carrier	PK	3,28
θ_{ul}	PRN Ranging Phase Deviation of Carrier	PP	2,9,11,21
β_{2u}	PCM TLM Subcarrier Phase Deviation of Carrier	PT	2, 9, 11, 21
β_{2d}	PCM TLM Subcarrier Phase Deviation of Carrier	PT	3,10,13,14,17, 23,26
β_{but}	PCM TLM Subcarrier Phase Deviation of Carrier	PT	4, 33, 35
β_{1u}	Voice Subcarrier Phase Deviation of Carrier	PV	2, 9, 11, 21
β_{1d}	Voice Subcarrier Phase Deviation of Carrier	PV	3,10,13,14,23

CØMSIM Parameter	Description	Computer Mnemonic	Block(s) Used
$\left(\frac{S}{N}\right)_{rbuvd}$ (db)	Required Backup Voice SNR in Postdetection BW	RBE	26
$\left(\frac{S}{N}\right)_{rqc}$ (db)	Required Carrier-to-Noise Ratio in Carrier Loop BW	RC	5
ρ_{b_1}	RMS to Peak Factor for Biomed Modulation Signal - Channel 1	RHOB	34
ρ_{b_2}	RMS to Peak Factor for Biomed Modulation Signal - Channel 2	RHOB	34
ρ_{b_3}	RMS to Peak Factor for Biomed Modulation Signal - Channel 3	RHOB	34
ρ_{b_4}	RMS to Peak Factor for Biomed Modulation Signal - Channel 4	RHOB	34
ρ_{pbv}	RMS to Peak Factor for Playback Voice	RHOPBV	27
ρ_t	RMS to Peak Factor for PCM TLM	RHOT	12
ρ_{spt}	RMS to Peak Factor for Split Phase TLM	RHOTP	18, 19
ρ_v	RMS to Peak Factor for Voice	RHOV	4,17,22,25,26, 33,35
ρ_{tv}	RMS to Peak Factor for Television	RHOX	29
$\left(\frac{S}{N}\right)_{rsck}$ (db)	Required Emergency Key SNR in Predetection BW	RKE	28
$\left(\frac{S}{N}\right)_{rqdl}$ (db)	Required PRN SNR	RPK	10
$\left(\frac{S}{N}\right)_{rstu}$ (db)	PM Mode Required PCM Telemetry SNR in Predetection BW	RTE	11
$\left(\frac{S}{N}\right)_{rstd}$ (db)	PM Mode Required PCM Telemetry SNR in Predetection BW	RTE	13, 14
$\left(\frac{S}{N}\right)_{rqtu}$	PM Mode Required PCM Telemetry SNR in Postdetection BW	RTO	12

CØMSIM Parameter	Description	Computer Mnemonic	Block(s) Used
$\left(\frac{S}{N}\right)_{rspber}$ (db)	Required Split Phase TLM SNR in Postdetection BW	RTPR	19
$\left(\frac{S}{N}\right)_{rstd}$ (db)	Required PCM TLM SNR in Pred BW with Voice on Carrier	RTSB	17
$\left(\frac{S}{N}\right)_{rstber}$ (db)	FM Mode Required PCM TLM SNR in Predetection BW	RTSFR	16
$\left(\frac{S}{N}\right)_{rsvu}$ (db)	PM Mode Required Voice SNR in Predetection BW	RVE	21
$\left(\frac{S}{N}\right)_{rsvd}$ (db)	PM Mode Required Voice SNR in Predetection BW	RVE	23
$\left(\frac{S}{N}\right)_{rqvu}$ (db)	Required Up Voice SNR in Postdetection BW	RVO	22,25
$\left(\frac{S}{N}\right)_{rqv}$ (db)	FM Mode Required Voice SNR in Postdetection BW	RVOF	25
$\left(\frac{S}{N}\right)_{rqsv}$ (db)	FM Mode Required Voice SNR in Predetection BW	RVSF	24
$\left(\frac{S}{N}\right)_{com}$ (db)	Composite SNR	SNRCOM	30
C_{SNR}	Transmitted SNR Routine Constant	SNRCST	Finite SNR
$\left(\frac{S}{N}\right)_{max}$ (db)	Maximum Transmission SNR of the Link	SNTRDB	Finite SNR
S_t	Transmitting Signal Power	ST	1
T_A	Taper Circuit Constant A	TAPERA	30
T_B	Taper Circuit Constant B	TAPERB	30
TRC	Transponder Gain Constant	TRC	9
α	Turned Around PRN Modulation Index	ALPHA	3,9,10,13,14,23
β	Turned Around Updata Modulation Index	BET	3,9,10,13,14,23

CØMSIM Parameter	Description	Computer Mnemonic	Block(s) Used
β_{EVA_1}	Biomed Phase Deviation with Voice on Carrier for Sub No 1	BETEVA	30, 33
β_{EVA_2}	Biomed Phase Deviation with Voice on Carrier for Sub No 2	BETEVA	30, 33
β_{EVA_3}	Biomed Phase Deviation with Voice on Carrier for Sub No 3	BETEVA	30, 33
β_{EVA_4}	Biomed Phase Deviation with Voice on Carrier for Sub No 4	BETEVA	30, 33
β_{EVA_5}	Biomed Phase Deviation with Voice on Carrier for Sub No 5	BETEVA	30, 33
β_{EVA_6}	Biomed Phase Deviation with Voice on Carrier for Sub No 6	BETEVA	30, 33
β_{EVA_7}	Biomed Phase Deviation with Voice on Carrier for Sub No 7	BETEVA	30, 33
β_{EVA_8}	Biomed Phase Deviation with Voice on Carrier for Sub No 8	BETEVA	30, 33
b	Composite Modulation Level	COMOLE	30
D_{EVA_1}	Biomed Sub. Below FM Thresh Degrad (With Mod) Sub No 1	DMMSF	32
D_{EVA_2}	Biomed Sub. Below FM Thresh Degrad (With Mod) Sub No 2	DMMSF	32
D_{EVA_3}	Biomed Sub. Below FM Thresh Degrad (With Mod) Sub No 3	DMMSF	32
D_{EVA_4}	Biomed Sub. Below FM Thresh Degrad (With Mod) Sub No 4	DMMSF	32
D_{scb_1}	Biomed Subcarrier Below FM Thresh Degrad for Sub. 1	DNMSF	31
D_{scb_2}	Biomed Subcarrier Below FM Thresh Degrad for Sub. 2	DNMSF	31
D_{scb_3}	Biomed Subcarrier Below FM Thresh Degrad for Sub. 3	DNMSF	31
D_{scb_4}	Biomed Subcarrier Below FM Thresh Degrad for Sub. 4	DNMSF	31

CØMSIM Parameter	Description	Computer Mnemonic	Block(s) Used
D_{scb_1}(db)	Biomed Subcarrier Below FM Thresh Degrad for Sub. 1	DNMSFB	31
D_{scb_2}(db)	Biomed Subcarrier Below FM Thresh Degrad for Sub. 2	DNMSFB	31
D_{scb_3}(db)	Biomed Subcarrier Below FM Thresh Degrad for Sub. 3	DNMSFB	31
D_{scb_4}(db)	Biomed Subcarrier Below FM Thresh Degrad for Sub. 4	DNMSFB	31
D_{pbv}	Playback Voice Below FM Threshold Degrad in Post BW	DPBV	27
D_{pbv}(db)	Playback Voice Below FM Threshold Degrad in Post BW	DPBVDB	27
D_{tu}	Updata Below FM Threshold Degrad in Post BW	DTB	12
D_{tu}(db)	Updata Below FM Threshold Degrad in Post BW	DTBDB	12
D_{spt}	Split Phase TLM Below FM Threshold Degrad in Post BW	DTP	18
D_{spt}(db)	Split Phase TLM Below FM Threshold Degrad in Post BW	DTPDB	18
D_{sptber}	Split Phase TLM Below FM Thresh Degrad in Post BW (BER Cal)	DTPR	19
D_{sptber}(db)	Split Phase TLM Below FM Thresh Degrad in Post BW (BER Cal)	DTPRDB	19
D_{sct}	FM Mode PCM TLM Below Thresh Degrad in Pred BW	DTSF	15
D_{sct}(db)	FM Mode PCM TLM Below Thresh Degrad in Pred BW	DTSFDB	15
D_{sctber}	FM Mode PCM TLM Below Thresh Degrad in Pred BW (BER Cal)	DTSFR	16
D_{sctber}(db)	FM Mode PCM TLM Below Thresh Degrad in Pred BW (BER Cal)	DTSFRB	16

CØMSIM Parameter	Description	Computer Mnemonic	Block(s) Used
D_{vu}	Upvoice Below FM Threshold Degrad in Post BW	DVB	22
D_{vu}(db)	Upvoice Below FM Threshold Degrad in Post BW	DVBDB	22
D_v	FM Mode Voice Below Threshold Degrad in Post BW	DVF	25
D_v(db)	FM Mode Voice Below Threshold Degrad in Post BW	DVFDB	25
D_{scv}	FM Mode Voice Below Threshold Degrad in Pred BW	DVSF	24
D_{scv}(db)	FM Mode Voice Below Threshold Degrad in Pred BW	DVSFDB	24
D_{tv}	Television Below FM Threshold Degrad in Post BW	DXE	29
D_{tv}(db)	Television Below FM Threshold Degrad in Post BW	DXEDB	29
L_1	Limiter Losses	ELLELL	8-11,13-17,21, 23,24,28,33,35
N_{IF}	Transponder Constant	ENIF	9
Δf_{EVA_1}	Biomed Sub. Freq. Deviation of Voice Sub. for Sub. 1	FREDEV	30-32
Δf_{EVA_2}	Biomed Sub. Freq. Deviation of Voice Sub. for Sub. 2	FREDEV	30-32
Δf_{EVA_3}	Biomed Sub. Freq. Deviation of Voice Sub. for Sub. 3	FREDEV	30-32
Δf_{EVA_4}	Biomed Sub. Freq. Deviation of Voice Sub. for Sub. 4	FREDEV	30-32
γ	Turned Around Upvoice Modulation Index	GAMM	3,9,10,13,14,23
L	Total Losses in Communication Link	LDB	1
L_s	Space Loss	LSDB	1
MAR_{ber}(db)	TLM Margin for BER Calculation	MGTBER	11-14,16,17,19, 20

CØMSIM Parameter	Description	Computer Mnemonic	Block(s) Used
P_c	Carrier Power	PC	2-6
P_c(db)	Carrier Power	PCDB	2-4
Φ_{IF}	Noise Spectral Density	PHIF	5-7,10,11,13,14, 17,21,23,26,28, 33,35
a_1	Modulation Level Relative to Channel One - Channel 1	RATIO	30
a_2	Modulation Level Relative to Channel One - Channel 2	RATIO	30
a_3	Modulation Level Relative to Channel One - Channel 3	RATIO	30
a_4	Modulation Level Relative to Channel One - Channel 4	RATIO	30
a_5	Modulation Level Relative to Channel One - Channel 5	RATIO	30
a_6	Modulation Level Relative to Channel One - Channel 6	RATIO	30
a_7	Modulation Level Relative to Channel One - Channel 7	RATIO	30
a_8	Modulation Level Relative to Channel One - Channel 8	RATIO	30
R_{nm}	Slant Range Between Spacecraft and Ground Station	RNM	1
$\left(\frac{S}{N}\right)'_{vu}$	Upvoice SNR for Above FM Thresh in Post BW	SNVOP	22
$\left(\frac{S}{N}\right)'_{vu}$(db)	Upvoice SNR for Above FM Thresh in Post BW	SNVOPB	22
S_r	Received Signal Level	SR	1-4,7,10,11,13, 14,17,21,23,26, 28,33,35
S_r(db)	Received Signal Level	SRDB	1
S_r(dbm)	Received Signal Level	SRDBM	1
S_t(db)	Transmitted Power	STDB	1

CØMSIM Parameter	Description	Computer Mnemonic	Block(s) Used
T	Effective System Noise Temperature	T	6
ξ	Turned Around Thermal Noise Modulation Index	XI	3,9,10,13,14,23
BER	Probability of Bit Error Rate	BER	20
MAR_{buvd}(db)	Back-up Voice Margin Predetection BW	MGBE	26
MAR_{c}(db)	Carrier Margin in Loop BW	MGC	5
MAR_{sck}(db)	Emergency Key Margin in Predetection BW	MGKE	28
MAR_{dl}(db)	PRN Ranging Margin	MGP	10
MAR_{std}(db)	PM Mode TLM Margin in Predetection BW	MGTE	13,14
MAR_{sctu}(db)	Updata Margin in Postdetection BW	MGTO	12
MAR_{sptber}	Split Phase TLM Margin in Postdetection BW	MGTPR	19
MAR_{bust}(db)	PCM TLM Margin in Predetection BW with Voice on Carrier	MGTSB	17
MAR_{sctber}(db)	FM Mode PCM TLM Margin in Predetection BW (BER Cal)	MGTSFR	16
MAR_{scvu}(db)	PM Mode Voice Margin in Predetection BW	MGVE	21
MAR_{scvd}(db)	PM Mode Voice Margin in Predetection BW	MGVE	23
MAR_{vu}(db)	PM Mode Voice Margin in Postdetection BW	MGVO	22,25
MAR_{v}(db)	FM Mode Voice Margin in Postdetection BW	MGVOF	25
MAR_{scv}(db)	FM Mode Voice Margin in Predetection BW	MGVSF	24
$L_{m/bv}$	Backup Voice Modulation Loss	MLBV	26

CØMSIM Parameter	Description	Computer Mnemonic	Block(s) Used
$L_{m/cs}$	Carrier Modulation Loss with Voice and Biomed Subcarrier	MLCVBS	4
$L_{m/dc}$	Downlink Carrier Modulation Loss	MLDC	3
$L_{m/dk}$	Downlink Keying Modulation Loss	MLDK	28
$L_{m/hdt}$	Downlink PM Mode High Bit Rate TLM Modulation Loss	MLDPHT	13
$L_{m/ldt}$	Downlink PM Mode Low Bit Rate TLM Modulation Loss	MLDPLT	14
$L_{m/dr}$	Downlink PRN Modulation Loss	MLDPRN	10
$L_{m/dpv}$	Downlink PM Mode Voice Modulation Loss	MLDPV	23
$L_{m/dltv}$	Downlink Low Bit Rate TLM with VOC Modulation Loss	MLDVLT	17
L_{m/EVA_1}	EVA Modulation Loss - Channel 1	MLEVA	33
L_{m/EVA_2}	EVA Modulation Loss - Channel 2	MLEVA	33
L_{m/EVA_3}	EVA Modulation Loss - Channel 3	MLEVA	33
L_{m/EVA_4}	EVA Modulation Loss - Channel 4	MLEVA	33
L_{m/EVA_5}	EVA Modulation Loss - Channel 5	MLEVA	33
L_{m/EVA_6}	EVA Modulation Loss - Channel 6	MLEVA	33
L_{m/EVA_7}	EVA Modulation Loss - Channel 7	MLEVA	33
L_{m/EVA_8}	EVA Modulation Loss - Channel 8	MLEVA	33
$L_{m/b}$	HLB Modulation Loss	MLHLB	35
$L_{m/uc}$	Uplink Carrier Modulation Loss	MLUC	2
$L_{m/ut}$	Uplink PM Mode TLM Modulation Loss	MLUPT	11
$L_{m/upv}$	Uplink PM Mode Voice Modulation Loss	MLUPV	21

CØMSIM Parameter	Description	Computer Mnemonic	Block(s) Used
F	Noise Figure	NOISEF	6
P_c(dbm)	Carrier Power	PCDBM	2-4
Φ_{IF}(db)	Noise Spectral Density	PHIFDB	6
$\left(\frac{S}{N}\right)_{b_1}$	Downlink Biomed SNR in Post-detection BW - Channel 1	SNBD	34
$\left(\frac{S}{N}\right)_{b_2}$	Downlink Biomed SNR in Post-detection BW - Channel 2	SNBD	34
$\left(\frac{S}{N}\right)_{b_3}$	Downlink Biomed SNR in Post-detection BW - Channel 3	SNBD	34
$\left(\frac{S}{N}\right)_{b_4}$	Downlink Biomed SNR in Post-detection BW - Channel 4	SNBD	34
$\left(\frac{S}{N}\right)_{b_1}$ (db)	Downlink Biomed SNR in Post-detection BW - Channel 1	SNBDDB	34
$\left(\frac{S}{N}\right)_{b_2}$ (db)	Downlink Biomed SNR in Post-detection BW - Channel 2	SNBDDB	34
$\left(\frac{S}{N}\right)_{b_3}$ (db)	Downlink Biomed SNR in Post-detection BW - Channel 3	SNBDDB	34
$\left(\frac{S}{N}\right)_{b_4}$ (db)	Downlink Biomed SNR in Post-detection BW - Channel 4	SNBDDB	34
$\left(\frac{S}{N}\right)_{buvd}$	Back-up Voice SNR in Post-detection BW	SNBE	26
$\left(\frac{S}{N}\right)_{buvd}$ (db)	Back-up Voice SNR in Postdetection BW	SNBEDB	26
$\left(\frac{S}{N}\right)_{c}$	Carrier to Noise Ratio in Loop BW	SNC	5
$\left(\frac{S}{N}\right)_{c}$ (db)	Carrier to Noise Ratio in Loop BW	SNCDB	5
$\left(\frac{S}{N}\right)_{EMU_1}$	Biomed Sub. SNR in Pred BW with Voice on Carrier Sub 1	SNESB	33

CØMSIM Parameter	Description	Computer Mnemonic	Block(s) Used
$\left(\frac{S}{N}\right)_{EMU_2}$	Biomed Sub. SNR in Pred BW with Voice on Carrier Sub 2	SNESB	33
$\left(\frac{S}{N}\right)_{EMU_3}$	Biomed Sub. SNR in Pred BW with Voice on Carrier Sub 3	SNESB	33
$\left(\frac{S}{N}\right)_{EMU_4}$	Biomed Sub. SNR in Pred BW with Voice on Carrier Sub 4	SNESB	33
$\left(\frac{S}{N}\right)_{EMU_5}$	Biomed Sub. SNR in Pred BW with Voice on Carrier Sub 5	SNESB	33
$\left(\frac{S}{N}\right)_{EMU_6}$	Biomed Sub. SNR in Pred BW with Voice on Carrier Sub 6	SNESB	33
$\left(\frac{S}{N}\right)_{EMU_7}$	Biomed Sub. SNR in Pred BW with Voice on Carrier Sub 7	SNESB	33
$\left(\frac{S}{N}\right)_{EMU_8}$	Biomed Sub. SNR in Pred BW with Voice on Carrier Sub 8	SNESB	33
$\left(\frac{S}{N}\right)_{EMU_1}$ (db)	Biomed Sub. SNR in Pred BW with Voice on Carrier Sub 1	SNESBB	33
$\left(\frac{S}{N}\right)_{EMU_2}$ (db)	Biomed Sub. SNR in Pred BW with Voice on Carrier Sub 2	SNESBB	33
$\left(\frac{S}{N}\right)_{EMU_3}$ (db)	Biomed Sub. SNR in Pred BW with Voice on Carrier Sub 3	SNESBB	33
$\left(\frac{S}{N}\right)_{EMU_4}$ (db)	Biomed Sub. SNR in Pred BW with Voice on Carrier Sub 4	SNESBB	33
$\left(\frac{S}{N}\right)_{EMU_5}$ (db)	Biomed Sub. SNR in Pred BW with Voice on Carrier Sub 5	SNESBB	33
$\left(\frac{S}{N}\right)_{EMU_6}$ (db)	Biomed Sub. SNR in Pred BW with Voice on Carrier Sub 6	SNESBB	33

CØMSIM Parameter	Description	Computer Mnemonic	Block(s) Used
$\left(\frac{S}{N}\right)_{EMU_7}$ (db)	Biomed Sub. SNR in Pred BW with Voice on Carrier Sub 7	SNESBB	33
$\left(\frac{S}{N}\right)_{EMU_8}$ (db)	Biomed Sub. SNR in Pred BW with Voice on Carrier Sub 8	SNESBB	33
$\left(\frac{S}{N}\right)_{HLB}$	HLB SNR in Predetection BW with Voice on Carrier	SNHSB	35
$\left(\frac{S}{N}\right)_{HLB}$ (db)	HLB SNR in Predetection BW with Voice on Carrier	SNHSBB	35
$\left(\frac{S}{N}\right)_{IF}$	IF SNR	SNIF	7-9,15,16,18,19, 24,27,29
$\left(\frac{S}{N}\right)_{IF}$ (db)	IF SNR	SNIFDB	7
$\left(\frac{S}{N}\right)_{sck}$	Emergency Key SNR in Predetection BW	SNKE	28
$\left(\frac{S}{N}\right)_{sck}$ (db)	Emergency Key SNR in Predetection BW	SNKEDB	28
$\left(\frac{S}{N}\right)_{EVA_1}$	Biomed Sub. SNR in Pred BW (with Modulation) Sub 1	SNMM	32
$\left(\frac{S}{N}\right)_{EVA_2}$	Biomed Sub. SNR in Pred BW (with Modulation) Sub 2	SNMM	32
$\left(\frac{S}{N}\right)_{EVA_3}$	Biomed Sub. SNR in Pred BW (with Modulation) Sub 3	SNMM	32
$\left(\frac{S}{N}\right)_{EVA_4}$	Biomed Sub. SNR in Pred BW (with Modulation) Sub 4	SNMM	32
$\left(\frac{S}{N}\right)_{EVA_1}$ (db)	Biomed Sub. SNR in Pred BW (with Modulation) Sub 1	SNMMDB	32
$\left(\frac{S}{N}\right)_{EVA_2}$ (db)	Biomed Sub. SNR in Pred BW (with Modulation) Sub 2	SNMMDB	32

CØMSIM Parameter	Description	Computer Mnemonic	Block(s) Used
$\left(\frac{S}{N}\right)_{EVA_3}$ (db)	Biomed Sub. SNR in Pred BW (with Modulation) Sub 3	SNMMDB	32
$\left(\frac{S}{N}\right)_{EVA_4}$ (db)	Biomed Sub. SNR in Pred BW (with Modulation) Sub 4	SNMMDB	32
$\left(\frac{S}{N}\right)_{scb_1}$	Biomed Sub. SNR in Pred BW (without Modulation) Sub 1	SNMSF	31, 34
$\left(\frac{S}{N}\right)_{scb_2}$	Biomed Sub. SNR in Pred BW (without Modulation) Sub 2	SNMSF	31, 34
$\left(\frac{S}{N}\right)_{scb_3}$	Biomed Sub. SNR in Pred BW (without Modulation) Sub 3	SNMSF	31, 34
$\left(\frac{S}{N}\right)_{scb_4}$	Biomed Sub. SNR in Pred BW (without Modulation) Sub 4	SNMSF	31, 34
$\left(\frac{S}{N}\right)_{scb_1}$ (db)	Biomed Sub. SNR in Pred BW (without Modulation) Sub 1	SNMSFB	31
$\left(\frac{S}{N}\right)_{scb_2}$ (db)	Biomed Sub. SNR in Pred BW (without Modulation) Sub 2	SNMSFB	31
$\left(\frac{S}{N}\right)_{scb_3}$ (db)	Biomed Sub. SNR in Pred BW (without Modulation) Sub 3	SNMSFB	31
$\left(\frac{S}{N}\right)_{scb_4}$ (db)	Biomed Sub. SNR in Pred BW (without Modulation) Sub 4	SNMSFB	31
$\left(\frac{S}{N}\right)_{d1}$	PRN Ranging SNR	SNP	10
$\left(\frac{S}{N}\right)_{d1}$ (db)	PRN Ranging SNR	SNPDB	10
$\left(\frac{S}{N}\right)_{pbv}$	Playback Voice SNR in Post-detection BW	SNPBV	27

CØMSIM Parameter	Description	Computer Mnemonic	Block(s) Used
$\left(\frac{S}{N}\right)_{pbv}$ (db)	Playback Voice SNR in Post-detection BW	SNPBVB	27
$\left(\frac{S}{N}\right)_{teu}$	PM Mode TLM SNR in Predetection BW	SNTE	11, 12
$\left(\frac{S}{N}\right)_{td}$	PM Mode TLM SNR in Predetection BW	SNTE	13, 14
$\left(\frac{S}{N}\right)_{teu}$ (db)	PM Mode TLM SNR in Predetection BW	SNTEDB	11
$\left(\frac{S}{N}\right)_{td}$ (db)	PM Mode TLM SNR in Predetection BW	SNTEDB	13, 14
$\left(\frac{S}{N}\right)_{sctber}$	FM Mode PCM TLM SNR in Predetection BW (BER Cal)	SNTFR	16
$\left(\frac{S}{N}\right)_{sctber}$ (db)	FM Mode PCM TLM SNR in Predetection BW (BER Cal)	SNTFRB	16
$\left(\frac{S}{N}\right)_{tu}$	PM Mode TLM SNR in Postdetection BW	SNTO	12
$\left(\frac{S}{N}\right)_{tu}$ (db)	PM Mode TLM SNR in Postdetection BW	SNTODB	12
$\left(\frac{S}{N}\right)_{spt}$	Split Phase TLM SNR in Post-detection BW	SNTP	18
$\left(\frac{S}{N}\right)_{spt}$ (db)	Split Phase TLM SNR in Post-detection BW	SNTPDB	18
$\left(\frac{S}{N}\right)_{sptber}$	Split Phase TLM SNR in Post-detection BW (BER Cal)	SNTPR	19
$\left(\frac{S}{N}\right)_{sptber}$ (db)	Split Phase TLM SNR in Postdetection BW (BER Cal)	SNTPRB	19
$\left(\frac{S}{N}\right)_{bust}$	PCM TLM SNR in Predetection BW with Voice on Carrier	SNTSB	17

CØMSIM Parameter	Description	Computer Mnemonic	Block(s) Used
$\left(\frac{S}{N}\right)_{bust}$ (db)	PCM TLM SNR in Predetection BW with Voice on Carrier	SNTSBB	17
$\left(\frac{S}{N}\right)_{sct}$	FM Mode PCM TLM SNR in Predetection BW	SNTSF	15
$\left(\frac{S}{N}\right)_{sct}$ (db)	FM Mode PCM TLM SNR in Predetection BW	SNTSFB	15
$\left(\frac{S}{N}\right)_{scvu}$	PM Mode Voice SNR in Predetection BW	SNVE	21, 22
$\left(\frac{S}{N}\right)_{scvd}$	PM Mode Voice SNR in Predetection BW	SNVE	23
$\left(\frac{S}{N}\right)_{scvu}$ (db)	PM Mode Voice SNR in Predetection BW	SNVEDB	21
$\left(\frac{S}{N}\right)_{scvd}$ (db)	PM Mode Voice SNR in Predetection BW	SNVEDB	23
$\left(\frac{S}{N}\right)_{vu}$	Upvoice SNR in Postdetection BW	SNVO	22
$\left(\frac{S}{N}\right)_{vu}$ (db)	Upvoice SNR in Postdetection BW	SNVODB	22
$\left(\frac{S}{N}\right)_{v}$	PM and FM Mode Voice SNR in Postdetection BW	SNVOF	25
$\left(\frac{S}{N}\right)_{v}$ (db)	PM and FM Mode Voice SNR in Postdetection BW	SNVOFB	25
$\left(\frac{S}{N}\right)_{scv}$	FM Mode Voice SNR in Predetection BW	SNVSF	23-25, 31, 32
$\left(\frac{S}{N}\right)_{scv}$ (db)	FM Mode Voice SNR in Predetection BW	SNVSFB	24
$\left(\frac{S}{N}\right)_{tv}$	Television SNR in Postdetection BW	SNXE	29
$\left(\frac{S}{N}\right)_{tv}$ (db)	Television SNR in Postdetection BW	SNXEDB	29

1.3 LINK SIMULATIONS

Having defined the CØMSIM blocks and identified each parameter within each block, we are now prepared to describe the various Apollo S-band communication links as sequences of the CØMSIM blocks.

We establish the following convention concerning the CØMSIM parameter which is to be varied for each simulation. For block sequences of the form 1,...,n or 9,1,...,n, range (in nautical miles) is the independent variable. For all other block sequences, received signal level (in dbm) is the independent variable.

We list below each of the Apollo S-band communication links and their corresponding CØMSIM block sequence where range is the independent variable. To obtain the CØMSIM block sequence for which received signal level is the independent variable, simply omit the sequence prefix 1, or 9,1.

1.3.1 CØMSIM Block Sequences

Mode	Block Sequence
	CSM/PM/Uplink
CSM/PM/1/E	1, 2, 6, 7, 8, 5
CSM/PM/1/S	1, 2, 6, 7, 8, 5
CSM/PM/2/E	1, 2, 6, 7, 8, 5, 21
CSM/PM/2/S	1, 2, 6, 7, 8, 5, 21, 22
CSM/PM/3/E	1, 2, 6, 7, 8, 11, 5
CSM/PM/3/S	1, 2, 6, 7, 8, 11, 5, 12
CSM/PM/4/E	1, 2, 6, 7, 8, 5, 21
CSM/PM/4/S	1, 2, 6, 7, 8, 5, 21, 22
CSM/PM/5/E	1, 2, 6, 7, 8, 11, 5
CSM/PM/5/S	1, 2, 6, 7, 8, 11, 5, 12
CSM/PM/6/E	1, 2, 6, 7, 8, 11, 5, 21
CSM/PM/6/S	1, 2, 6, 7, 8, 11, 5, 21, 22, 12
CSM/PM/7/E	1, 2, 6, 7, 8, 11, 5, 21
CSM/PM/7/S	1, 2, 6, 7, 8, 11, 5, 21, 22, 12
CSM/PM/8/E	1, 2, 6, 7, 8, 5, 21
CSM/PM/8/S	1, 2, 6, 7, 8, 5, 21, 22
	CSM/PM/Downlink
CSM/PM/1/E	1, 3, 6, 7, 8, 13, 5, 23, 20
CSM/PM/1/S	1, 3, 6, 7, 8, 13, 5, 23, 20, 25
CSM/PM/1/EN PRN	9, 1, 3, 6, 7, 8, 13, 5, 23, 20
CSM/PM/1/SN PRN	9, 1, 3, 6, 7, 8, 13, 5, 23, 20, 25
CSM/PM/2/E	9, 1, 3, 6, 7, 8, 13, 10, 5, 23, 20
CSM/PM/2/S	9, 1, 3, 6, 7, 8, 13, 10, 5, 23, 20, 25
CSM/PM/3/E	9, 1, 3, 6, 7, 8, 14, 10, 5, 23, 20
CSM/PM/3/S	9, 1, 3, 6, 7, 8, 14, 10, 5, 23, 20, 25
CSM/PM/4/E	1, 3, 6, 7, 8, 14, 5, 23, 20
CSM/PM/4/S	1, 3, 6, 7, 8, 14, 5, 23, 20, 25
CSM/PM/5	1, 3, 6, 7, 8, 14, 20, 5

Mode	Block Sequence
	CSM/PM/Downlink (Continued)
CSM/PM/6	1, 3, 6, 7, 8, 5, 28
CSM/PM/7	9, 1, 3, 6, 7, 8, 10, 5
CSM/PM/8	1, 4, 6, 7, 8, 5, 26, 17, 20
CSM/PM/9	9, 1, 3, 6, 7, 8, 14, 20, 10, 5
CSM/PM/10	1, 4, 6, 7, 8, 5, 26
	LM/PM/Uplink
LM/PM/1/E	1, 2, 6, 7, 8, 5
LM/PM/1/S	1, 2, 6, 7, 8, 5
LM/PM/2/E	1, 2, 6, 7, 8, 5, 21
LM/PM/2/S	1, 2, 6, 7, 8, 5, 21, 22
LM/PM/3/E	1, 2, 6, 7, 8, 11, 5
LM/PM/3/S	1, 2, 6, 7, 8, 11, 5, 12
LM/PM/4/E	1, 2, 6, 7, 8, 5, 21
LM/PM/4/S	1, 2, 6, 7, 8, 5, 21, 22
LM/PM/5/E	1, 2, 6, 7, 8, 11, 5
LM/PM/5/S	1, 2, 6, 7, 8, 11, 5, 12
LM/PM/6/E	1, 2, 6, 7, 8, 11, 5, 21
LM/PM/6/S	1, 2, 6, 7, 8, 11, 5, 21, 22, 12
LM/PM/7/E	1, 2, 6, 7, 8, 11, 5, 21
LM/PM/7/S	1, 2, 6, 7, 8, 11, 5, 21, 22, 12
LM/PM/8/E	1, 2, 6, 7, 8, 5, 21
LM/PM/8/S	1, 2, 6, 7, 8, 5, 21, 22
	LM/PM/Downlink
LM/PM/1/E	1, 3, 6, 7, 8, 13, 20, 5, 23, 30*, 31, 32
LM/PM/1/S	1, 3, 6, 7, 8, 13, 20, 5, 23, 30*, 25, 31, 32, 34
LM/PM/2/E	9, 1, 3, 6, 7, 8, 13, 20, 10, 5, 23, 30*, 31, 32
LM/PM/2/S	9, 1, 3, 6, 7, 8, 13, 20, 10, 5, 23, 25, 30*, 31, 32, 34
LM/PM/3	1, 3, 6, 7, 8, 5, 14, 20
LM/PM/4	1, 4, 6, 7, 8, 5, 26, 17, 20

Mode	Block Sequence
	LM/PM/Downlink (Continued)
LM/PM/5	1, 4, 6, 7, 8, 5, 26
LM/PM/6	1, 3, 6, 7, 8, 5, 28
LM/PM/7/E	1, 3, 6, 7, 8, 14, 20, 5, 23, 30*, 31, 32
LM/PM/7/S	1, 3, 6, 7, 8, 14, 20, 5, 23, 30*, 31, 25, 32, 34
LM/PM/8	1, 4, 6, 7, 8, 17, 20, 5, 26, 35, 30*, 33
	CSM/FM/Downlink
CSM/FM/1/E	1, 6, 7, 8, 27, 15, 16, 20
CSM/FM/1/S	1, 6, 7, 8, 27, 15, 16, 20
CSM/FM/2/E	1, 6, 7, 8, 27, 15, 16, 20
CSM/FM/2/S	1, 6, 7, 8, 27, 15, 16, 20
CSM/FM/3	1, 6, 7, 8, 18, 19, 20
CSM/FM/4	1, 6, 7, 8, 29
	LM/FM/Downlink
LM/FM/9A/E	1, 6, 7, 8, 24, 15, 16, 20, 30*, 31, 32
LM/FM/9A/S	1, 6, 7, 8, 24, 15, 16, 20, 30*, 31, 25, 32, 34
LM/FM/9B/E	1, 6, 7, 8, 24, 15, 16, 20, 30*, 31, 32
LM/FM/9B/S	1, 6, 7, 8, 24, 15, 16, 20, 30*, 31, 25, 32, 34
LM/FM/10A/E	1, 6, 7, 8, 24, 15, 16, 20, 30*, 31, 29, 32
LM/FM/10A/S	1, 6, 7, 8, 24, 15, 16, 20, 30*, 31, 29, 25, 32, 34
LM/FM/10B/E	1, 6, 7, 8, 24, 15, 16, 20, 30*, 31, 29, 32
LM/FM/10B/S	1, 6, 7, 8, 24, 15, 16, 20, 30*, 31, 29, 25, 32, 34

* Block 30 is optional in this sequence. Use block 30 if B_{EVA_i} and Δf_{EVA_i} are both to be calculated. If block 30 is omitted, both these parameters must be input.

1.3.2 CØMSIM Block Inputs

Each of the thirty-five functioning CØMSIM blocks requires certain specified parameters as input. If these parameters are not specified, or if they are inconsistent, a computational error may occur and this will generate an error walkback. To aid the user in establishing the proper input for each CØMSIM block sequence we list below the downlink input parameters required for each of the CØMSIM blocks. For the uplink case, add one to each of the indicated parameter numbers.

In addition to the parameter numbers indicated below, the slant range increment (parameter No. 123) or received signal level increment (parameter No. 125) must be input depending upon whether the independent variable is range or received signal level, respectively. If the finite transmitted SNR calculation is to be used, the parameters 249 and 251 must also be input.

Block No.	Input Parameter No.
1‡	123, 137, 155*, 157*, 159*, 165*, 253, 429
2‡	193*, 197*, 199*, 201*
3‡	193*, 195*, 199*, 201*, 301*, 303*, 399*, 445*
4‡	183*, 185*, 189*, 191*, 193*, 199*, 221
5	15, 205*
6‡	1, 3*, 161
7‡	43
8‡	--
9‡	43, 77, 197*, 199*, 201*, 259
10	75, 193*, 199*, 201*, 227*
11	79, 193*, 197*, 199*, 201*, 229*
12	79, 83, 131, 145, 217, 231*
13	79, 193*, 199, 201*, 229*
14	79, 193*, 199, 201*, 229*
15	43, 81, 97, 111, 131, 141
16	43, 81, 97, 111, 131, 141, 237*

Block No.	Input Parameter No.
17	79, 183*, 185*, 189*, 191*, 193*, 199, 221, 235*
18	59, 85, 87, 133, 143, 219
19	59, 85, 87, 133, 143, 219, 233*
20‡	--
21	89, 193*, 197*, 199*, 201, 239*
22	89, 93, 127, 149, 221, 241*
23	89, 193*, 199*, 201, 239*
24	43, 91, 99, 113, 127, 147, 245*
25	47, 91, 95, 127, 151, 221, 243*
26	13, 183*, 185, 189*, 191*, 193*, 199*, 203*, 221
27	57, 71, 73, 129, 139, 215
28	45, 193*, 195, 225*
29	43, 61, 101, 135, 153, 223
30‡	103, 105, 107, 109, 167, 169, 171, 173, 175, 177, 179, 181, 183, 187, 247, 255, 257
31	49, 51, 53, 55, 63, 65, 67, 69, 91, 103, 105, 107, 109, 127, 391†, 393†, 395†, 397†
32	49, 51, 53, 55, 63, 65, 67, 69, 91, 103, 105, 107, 109, 127, 183, 391†, 393†, 395†, 397†
33	25, 27, 29, 31, 33, 35, 37, 39, 183, 185*, 189, 193*, 199*, 221, 305†, 307†, 309†, 311†, 313†, 315†, 317†, 319†
34	5, 7, 9, 11, 17, 19, 21, 23, 63, 65, 67, 69, 115, 117, 119, 121, 163, 183, 207, 209, 211, 213
35	41, 183*, 185*, 189*, 191, 193*, 199, 221

* This parameter may be equal to zero.

† This parameter may be omitted when Block 30 is used.

‡ This block may not be followed by the finite transmitted SNR calculation.

2. INPUT

By a data deck we shall mean all of the Hollerith cards, in their proper sequence, which the user is required to submit for any particular computer run, exclusive of machine control cards. The CØMSIM data deck is divided into two parts. The first part of the CØMSIM data deck consists of parameter description cards which annotate the CØMSIM parameters for output listings. The second part of the CØMSIM data deck consists of one or more problem sets. Each CØMSIM problem set consists of one or more problems; the problems within a particular problem set are usually related in that they have similar input requirements, though this is not necessary. Each CØMSIM problem consists of one or two link specification cards which describe a downlink and/or uplink block sequence, zero or more parameter definition cards which define values of any of the input or interm parameters and zero or more sets of report specification data, which describe the report(s), if any, to be printed for this particular CØMSIM problem. Figure 2-1 illustrates the CØMSIM data deck.

Since the first part of the CØMSIM data deck, the parameter description cards, will rarely, if ever, be altered, a standard deck of parameter description cards has been prepared and placed on the program PCF tape. The user may call for this standard deck simply by replacing the first part of the CØMSIM data deck by a single card containing the symbols "∇ΔEØF" (∇indicates a 7/8 punch in card column one; Δ indicates one or more blank columns); otherwise the program expects parameter description cards to be input by the user. Retrieving and altering or replacing this standard deck of parameter description cards is accomplished by means of two utility programs described in the Appendix.

2.1 DETAILED DESCRIPTION OF PARAMETER DESCRIPTION CARDS

One parameter description card corresponds to precisely two CØMSIM parameter numbers (one downlink and one uplink). The number of parameter description cards input by the user is optional; each parameter description card, however, must have the following format:

Field (card columns)	Contents
1 - 6	Computer mnemonic for parameter being described (left justified)
8 - 10	Downlink parameter number for parameter being described (right justified)
12 - 72	Description of parameter (left justified)
74 - 80	Units, if any, of parameter being described (left justified)

Not every CØMSIM parameter need have a parameter description card; those for which no parameter description card is provided will simply have blank annotation in the output listing. If more than one parameter description card is provided for the same CØMSIM parameter, the last card entered (i.e. the card closest to the end of the data deck) will be the card used for annotation. The parameter description cards must be terminated by an end card, i.e. by a card with the symbols "$END" in columns two through five. In the event that the user chooses to call for the standard deck of parameter description cards from the program PCF tape, this end card is optional. In this latter case, the "∇ΔEØF" card must be, physically, the first card of the CØMSIM data deck; the "∇ΔEØF" card simply replaces the entire deck of parameter description cards.

2.2 DETAILED DESCRIPTION OF CØMSIM PROBLEM SETS

Following the end card which terminates the parameter description card deck, comes one or more problem sets. The first cards of each problem set must be a FØRTRAN namelist $PRBSET. The symbols "$PRBSET" must appear in columns two through eight of the first problem set card. Certain problem set inputs (as described below) may then be entered in any order, beginning in any column (except column one) in the form PARAM1=xxxxx, PARAM2=xxxxx,... The only restrictions are that no punch ever appear in column one and that no number be split between two data cards. This namelist must be terminated by an end card.

Three problem set inputs may be entered via the $PRBSET namelist. Each of these inputs has the value entered for it; if no value is entered a certain value is assumed as indicated below.

Input	Description
DATAPE	Data tape ID number (1,2,...). Indicates the FØRTRAN unit number on which the data tape is to be mounted. DATAPE is initialized to 8.
NPRØBS	Number of problems in this problem set (1,2,...). NPRØBS is initialized to 1.
SAVE	Save factor. Upon entering this problem set, all parameters from the preceding problem set are multiplied by the value of SAVE. SAVE=0.0 indicates that all parameters are to be initialized to zero. SAVE=1.0 indicates that all parameters are to be retained from the previous problem set. SAVE is initialized to 0.0.

2.2.1 Detailed Description of CØMSIM Problems

Following the namelist $PRBSET comes the number of problems specified by NPRØBS. The first cards of each problem must be a FØRTRAN namelist $PRBSPC. As usual, this namelist must be terminated by an end card.

Six problem specification inputs may be entered via the $PRBSPC namelist. Each of these inputs has the value entered for it; if no value is entered a certain value is assumed as indicated below.

Input	Description
IPRINT	Optional print indicator flag (0,1) 0 indicates no optional print is desired. 1 indicates optional print output of Bessel functions is desired. IPRINT is initialized to 0.
LINKS	Number of links involved in simulation (1,2). Possibilities are: Downlink only (1), uplink only (1) or uplink and downlink (2). LINKS is initialized to 1.

Input	Description
NFILE	File on the data tape which contains previously generated results (1,2,...). NFILE is interrogated only if NLISTS < 0. NFILE must be reinitialized by the user whenever DATAPE has been changed.
NLINES	Number of lines desired per page, per output report (1,2,...). A total of NLINES * NPAGES computational points will be processed. NLINES is initialized to 1.
NLISTS	Number of output reports desired (0, ±1, ±2,...). If NLISTS < 0, NLISTS number of reports will be generated from file number NFILE of a previously generated data tape. NLISTS is initialized to 1.
NPAGES	Number of pages desired per output report (1,2,...). A total of NLINES * NPAGES computational points will be processed. NPAGES is initialized to 1.

2.2.2 Detailed Description of CØMSIM Link Specification Cards

Following the end card which terminates the namelist $PRBSPC, one or two link specification cards, as indicated by LINKS, must appear. These cards describe the downlink and/or uplink block sequences for this particular CØMSIM problem. The format of the link specification card is given below.

Field (card column)	Contents
1 - 18	Title, identifying link (left justified)
20	Down/up link indicator. The symbol "1" in this column indicates that this card refers to the downlink simulation. The symbol "2" in this column indicates that this card refers to the uplink simulation.
22 - 80	Block sequence desired for this link. If the leading block number has two digits, then it begins in column 22, otherwise the leading block number begins in column 23. Each block number must be followed by either one or two blank columns (depending upon whether the following block number has two or one digits, respectively) or the symbol "-". If a block number is followed by the symbol "-", the output of the following block (i.e. the block which is preceded by "-" is applied to the finite transmitted SNR block.

2.2.3 Detailed Description of CØMSIM Parameter Definition Cards

Following the link specification card(s) is zero or more parameter definition cards. The format of each parameter definition card is given below. An end card must follow the last parameter definition card.

Field (card columns)	Contents
8 - 10	CØMSIM parameter number
13 - 28	Value for indicated parameter in either "floating point" form (i.e. xxx.xxxxx) or in "E" notation (i.e. x.xxxxE±ee). In the former case the use of "." is mandatory. In the latter case the number must be right justified in this field.

2.2.4 Detailed Description of CØMSIM Report Specification Data

If NLISTS ≠ 0, |NLISTS| number of report specification data sets must follow the end card which terminates the CØMSIM parameter definition data. Each report specification data set is a namelist, $REPSPC, which is described below.

Input	Description
LISTID	Report type indicator flag (1,...,5). Indicates which one of the five report types to output. LISTID is initialized to 5.
NVAR(1),...,NVAR(8)	CØMSIM parameter numbers to be output for report type number five (1,...,800). NVAR is not initialized.
START	Minimum value of the independent variable to be output in the report. START is initialized to 0.0.
STØP	Maximum value of the independent variable to be output in the report. If STØP = START, all values of the independent variable generated in the simulation for this problem will be output. STØP is initialized to 0.0.

2.3 SUMMARY OF CØMSIM DATA DECK INPUT

The modularity and "nesting" of the CØMSIM data deck provides the user with great flexibility in setting up communication link simulations. Link simulations which differ only in that a few input parameters are changed or that different output reports are desired may be run as different problems within the same problem set, allowing parameter values to be carried over from simulation to simulation. Simulations of a completely different nature may be run as separate problem sets, setting the save factor, SAVE, to zero in the second problem set, thereby resetting all parameters to zero. Also, a previously generated data tape can be mounted on a specified unit, allowing the user to generate reports from this older data tape in one problem set, then switching tape units and generating a new data tape in a second problem set.

Figure 2-1 illustrates the general deck setup for the CØMSIM data deck.

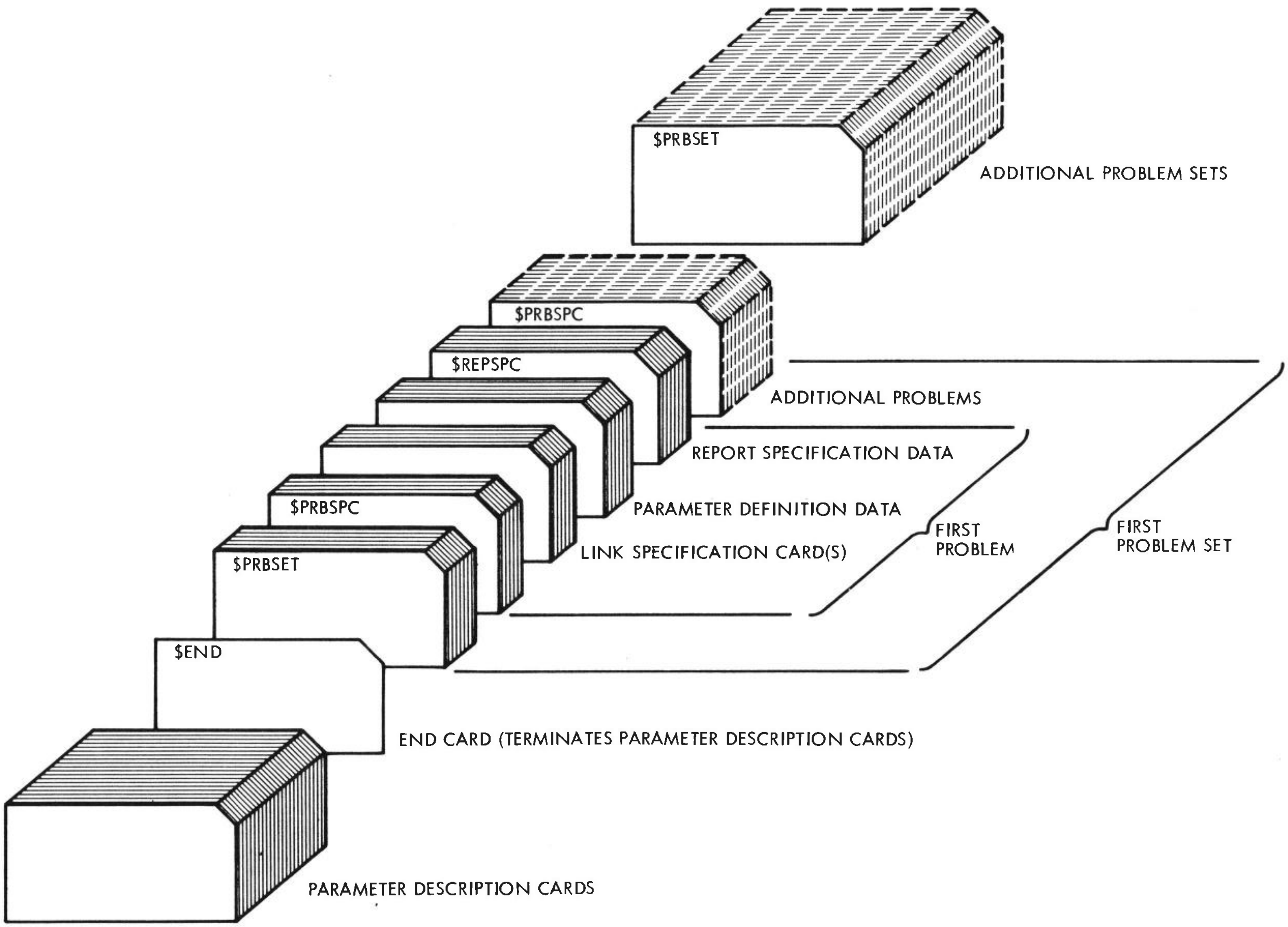


Figure 2-1. CØMSIM Data Deck

3. OUTPUT

Data output for this program is in the form of standard and optional printed output and data tape output. Refer to §4.2 for sample printed output.

3.1 DETAILED DESCRIPTION OF PRINTED OUTPUT

The CØMSIM printed output is cyclic, each cycle being identical in format, one for each problem set. Each cycle begins with a listing of the problem set data for that particular problem set. This listing is followed by a sequence of identically formatted printed outputs, one for each problem within this particular problem set. Each sub-cycle of identically formatted printed output begins with a listing of the problem description and link specification data for that particular problem. Immediately following the link specification data each of the input and interm parameters, as input by the user (or saved from the preceding problem set), is listed with its description, computer mnemonic and parameter numbers; we refer to this listing as the <u>input parameter listing</u>. The input parameter listing terminates, for this problem, that portion of the printed output which simply lists user input.

Following the input parameter listing, for any given problem, |NLISTS| number of CØMSIM reports will follow. Each report is preceded by the report specification data which defines that particular report. There are five report types available. Report types one through four list certain specified CØMSIM parameters as indicated below. Report type five lists up to eight CØMSIM parameters as indicated by the user. All reports list values of CØMSIM parameters versus values of the independent variable (either range or received signal level).

Following the CØMSIM reports or the input parameter listing (if no reports are printed) is the <u>output parameter listing</u>, i.e. a listing of each interm and output parameter with its description, computer mnemonic, parameter numbers and the value it has at the last value of the independent variable.

If the optional print indicator flag is on, i.e. IPRINT=1, the output namelist BJSCØN will be printed following the output parameter listing. This namelist prints the values of all Bessel functions computed for this particular problem. A complete description of this namelist is given below.

3.1.1 Detailed Description of Report Type One

Column	Parameter	Unit
1	Received Power	DBM
2	PRN Margin	DB
3	Voice SNR	DB
4	Telemetry SNR	DB
5	Bit Error Rate	
6	Voice — Postdetection SNR	DB
7	Telemetry — Postdetection SNR	DB

3.1.2 Detailed Description of Report Type Two

Column	Parameter	Unit
1	Received Power	DBM
2	PRN Margin	DB
3	Backup Voice SNR	DB
4	Telemetry SNR	DB
5	Bit Error Rate	
6	Hardline SNR/EVA SNR Channel 4	DB/DB
7	EVA SNR Channel 1/EVA SNR Channel 5	DB/DB
8	EVA SNR Channel 2/EVA SNR Channel 6	DB/DB
9	EVA SNR Channel 3/EVA SNR Channel 7	DB/DB

3.1.3 Detailed Description of Report Type Three

Column	Parameter	Unit
1	Received Power	DBM
2	FM Voice SNR Predetection/FM Voice SNR Postdetection	DB/DB
3	FM Telemetry SNR	DB
4	FM Television SNR	DB
5	Bit Error Rate	
6	FM EVA Biomed SNR Predetection Channel 1/Channel 3	DB/DB
7	FM EVA Biomed SNR Predetection Channel 2/Channel 4	DB/DB
8	FM EVA Biomed SNR Postdetection Channel 1/Channel 3	DB/DB

Column	Parameter	Unit
9	FM EVA Biomed SNR Postdetection Channel 2/Channel 4	DB/DB

3.1.4 Detailed Description of Report Type Four

Column	Parameter	Unit
1	Received Power	DBM
2	Keying SNR	DB
3	Keying Margin	DB

3.1.5 Detailed Description of the Namelist BJSCØN

Entry	Bessel Function
BJ(1,1,1)	$J_0(\beta_{1d})$
BJ(2,1,1)	$J_1(\beta_{1d})$
BJ(3,1,1)	$J_2(\beta_{1d})$
BJ(1,2,1)	$J_0(\beta_{1u})$
BJ(2,2,1)	$J_1(\beta_{1u})$
BJ(3,2,1)	$J_2(\beta_{1u})$
BJ(1,1,2)	$J_0(\beta_{2d})$
BJ(2,1,2)	$J_1(\beta_{2d})$
BJ(3,1,2)	$J_2(\beta_{2d})$
BJ(1,2,2)	$J_0(\beta_{2u})$
BJ(2,2,2)	$J_1(\beta_{2u})$
BJ(3,2,2)	$J_2(\beta_{2u})$
BJ(1,1,3)	$J_0(\beta_{sck})$
BJ(2,1,3)	$J_1(\beta_{sck})$
BJ(3,1,3)	$J_2(\beta_{sck})$
BJ(1,2,3)	$J_0(\beta_{sck})$
BJ(2,2,3)	$J_1(\beta_{sck})$
BJ(3,2,3)	$J_2(\beta_{sck})$

Entry	Bessel Function
BJBET(1)	$J_0(\beta)$
BJBET(2)	$J_1(\beta)$
BJBET(3)	$J_2(\beta)$
BJGAM(1)	$J_0(\gamma)$
BJGAM(2)	$J_1(\gamma)$
BJGAM(3)	$J_2(\gamma)$
BJXI(1)	$J_0(\xi)$
BJXI(2)	$J_1(\xi)$
BJXI(3)	$J_2(\xi)$
BJPE(1,1)	$J_0(\beta_{EMU})$
BJPE(2,1)	$J_1(\beta_{EMU})$
BJPE(1,2)	$J_0(\beta_{EMU})$
BJPE(2,2)	$J_1(\beta_{EMU})$
BJPH(1,1)	$J_0(\beta_{HLB})$
BJPH(2,1)	$J_1(\beta_{HLB})$
BJPH(1,2)	$J_0(\beta_{HLB})$
BJPH(2,2)	$J_1(\beta_{HLB})$
BJPK(1,1)	$J_0(\beta_{sck})$
BJPK(2,1)	$J_1(\beta_{sck})$
BJPK(1,2)	$J_0(\beta_{sck})$
BJPK(2,2)	$J_1(\beta_{sck})$

Entry	Bessel Function
BJEVA(1,1,1)	$J_0(\beta_{EVA_1})$
BJEVA(2,1,1)	$J_1(\beta_{EVA_1})$
BJEVA(1,2,1)	$J_0(\beta_{EVA_1})$
BJEVA(2,2,1)	$J_1(\beta_{EVA_1})$
BJEVA(1,1,2)	$J_0(\beta_{EVA_2})$
BJEVA(2,1,2)	$J_1(\beta_{EVA_2})$
BJEVA(1,2,2)	$J_0(\beta_{EVA_2})$
BJEVA(2,2,2)	$J_1(\beta_{EVA_2})$
BJEVA(1,1,3)	$J_0(\beta_{EVA_3})$
BJEVA(2,1,3)	$J_1(\beta_{EVA_3})$
BJEVA(1,2,3)	$J_0(\beta_{EVA_3})$
BJEVA(2,2,3)	$J_1(\beta_{EVA_3})$
BJEVA(1,1,4)	$J_0(\beta_{EVA_4})$
BJEVA(2,1,4)	$J_1(\beta_{EVA_4})$
BJEVA(1,2,4)	$J_0(\beta_{EVA_4})$
BJEVA(2,2,4)	$J_1(\beta_{EVA_4})$
BJEVA(1,1,5)	$J_0(\beta_{EVA_5})$
BJEVA(2,1,5)	$J_1(\beta_{EVA_5})$
BJEVA(1,2,5)	$J_0(\beta_{EVA_5})$
BJEVA(2,2,5)	$J_1(\beta_{EVA_5})$

Entry	Bessel Function
BJEVA(1,1,6)	$J_0(\beta_{EVA_6})$
BJEVA(2,1,6)	$J_1(\beta_{EVA_6})$
BJEVA(1,2,6)	$J_0(\beta_{EVA_6})$
BJEVA(2,2,6)	$J_1(\beta_{EVA_6})$
BJEVA(1,1,7)	$J_0(\beta_{EVA_7})$
BJEVA(2,1,7)	$J_1(\beta_{EVA_7})$
BJEVA(1,2,7)	$J_0(\beta_{EVA_7})$
BJEVA(2,2,7)	$J_1(\beta_{EVA_7})$
BJEVA(1,1,8)	$J_0(\beta_{EVA_8})$
BJEVA(2,1,8)	$J_1(\beta_{EVA_8})$
BJEVA(1,2,8)	$J_0(\beta_{EVA_8})$
BJEVA(2,2,8)	$J_1(\beta_{EVA_8})$

3.2 DETAILED DESCRIPTION OF DATA TAPE OUTPUT

Precisely one file is written on a data tape for each CØMSIM problem. No distinction is made between problem sets on the data tape; problems appear successively on the data tape, regardless of the problem set in which they were computed. If more than one data tape is generated during a particular computer run, files appear consecutively on the data tape to which they are directed, i.e. the data tapes are not rewound between problem sets; furthermore, only the most recently used data tape will be rewound at the completion of the computer run.

Each file on a data tape, corresponding to one CØMSIM problem, consists of a variable number of records, the number of records being equal to the number of values the independent variable assumed during the simulation.

Each record on a data tape consists of 801 words. The first 800 words corresponding to the 800 CØMSIM parameter numbers and word 801 being an integer representing the number of records in the file which contains this particular record.

4. SAMPLE CASE

We include here a sample computer run so as to demonstrate program capabilities and options. Since this program is designed to use the TRWPLT General Plotting Program we have included plot input cards and output with this sample case.

4.1 AN EXAMPLE

Suppose we wish to simulate the following Apollo S-band communication modes: CSM/PM/6/S, CSM/PM/8, LM/FM/9B/S. Because of the similarity between the first two modes we decide to include them as two links within one problem set. Since the third mode is completely different we include it in a second problem set. From Section 1.3.1 we determine the proper block sequence for each mode. In the third case we decide to perform simulations with range as the independent variable and then again with received signal level as the independent variable. For certain of these blocks we have the option of performing an additional calculation for finite transmitted SNR. After determining the proper block sequence we refer to Section 1.3.2 to determine the input parameters required for each CØMSIM problem. Finally, we prepare the coding forms as illustrated below and submit the computer run.

4.2 SAMPLE CODING FORMS

DATE 1 AUGUST 68
NAME J P WILSØN
EXT 2504
NO. OF CARDS 211

PRIORITY
PROBLEM NO. H38101
SPECIAL CHARACTERS:

TRW SYSTEMS
HOUSTON COMPUTING CENTER
80 COLUMN FREE KEY PUNCH FORM

CARD STOCK
☑ PLAIN YELLØW
☐ FORTRAN SOURCE
☐ 7094 SYMBOLIC

PAGE 1 OF 11
KEYPUNCHED BY
VERIFIED BY

```
V XQT HV008C
                  BEGIN FIRST PRØBLEM SET
 $PRBSET
 $END
 $PRBSPC  LINKS = 2, NLINES = 12, NLISTS = 2
 $END
CSM/PM/8             1  1  4  6  7  8  5 26 17 20
CSM/PM/6/S           2  1  2  6  7  8 11- 5-21 22 12
        2            3.360E+03
        4            1.260E+14
       16          700.
       44            4.800E+06
       80            1.810E+03
       84            6.700E+03
       90            1.630E+04
       94            3.800E+03
      124          500.
      128              .6
      132              .8
      138         2101.8
```

STL FORM 708 REV. 8-65

DATE ______ PRIORITY ______

NAME ______ PROBLEM NO ______

EXT ______ SPECIAL CHARACTERS:

NO OF CARDS ______

TRW SYSTEMS
HOUSTON COMPUTING CENTER

80 COLUMN FREE KEY PUNCH FORM

CARD STOCK
☐ PLAIN ______
☐ FORTRAN SOURCE
☐ 7094 SYMBOLIC

PAGE 2 OF 11

KEYPUNCHED BY ______

VERIFIED BY ______

```
      146            5.000E+03
      150            5.000E+03
      160           50.
      162            1.380E-23
      198             .5
      200             .8
      202            1.
      206           10.
      218             .707
      222             .707
      230           10.
      232           10.
      240           10.
      242           10.
      252           10.
      254           10.
      430          500.
        1            3.360E+03
        3            1.260E+14
       13            6.000E+03
```

STL FORM 708 REV. 8-68

DATE ______ PRIORITY ______ NAME ______ PROBLEM NO ______ EXT ______ NO OF CARDS ______

SPECIAL CHARACTERS

TRW SYSTEMS
HOUSTON COMPUTING CENTER

80 COLUMN FREE KEY PUNCH FORM

CARD STOCK
☐ PLAIN ______
☐ FORTRAN SOURCE
☐ 7094 SYMBOLIC

PAGE 3 OF 11

KEYPUNCHED BY ______

VERIFIED BY ______

```
       15       700.
       43           4.800E+06
       79           1.810E+03
      123       500.
      137      2282.5
      161           1.380E-23
      183           2.
      185             .73
      189             .2
      191             .2
      199             .8
      203        10.
      205        10.
      221             .707
      235        10.
      253        10.
      429       500.
$END
$REPSPC
 LISTID = 1
```

STL FORM 708 REV. 8-68

DATE ____ PRIORITY ____

NAME ____ PROBLEM NO ____

EXT ____ SPECIAL CHARACTERS

NO OF CARDS ____

TRW SYSTEMS
HOUSTON COMPUTING CENTER

80 COLUMN FREE KEY PUNCH FORM

CARD STOCK
☐ PLAIN ____
☐ FORTRAN SOURCE
☐ 7094 SYMBOLIC

PAGE 4 OF 11

KEYPUNCHED BY ____

VERIFIED BY ____

```
START = 2000
STØP = 5000
$END
$REPSPC
NVAR = 440, 639, 640, 720, 514, 501, 595, 639
$END
                              BEGIN SECØND PRØBLEM SET
$PRBSET
NPRØBS = 2
$END
$PRBSPC
NLINES = 10
NPAGES = 2
$END
LM/FM/9B/S
        1          3.360E+03
        5         30.
        7         60.
       17         30.
       19         60.
```

STL FORM 708 REV. 5-65

DATE ______ PRIORITY ______

NAME ______ PROBLEM NO ______

EXT ______ SPECIAL CHARACTERS

NO OF CARDS ______

TRW SYSTEMS
HOUSTON COMPUTING CENTER

80 COLUMN FREE KEY PUNCH FORM

CARD STOCK
☐ PLAIN ______
☐ FORTRAN SOURCE
☐ 7094 SYMBOLIC

PAGE 5 OF 11

KEYPUNCHED BY ______

VERIFIED BY ______

43	4.800E+06
47	1.680E+04
49	5.860E+02
51	5.860E+02
63	5.860E+02
65	1.102E+03
81	1.550E+05
91	4.176E+04
95	3.470E+03
97	4.320E+06
99	4.320E+06
103	3.900E+03
105	7.350E+03
111	1.024E+06
113	1.250E+06
115	30.
117	60.
123	500.
127	.6
131	.8

STL FORM 708 REV. 8-65

DATE ______ PRIORITY ______ NAME ______ PROBLEM NO ______ EXT ______ NO OF CARDS ______

SPECIAL CHARACTERS:

TRW SYSTEMS
HOUSTON COMPUTING CENTER

80 COLUMN FREE KEY PUNCH FORM

CARD STOCK
☐ PLAIN ______
☐ FORTRAN SOURCE
☐ 7094 SYMBOLIC

PAGE 6 OF 11
KEYPUNCHED BY ______
VERIFIED BY ______

137	2282.5
141	4.510E+05
147	2.250E+05
151	3.000E+03
159	50.
161	1.380E-23
163	.8
167	1.
169	1.
183	2.
207	1.
209	1.
221	.707
237	10.
243	10.
245	10.
247	10.
249	1.
251	12.
253	10.

STL FORM 706 REV. 5-68

DATE ____ NAME ____ EXT ____ NO OF CARDS ____

PRIORITY ____ PROBLEM NO ____ SPECIAL CHARACTERS

TRW SYSTEMS
HOUSTON COMPUTING CENTER

80 COLUMN FREE KEY PUNCH FORM

CARD STOCK
☐ PLAIN ____
☐ FORTRAN SOURCE
☐ 7094 SYMBOLIC

PAGE 7 OF 11

KEYPUNCHED BY ____
VERIFIED BY ____

```
       255       -1.471E+02
       257        4.183E-02
       429      500.
$END
$REPSPC
LISTID = 3
$END
$PRBSPC
IPRINT = 1
NLINES = 15
$END
LM/FM/9B/S        1  6  7  8 24 15 16 20 30 31 25 32 34
         1        3.360E+03
         5       30.
         7       60.
        17       30.
        19       60.
        43        4.800E+06
        47        1.680E+04
        49        5.860E+02
```

STL FORM 700 REV. 8-65

DATE ______ PRIORITY ______

NAME ______ PROBLEM NO ______

EXT ______ SPECIAL CHARACTERS

NO OF CARDS ______

TRW SYSTEMS
HOUSTON COMPUTING CENTER

80 COLUMN FREE KEY PUNCH FORM

CARD STOCK
☐ PLAIN ______
☐ FORTRAN SOURCE
☐ 7094 SYMBOLIC

PAGE 8 OF 11

KEYPUNCHED BY ______

VERIFIED BY ______

51	5.860E+02
63	5.860E+02
65	1.102E+03
81	1.550E+05
91	4.176E+04
95	3.470E+03
97	4.320E+06
99	4.320E+06
103	3.900E+03
105	7.350E+03
111	1.024E+06
113	1.250E+06
115	30.
117	60.
125	5.
127	.6
131	.8
141	4.510E+05
147	2.250E+05
151	3.000E+03

STL FORM 708 REV. 8-65

TRW SYSTEMS
HOUSTON COMPUTING CENTER

80 COLUMN FREE KEY PUNCH FORM

DATE ______ PRIORITY ______ CARD STOCK PAGE 9 OF 11

NAME ______ PROBLEM NO ______ ☐ PLAIN ______ KEYPUNCHED BY ______

EXT ______ SPECIAL CHARACTERS: ☐ FORTRAN SOURCE

NO OF CARDS ______ ☐ 7094 SYMBOLIC VERIFIED BY ______

```
      161        1.380E-23
      163         .8
      167        1.
      169        1.
      183        2.
      207        1.
      209        1.
      221         .707
      237       10.
      243       10.
      245       10.
      247       10.
      249        1.
      255      -1.471E+02
      257        4.183E-02
      439     -140.
 $END
 $REPSPC
 LISTID = 3
 $END
```

STL FORM 708 REV. 5-68

DATE ____ PRIORITY ____

NAME ____ PROBLEM NO ____

EXT ____ SPECIAL CHARACTERS:

NO OF CARDS ____

TRW SYSTEMS
HOUSTON COMPUTING CENTER

80 COLUMN FREE KEY PUNCH FORM

CARD STOCK
☐ PLAIN ____
☐ FORTRAN SOURCE
☐ 7094 SYMBOLIC

PAGE 10 OF 11

KEYPUNCHED BY ____

VERIFIED BY ____

```
∇ XQT TRWPLT
  NØIREC = 1
  TITLE=ID=CSM/PM/6/S
  XLABEL=ID=SLANT RANGE (NM)
  YLABEL=ID=RECEIVED SIGNAL LEVEL
  PLØT=430,440,ENDLST
  ENDPLT
  XLABEL=ID=IF SNR (DB)
  YLABEL=ID=POSTDETECTIØN UPLINK VOICE SNR
  PLØT=640,720,ENDLST
  ENDPLT
  TITLE=ID=CSM/PM/8
  XLABEL=ID=RECEIVED SIGNAL LEVEL (DBM)
  YLABEL=ID=BIT ERRØR RATE
  PLØT=439,501,ENDLST
  ENDPLT
  ENDPHA
  TITLE=ID=LM/FM/9B/S
  YLABEL=ID=IF SNR
  PLØT=439,639,ENDLST
```

STL FORM 708 REV. 6-65

DATE ______ PRIORITY ______

NAME ______ PROBLEM NO ______

EXT ______ SPECIAL CHARACTERS:

NO OF CARDS ______

TRW SYSTEMS
HOUSTON COMPUTING CENTER

80 COLUMN FREE KEY PUNCH FORM

CARD STOCK
☐ PLAIN ______
☐ FORTRAN SOURCE
☐ 7094 SYMBOLIC

PAGE 11 OF 11

KEYPUNCHED BY ______

VERIFIED BY ______

```
ENDPLT
XLABEL=ID=IF SNR (DB)
YLABEL=ID=PREDETECTIØN VØICE SUBCARRIER SNR
PLØT=639,727,ENDLST
ENDPLT
YLABEL=ID=PØSTDETECTIØN BIØMED SNR SUB. 1
PLØT=639,585,ENDLST
ENDPLT
ENDPHA
REPEAT
ENDJØB
```

STL FORM 708 REV. 8-65

4.3 SAMPLE OUTPUT

13634647

3 XOT HV00BC

```
PROBLEM SET DATA-

    NUMBER OF PROBLEMS =  1
    DATA TAPE I.D. NUMBER =  8
    SAVE FACTOR =  .000
```

```
PROPLEM SPECIFICATION DATA-

     NUMBER OF LINKS = 2
     NUMBER OF REPORTS DESIRED =  2
     NUMBER OF PAGES PER REPORT =  1
     NUMBER OF LINES PER PAGE = 12
     NUMBER OF LINES PER REPORT = 12
     DATA LOCATED IN FILE NO.  1
     PRINT FLAG = 0

LINK SPECIFICATION DATA-

     CSM/PM/8            DOWNLINK.  BLOCK SEQUENCE =   1,   4,   6,   7,   8,   5,  26,  17,  20,   0,
                                                       0,   0,   0,   0,   0,   0,   0,   0,   0,   0.

     CSM/PM/6/S            UPLINK.  BLOCK SEQUENCE =   1,   2,   6,   7,   8,  11,  -5, -21,  22,  12,
                                                       0,   0,   0,   0,   0,   0,   0,   0,   0,   0.
```

INPUT PARAMETERS LISTING

PARAMETER DEFINITION	NO.	DOWNLINK VALUE	NO.	UPLINK VALUE	UNITS	COMPUTER MNEMONIC
NOISE SPECTRAL DENSITY CONSTANT A	1	3.3600+03	2	3.3600+03	DEG	A
NOISE SPECTRAL DENSITY CONSTANT B	3	1.2600+14	4	1.2600+14	--	B
FM BIOMED POSTDETECTION NOISE BANDWIDTH - CHANNEL 1	5	0.0000	6	0.0000	HZ	BB
FM BIOMED POSTDETECTION NOISE BANDWIDTH - CHANNEL 2	7	0.0000	8	0.0000	HZ	BB
FM BIOMED POSTDETECTION NOISE BANDWIDTH - CHANNEL 3	9	0.0000	10	0.0000	HZ	BB
FM BIOMED POSTDETECTION NOISE BANDWIDTH - CHANNEL 4	11	0.0000	12	0.0000	HZ	BB
BACK-UP VOICE POSTDETECTION NOISE BW	13	6.0000+03	14	0.0000	HZ	BBE
PM MODE CARRIER LOOP NOISE BW	15	7.0000+02	16	7.0000+02	HZ	BC
BIOMED EFFECTIVE BASEBAND CLICK BANDWIDTHS - CHANNEL 1	17	0.0000	18	0.0000	HZ	BD
BIOMED EFFECTIVE BASEBAND CLICK BANDWIDTHS - CHANNEL 2	19	0.0000	20	0.0000	HZ	BD
BIOMED EFFECTIVE BASEBAND CLICK BANDWIDTHS - CHANNEL 3	21	0.0000	22	0.0000	HZ	BD
BIOMED EFFECTIVE BASEBAND CLICK BANDWIDTHS - CHANNEL 4	23	0.0000	24	0.0000	HZ	BD
BIOMED PRED NOISE BW WITH VOICE ON CARRIER FOR SUB. NO. 1	25	0.0000	26	0.0000	HZ	BEE
BIOMED PRED NOISE BW WITH VOICE ON CARRIER FOR SUB. NO. 2	27	0.0000	28	0.0000	HZ	BEE
BIOMED PRED NOISE BW WITH VOICE ON CARRIER FOR SUB. NO. 3	29	0.0000	30	0.0000	HZ	BEE
BIOMED PRED NOISE BW WITH VOICE ON CARRIER FOR SUB. NO. 4	31	0.0000	32	0.0000	HZ	BEE
BIOMED PRED NOISE BW WITH VOICE ON CARRIER FOR SUB. NO. 5	33	0.0000	34	0.0000	HZ	BEE
BIOMED PRED NOISE BW WITH VOICE ON CARRIER FOR SUB. NO. 6	35	0.0000	36	0.0000	HZ	BEE
BIOMED PRED NOISE BW WITH VOICE ON CARRIER FOR SUB. NO. 7	37	0.0000	38	0.0000	HZ	BEE
BIOMED PRED NOISE BW WITH VOICE ON CARRIER FOR SUB. NO. 8	39	0.0000	40	0.0000	HZ	BEE
HLB PRED NOISE BW WITH VOICE ON CARRIER	41	0.0000	42	0.0000	HZ	BHE
IF NOISE BANDWIDTH	43	4.8000+06	44	4.8000+06	HZ	BIF
EMERGENCY KEY PREDETECTION NOISE BW	45	0.0000	46	0.0000	HZ	BKE
VOICE EFFECTIVE BASEBAND CLICK BANDWIDTH	47	0.0000	48	0.0000	HZ	BLF
BIOMED EFFECTIVE CLICK BANDWIDTH - SUB. NO. 1	49	0.0000	50	0.0000	HZ	BLM
BIOMED EFFECTIVE CLICK BANDWIDTH - SUB. NO. 2	51	0.0000	52	0.0000	HZ	BLM
BIOMED EFFECTIVE CLICK BANDWIDTH - SUB. NO. 3	53	0.0000	54	0.0000	HZ	BLM
BIOMED EFFECTIVE CLICK BANDWIDTH - SUB. NO. 4	55	0.0000	56	0.0000	HZ	BLM
PLAY BACK VOICE EFFECTIVE CLICK BANDWIDTH	57	0.0000	58	0.0000	HZ	BLPBV
SPLIT PHASE TLM EFFECTIVE CLICK BANDWIDTH	59	0.0000	60	0.0000	HZ	BLTP
TELEVISION EFFECTIVE CLICK BANDWITH	61	0.0000	62	0.0000	HZ	BLX
BIOMED SUBCARRIER PRED NOISE BW FOR SUB. NO. 1	63	0.0000	64	0.0000	HZ	BMSF
BIOMED SUBCARRIER PRED NOISE BW FOR SUB. NO. 2	65	0.0000	66	0.0000	HZ	BMSF

PARAMETER DEFINITION	NO.	DOWNLINK VALUE	NO.	UPLINK VALUE	UNITS	COMPUTER MNEMONIC
BIOMED SUBCARRIER PRED NOISE BW FOR SUB. NO. 3	67	0.0000	68	0.0000	HZ	BMSF
BIOMED SUBCARRIER PRED NOISE BW FOR SUB. NO. 4	69	0.0000	70	0.0000	HZ	BMSF
PLAYBACK VOICE PREDETECTION NOISE BW	71	0.0000	72	0.0000	HZ	BPBVE
PLAYBACK VOICE POSTDETECTION NOISE BW	73	0.0000	74	0.0000	HZ	BPBVO
PRN RANGING BANDWIDTH	75	0.0000	76	0.0000	HZ	BPK
TRANSPONDER VIDEO BANDWIDTH	77	0.0000	78	0.0000	HZ	BR
PM MODE PCM TELEMETRY PREDETECTION NOISE BW	79	1.8100+03	80	1.8100+03	HZ	BTE
FM MODE PCM TELEMETRY PREDETECTION NOISE BW	81	0.0000	82	0.0000	HZ	BTEF
UPDATA POSTDETECTION NOISE BW	83	0.0000	84	6.7000+03	HZ	BTO
SPLIT PHASE TLM PREDETECTION NOISE BW	85	0.0000	86	0.0000	HZ	BTPE
SPLIT PHASE TLM POSTDETECTION NOISE BW	87	0.0000	88	0.0000	HZ	BTPO
PM MODE VOICE PREDETECTION NOISE BW	89	0.0000	90	1.6300+04	HZ	BVE
FM MODE VOICE PREDETECTION NOISE BW	91	0.0000	92	0.0000	HZ	BVEF
PM MODE VOICE POSTDETECTION NOISE BW	93	0.0000	94	3.8000+03	HZ	BVO
FM MODE VOICE POSTDETECTION NOISE BW	95	0.0000	96	0.0000	HZ	BVOF
TLM SUBCARRIER EFFECTIVE CLICK BANDWIDTH	97	0.0000	98	0.0000	HZ	BWTSF
VOICE SUBCARRIER EFFECTIVE CLICK BANDWIDTH	99	0.0000	100	0.0000	HZ	BWVSF
TELEVISION POSTDETECTION NOISE BW	101	0.0000	102	0.0000	HZ	BXE
BIOMED SUBCARRIER CENTER FREQUENCY FOR SUB. NO. 1	103	0.0000	104	0.0000	HZ	CMSF
BIOMED SUBCARRIER CENTER FREQUENCY FOR SUB. NO. 2	105	0.0000	106	0.0000	HZ	CMSF
BIOMED SUBCARRIER CENTER FREQUENCY FOR SUB. NO. 3	107	0.0000	108	0.0000	HZ	CMSF
BIOMED SUBCARRIER CENTER FREQUENCY FOR SUB. NO. 4	109	0.0000	110	0.0000	HZ	CMSF
FM MODE PCM TLM SUBCARRIER CENTER FREQUENCY	111	0.0000	112	0.0000	HZ	CTSF
FM MODE VOICE SUBCARRIER CENTER FREQUENCY	113	0.0000	114	0.0000	HZ	CVSF
FM BIOMED SUBCARRIER FREQUENCY DEVIATION SUB. 1	115	0.0000	116	0.0000	HZ	DELFB
FM BIOMED SUBCARRIER FREQUENCY DEVIATION SUB. 2	117	0.0000	118	0.0000	HZ	DELFB
FM BIOMED SUBCARRIER FREQUENCY DEVIATION SUB. 3	119	0.0000	120	0.0000	HZ	DELFB
FM BIOMED SUBCARRIER FREQUENCY DEVIATION SUB. 4	121	0.0000	122	0.0000	HZ	DELFB
DELTA RANGE INCREMENT	123	5.0000+02	124	5.0000+02	NM	DELNM
DELTA RECEIVED SIGNAL LEVEL INCREMENT	125	0.0000	126	0.0000	DBM	DELSR
VOICE DEGRADATION DUE TO NON-RECT OUTPUT BW	127	0.0000	128	6.0000-01	--	DFK
PLAYBACK VOICE DEGRAD FACTOR DUE TO NON-RECT OUTPUT BW	129	0.0000	130	0.0000	--	DFKPBV
PCM TLM DEGRAD FACTOR DUE TO NON-RECT OUTPUT BW	131	0.0000	132	8.0000-01	--	DFKT

PARAMETER DEFINITION	NO.	DOWNLINK VALUE	NO.	UPLINK VALUE	UNITS	COMPUTER MNEMONIC
SPLIT PHASE TLM DEGRAD FACTOR DUE TO NON-RECT OUTPUT BW	133	0.0000	134	0.0000	--	DFKTP
TELEVISION DEGRAD FACTOR DUE TO NON-RECT OUTPUT BW	135	0.0000	136	0.0000	--	DFKX
TRANSMITTING FREQUENCY	137	2.2825+03	138	2.1018+03	MHZ	FMC
PLAYBACK VOICE FREQUENCY DEVIATION OF CARRIER	139	0.0000	140	0.0000	HZ	FPBV
FM MODE PCM TLM SUBCARRIER FREQUENCY DEVIATION OF CARRIER	141	0.0000	142	0.0000	HZ	FTF
SPLIT PHASE TELEMETRY FREQUENCY DEVIATION OF CARRIER	143	0.0000	144	0.0000	HZ	FTP
UPDATA SUBCARRIER FREQUENCY DEVIATION OF CARRIER	145	0.0000	146	5.0000+03	HZ	FTS
VOICE SUBCARRIER FREQUENCY DEVIATION OF CARRIER	147	0.0000	148	0.0000	HZ	FVF
UPVOICE SUBCARRIER FREQUENCY DEVIATION OF CARRIER	149	0.0000	150	5.0000+03	HZ	FVS
FREQUENCY DEVIATION OF VOICE SUBCARRIER	151	0.0000	152	0.0000	HZ	FVSF
TELEVISION FREQUENCY DEVIATION OF CARRIER	153	0.0000	154	0.0000	HZ	FXF
LOSSES DUE TO SPACECRAFT ATTITUDE	155	0.0000	156	0.0000	DB	GAMMA
RECEIVER ANTENNA GAIN	157	0.0000	158	0.0000	DB	GR
TRANSMITTER ANTENNA GAIN	159	0.0000	160	5.0000+01	DB	GT
BOLTZMANN'S CONSTANT	161	1.3800-23	162	1.3800-23	--	K
BIOMED DEGRADATION DUE TO NON-RECT OUTPUT BANDWIDTH	163	0.0000	164	0.0000	--	KB
CIRCUIT LOSSES	165	0.0000	166	0.0000	DB	LC
MODULATION LEVEL CHANNEL 1	167	0.0000	168	0.0000	--	MODLEV
MODULATION LEVEL CHANNEL 2	169	0.0000	170	0.0000	--	MODLEV
MODULATION LEVEL CHANNEL 3	171	0.0000	172	0.0000	--	MODLEV
MODULATION LEVEL CHANNEL 4	173	0.0000	174	0.0000	--	MODLEV
MODULATION LEVEL CHANNEL 5	175	0.0000	176	0.0000	--	MODLEV
MODULATION LEVEL CHANNEL 6	177	0.0000	178	0.0000	--	MODLEV
MODULATION LEVEL CHANNEL 7	179	0.0000	180	0.0000	--	MODLEV
MODULATION LEVEL CHANNEL 8	181	0.0000	182	0.0000	--	MODLEV
NUMBER OF EVA SUBCARRIERS WITH VOICE ON CARRIER	183	2.0000+00	184	0.0000	--	NEMU
BACK-UP VOICE PHASE DEVIATION	185	7.3000-01	186	0.0000	RAD	PBE
COMPOSIT PHASE DEVIATION	187	0.0000	188	0.0000	RAD	PDEV
EVA PHASE DEVIATION WITH VOICE ON CARRIER	189	2.0000-01	190	0.0000	RAD	PE
HLB PHASE DEVIATION WITH VOICE ON CARRIER	191	2.0000-01	192	0.0000	RAD	PH
STATIC PHASE ERROR IN CARRIER LOOP	193	0.0000	194	0.0000	RAD	PHIO
EMERGENCY KEY PHASE DEVIATION OF CARRIER	195	0.0000	196	0.0000	RAD	PK
PRN RANGING PHASE DEVIATION OF CARRIER	197	0.0000	198	5.0000-01	RAD	PP

PARAMETER DEFINITION	NO.	DOWNLINK VALUE	NO.	UPLINK VALUE	UNITS	COMPUTER MNEMONIC
PCM TLM SUBCARRIER PHASE DEVIATION OF CARRIER	199	8.0000-01	200	8.0000-01	RAD	PT
VOICE SUBCARRIER PHASE DEVIATION OF CARRIER	201	0.0000	202	1.0000+00	RAD	PV
REQUIRED BACK-UP VOICE SNR IN POSTDETECTION BW	203	1.0000+01	204	0.0000	DB	RBE
REQUIRED CARRIER-TO-NOISE RATIO IN CARRIER LOOP BW	205	1.0000+01	206	1.0000+01	DB	RC
RMS TO PEAK FACTOR FOR BIOMED MODULATION SIGNAL - CHANNEL 1	207	0.0000	208	0.0000		RHOB
RMS TO PEAK FACTOR FOR BIOMED MODULATION SIGNAL - CHANNEL 2	209	0.0000	210	0.0000		RHOB
RMS TO PEAK FACTOR FOR BIOMED MODULATION SIGNAL - CHANNEL 3	211	0.0000	212	0.0000		RHOB
RMS TO PEAK FACTOR FOR BIOMED MODULATION SIGNAL - CHANNEL 4	213	0.0000	214	0.0000		RHOB
RMS TO PEAK FACTOR FOR PLAYBACK VOICE	215	0.0000	216	0.0000	--	RHOPBV
RMS TO PEAK FACTOR FOR PCM TLM	217	0.0000	218	7.0700-01	--	RHOT
RMS TO PEAK FACTOR FOR SPLIT PHASE TLM	219	0.0000	220	0.0000	--	RHOTP
RMS TO PEAK FACTOR FOR VOICE	221	7.0700-01	222	7.0700-01	--	RHOV
RMS TO PEAK FACTOR FOR TELEVISION	223	0.0000	224	0.0000	--	RHOX
REQUIRED EMERGENCY KEY SNR IN PREDETECTION BW	225	0.0000	226	0.0000	DB	RKE
REQUIRED PRN SNR	227	0.0000	228	0.0000	DB	RPK
PM MODE REQUIRED PCM TELEMETRY SNR IN PREDETECTION BW	229	0.0000	230	1.0000+01	DB	RTE
PM MODE REQUIRED PCM TELEMETRY SNR IN POSTDETECTION BW	231	0.0000	232	1.0000+01	DB	RTO
REQUIRED SPLIT PHASE TLM SNR IN POSTDETECTION BW	233	0.0000	234	0.0000	DB	RTPR
REQUIRED PCM TLM SNR IN PRED BW WITH VOICE ON CARRIER	235	1.0000+01	236	0.0000	DB	RTSB
FM MODE REQUIRED PCM TLM SNR IN PREDETECTION BW	237	0.0000	238	0.0000	DB	RTSFR
PM MODE REQUIRED VOICE SNR IN PREDETECTION BW	239	0.0000	240	1.0000+01	DB	RVE
REQUIRED UP VOICE SNR IN POSTDETECTION BW	241	0.0000	242	1.0000+01	DB	RVO
FM MODE REQUIRED VOICE SNR IN POSTDETECTION BW	243	0.0000	244	0.0000	DB	RVOF
FM MODE REQUIRED VOICE SNR IN PREDETECTION BW	245	0.0000	246	0.0000	DB	RVSF
COMPOSITE SNR	247	0.0000	248	0.0000	DB	SNRCOM
TRANSMITTED SNR ROUTINE CONSTANT	249	0.0000	250	0.0000	PURE	SNRCST
MAXIMUM TRANSMISSION SNR OF THE LINK	251	0.0000	252	1.0000+01	DB	SNTROB
TRANSMITTING SIGNAL POWER	253	1.0000+01	254	1.0000+01	WATTS	ST
TAPER CIRCUIT CONSTANT A	255	0.0000	256	0.0000	--	TAPERA
TAPER CIRCUIT CONSTANT B	257	0.0000	258	0.0000	--	TAPERB
TRANSPONDER GAIN CONSTANT	259	0.0000	260	0.0000	--	TRC
THESE LOCATIONS ARE NOT CURRENTLY USED	261	0.0000	262	0.0000		
THESE LOCATIONS ARE NOT CURRENTLY USED	263	0.0000	264	0.0000		

PARAMETER DEFINITION	NO.	DOWNLINK VALUE	NO.	UPLINK VALUE	UNITS	COMPUTER MNEMONIC
THESE LOCATIONS ARE NOT CURRENTLY USED	265	0.0000	266	0.0000		
THESE LOCATIONS ARE NOT CURRENTLY USED	267	0.0000	268	0.0000		
THESE LOCATIONS ARE NOT CURRENTLY USED	269	0.0000	270	0.0000		
THESE LOCATIONS ARE NOT CURRENTLY USED	271	0.0000	272	0.0000		
THESE LOCATIONS ARE NOT CURRENTLY USED	273	0.0000	274	0.0000		
THESE LOCATIONS ARE NOT CURRENTLY USED	275	0.0000	276	0.0000		
THESE LOCATIONS ARE NOT CURRENTLY USED	277	0.0000	278	0.0000		
THESE LOCATIONS ARE NOT CURRENTLY USED	279	0.0000	280	0.0000		
THESE LOCATIONS ARE NOT CURRENTLY USED	281	0.0000	282	0.0000		
THESE LOCATIONS ARE NOT CURRENTLY USED	283	0.0000	284	0.0000		
THESE LOCATIONS ARE NOT CURRENTLY USED	285	0.0000	286	0.0000		
THESE LOCATIONS ARE NOT CURRENTLY USED	287	0.0000	288	0.0000		
THESE LOCATIONS ARE NOT CURRENTLY USED	289	0.0000	290	0.0000		
THESE LOCATIONS ARE NOT CURRENTLY USED	291	0.0000	292	0.0000		
THESE LOCATIONS ARE NOT CURRENTLY USED	293	0.0000	294	0.0000		
THESE LOCATIONS ARE NOT CURRENTLY USED	295	0.0000	296	0.0000		
THESE LOCATIONS ARE NOT CURRENTLY USED	297	0.0000	298	0.0000		
THESE LOCATIONS ARE NOT CURRENTLY USED	299	0.0000	300	0.0000		
TURNED AROUND PRN MODULATION INDEX	301	0.0000	302	0.0000	RAD	ALPHA
TURNED AROUND UPDATA MODULATION INDEX	303	0.0000	304	0.0000	RAD	BET
BIOMED PHASE DEVIATION WITH VOICE ON CARRIER FOR SUB NO 1	305	0.0000	306	0.0000	RAD	BETEVA
BIOMED PHASE DEVIATION WITH VOICE ON CARRIER FOR SUB NO 2	307	0.0000	308	0.0000	RAD	BETEVA
BIOMED PHASE DEVIATION WITH VOICE ON CARRIER FOR SUB NO 3	309	0.0000	310	0.0000	RAD	BETEVA
BIOMED PHASE DEVIATION WITH VOICE ON CARRIER FOR SUB NO 4	311	0.0000	312	0.0000	RAD	BETEVA
BIOMED PHASE DEVIATION WITH VOICE ON CARRIER FOR SUB NO 5	313	0.0000	314	0.0000	RAD	BETEVA
BIOMED PHASE DEVIATION WITH VOICE ON CARRIER FOR SUB NO 6	315	0.0000	316	0.0000	RAD	BETEVA
BIOMED PHASE DEVIATION WITH VOICE ON CARRIER FOR SUB NO 7	317	0.0000	318	0.0000	RAD	BETEVA
BIOMED PHASE DEVIATION WITH VOICE ON CARRIER FOR SUB NO 8	319	0.0000	320	0.0000	RAD	BETEVA
COMPOSITE MODULATION LEVEL	321	0.0000	322	0.0000	--	COMOLE
BIOMED SUB. BELOW FM THRESH DEGRAD (WITH MOD) SUB NO 1	323	0.0000	324	0.0000	RATIO	DMMSF
BIOMED SUB. BELOW FM THRESH DEGRAD (WITH MOD) SUB NO 2	325	0.0000	326	0.0000	RATIO	DMMSF
BIOMED SUB. BELOW FM THRESH DEGRAD (WITH MOD) SUB NO 3	327	0.0000	328	0.0000	RATIO	DMMSF
BIOMED SUB. BELOW FM THRESH DEGRAD (WITH MOD) SUB NO 4	329	0.0000	330	0.0000	RATIO	DMMSF

PARAMETER DEFINITION	NO.	DOWNLINK VALUE	NO.	UPLINK VALUE	UNITS	COMPUTER MNEMONIC
BIOMED SUBCARRIER BELOW FM THRESH DEGRAD FOR SUB. 1	331	0.0000	332	0.0000	RATIO	DNMSF
BIOMED SUBCARRIER BELOW FM THRESH DEGRAD FOR SUB. 2	333	0.0000	334	0.0000	RATIO	DNMSF
BIOMED SUBCARRIER BELOW FM THRESH DEGRAD FOR SUB. 3	335	0.0000	336	0.0000	RATIO	DNMSF
BIOMED SUBCARRIER BELOW FM THRESH DEGRAD FOR SUB. 4	337	0.0000	338	0.0000	RATIO	DNMSF
BIOMED SUBCARRIER BELOW FM THRESH DEGRAD FOR SUB. 1	339	0.0000	340	0.0000	DB	DNMSFB
BIOMED SUBCARRIER BELOW FM THRESH DEGRAD FOR SUB. 2	341	0.0000	342	0.0000	DB	DNMSFB
BIOMED SUBCARRIER BELOW FM THRESH DEGRAD FOR SUB. 3	343	0.0000	344	0.0000	DB	DNMSFB
BIOMED SUBCARRIER BELOW FM THRESH DEGRAD FOR SUB. 4	345	0.0000	346	0.0000	DB	DNMSFB
PLAYBACK VOICE BELOW FM THRESHOLD DEGRAD IN POST BW	347	0.0000	348	0.0000	RATIO	DPBV
PLAYBACK VOICE BELOW FM THRESHOLD DEGRAD IN POST BW	349	0.0000	350	0.0000	DB	DPBVDB
UPDATA BELOW FM THRESHOLD DEGRAD IN POST BW	351	0.0000	352	0.0000	RATIO	DTB
UPDATA BELOW FM THRESHOLD DEGRAD IN POST BW	353	0.0000	354	0.0000	DB	DTBDB
SPLIT PHASE TLM BELOW FM THRESHOLD DEGRAD IN POST BW	355	0.0000	356	0.0000	RATIO	DTP
SPLIT PHASE TLM BELOW FM THRESHOLD DEGRAD IN POST BW	357	0.0000	358	0.0000	DB	DTPDB
SPLIT PHASE TLM BELOW FM THRESH DEGRAD IN POST BW(BER CAL)	359	0.0000	360	0.0000	RATIO	DTPR
SPLIT PHASE TLM BELOW FM THRESH DEGRAD IN POST BW(BER CAL)	361	0.0000	362	0.0000	DB	DTPRDB
FM MODE PCM TLM BELOW THRESH DEGRAD IN PRED BW	363	0.0000	364	0.0000	RATIO	DTSF
FM MODE PCM TLM BELOW THRESH DEGRAD IN PRED BW	365	0.0000	366	0.0000	DB	DTSFDB
FM MODE PCM TLM BELOW THRESH DEGRAD IN PRED BW (BER CAL)	367	0.0000	368	0.0000	RATIO	DTSFR
FM MODE PCM TLM BELOW THRESH DEGRAD IN PRED BW (BER CAL)	369	0.0000	370	0.0000	DB	DTSFRB
UPVOICE BELOW FM THRESHOLD DEGRAD IN POST BW	371	0.0000	372	0.0000	RATIO	DVB
UPVOICE BELOW FM THRESHOLD DEGRAD IN POST BW	373	0.0000	374	0.0000	DB	DVBDB
FM MODE VOICE BELOW THRESHOLD DEGRAD IN POST BW	375	0.0000	376	0.0000	RATIO	DVF
FM MODE VOICE BELOW THRESHOLD DEGRAD IN POST BW	377	0.0000	378	0.0000	DB	DVFDB
FM MODE VOICE BELOW THRESHOLD DEGRAD IN PRED BW	379	0.0000	380	0.0000	RATIO	DVSF
FM MODE VOICE BELOW THRESHOLD DEGRAD IN PRED BW	381	0.0000	382	0.0000	DB	DVSFDB
TELEVISION BELOW FM THRESHOLD DEGRAD IN POST BW	383	0.0000	384	0.0000	RATIO	DXE
TELEVISION BELOW FM THRESHOLD DEGRAD IN POST BW	385	0.0000	386	0.0000	DB	DXEDB
LIMITER LOSSES	387	0.0000	388	0.0000	WATTS	ELLELL
TRANSPONDER CONSTANT	389	0.0000	390	0.0000		ENIF
BIOMED SUB. FREQ. DEVIATION OF VOICE SUB. FOR SUB. 1	391	0.0000	392	0.0000	HZ	FREDEV
BIOMED SUB. FREQ. DEVIATION OF VOICE SUB. FOR SUB. 3	393	0.0000	394	0.0000	HZ	FREDEV
BIOMED SUB. FREQ. DEVIATION OF VOICE SUB. FOR SUB. 5	395	0.0000	396	0.0000	HZ	FREDEV

PARAMETER DEFINITION	NO.	DOWNLINK VALUE	NO.	UPLINK VALUE	UNITS	COMPUTER MNEMONIC
BIOMED SUB. FREQ. DEVIATION OF VOICE SUB. FOR SUB. 7	397	0.0000	398	0.0000	HZ	FREDEV
TURNED AROUND UPVOICE MODULATION INDEX	399	0.0000	400	0.0000	RAD	GAMM
TOTAL LOSSES IN COMMUNICATION LINK	401	0.0000	402	0.0000	DB	LDB
SPACE LOSS	403	0.0000	404	0.0000	DB	LSDB
TLM MARGIN FOR BER CALCULATION	405	0.0000	406	0.0000	DB	MGTBER
CARRIER POWER	407	0.0000	408	0.0000	WATTS	PC
CARRIER POWER	409	0.0000	410	0.0000	DB	PCDB
NOISE SPECTRAL DENSITY	411	0.0000	412	0.0000	W/HZ	PHIF
MODULATION LEVEL RELATIVE TO CHANNEL ONE - CHANNEL 1	413	0.0000	414	0.0000	--	RATIO
MODULATION LEVEL RELATIVE TO CHANNEL ONE - CHANNEL 2	415	0.0000	416	0.0000	--	RATIO
MODULATION LEVEL RELATIVE TO CHANNEL ONE - CHANNEL 3	417	0.0000	418	0.0000	--	RATIO
MODULATION LEVEL RELATIVE TO CHANNEL ONE - CHANNEL 4	419	0.0000	420	0.0000	--	RATIO
MODULATION LEVEL RELATIVE TO CHANNEL ONE - CHANNEL 5	421	0.0000	422	0.0000	--	RATIO
MODULATION LEVEL RELATIVE TO CHANNEL ONE - CHANNEL 6	423	0.0000	424	0.0000	--	RATIO
MODULATION LEVEL RELATIVE TO CHANNEL ONE - CHANNEL 7	425	0.0000	426	0.0000	--	RATIO
MODULATION LEVEL RELATIVE TO CHANNEL ONE - CHANNEL 8	427	0.0000	428	0.0000	--	RATIO
SLANT RANGE BETWEEN SPACECRAFT AND GROUND STATION	429	5.0000+02	430	5.0000+02	NM	RNM
UPVOICE SNR FOR ABOVE FM THRESH IN POST BW	431	0.0000	432	0.0000	RATIO	SNVOP
UPVOICE SNR FOR ABOVE FM THRESH IN POST BW	433	0.0000	434	0.0000	DB	SNVOPB
RECEIVED SIGNAL LEVEL	435	0.0000	436	0.0000	WATTS	SR
RECEIVED SIGNAL LEVEL	437	0.0000	438	0.0000	DB	SRDB
RECEIVED SIGNAL LEVEL	439	0.0000	440	0.0000	DBM	SRDBM
TRANSMITTED POWER	441	0.0000	442	0.0000	DBW	STDB
EFFECTIVE SYSTEM NOISE TEMPERATURE	443	0.0000	444	0.0000	DEG	T
TURNED AROUND THERMAL NOISE MODULATION INDEX	445	0.0000	446	0.0000	RAD	XI
THESE LOCATIONS ARE NOT CURRENTLY USED	447	0.0000	448	0.0000		
THESE LOCATIONS ARE NOT CURRENTLY USED	449	0.0000	450	0.0000		
THESE LOCATIONS ARE NOT CURRENTLY USED	451	0.0000	452	0.0000		
THESE LOCATIONS ARE NOT CURRENTLY USED	453	0.0000	454	0.0000		
THESE LOCATIONS ARE NOT CURRENTLY USED	455	0.0000	456	0.0000		
THESE LOCATIONS ARE NOT CURRENTLY USED	457	0.0000	458	0.0000		
THESE LOCATIONS ARE NOT CURRENTLY USED	459	0.0000	460	0.0000		
THESE LOCATIONS ARE NOT CURRENTLY USED	461	0.0000	462	0.0000		

PARAMETER DEFINITION	NO.	DOWNLINK VALUE	NO.	UPLINK VALUE	UNITS	COMPUTER MNEMONIC
THESE LOCATIONS ARE NOT CURRENTLY USED	463	0.0000	464	0.0000		
THESE LOCATIONS ARE NOT CURRENTLY USED	465	0.0000	466	0.0000		
THESE LOCATIONS ARE NOT CURRENTLY USED	467	0.0000	468	0.0000		
THESE LOCATIONS ARE NOT CURRENTLY USED	469	0.0000	470	0.0000		
THESE LOCATIONS ARE NOT CURRENTLY USED	471	0.0000	472	0.0000		
THESE LOCATIONS ARE NOT CURRENTLY USED	473	0.0000	474	0.0000		
THESE LOCATIONS ARE NOT CURRENTLY USED	475	0.0000	476	0.0000		
THESE LOCATIONS ARE NOT CURRENTLY USED	477	0.0000	478	0.0000		
THESE LOCATIONS ARE NOT CURRENTLY USED	479	0.0000	480	0.0000		
THESE LOCATIONS ARE NOT CURRENTLY USED	481	0.0000	482	0.0000		
THESE LOCATIONS ARE NOT CURRENTLY USED	483	0.0000	484	0.0000		
THESE LOCATIONS ARE NOT CURRENTLY USED	485	0.0000	486	0.0000		
THESE LOCATIONS ARE NOT CURRENTLY USED	487	0.0000	488	0.0000		
THESE LOCATIONS ARE NOT CURRENTLY USED	489	0.0000	490	0.0000		
THESE LOCATIONS ARE NOT CURRENTLY USED	491	0.0000	492	0.0000		
THESE LOCATIONS ARE NOT CURRENTLY USED	493	0.0000	494	0.0000		
THESE LOCATIONS ARE NOT CURRENTLY USED	495	0.0000	496	0.0000		
THESE LOCATIONS ARE NOT CURRENTLY USED	497	0.0000	498	0.0000		
THESE LOCATIONS ARE NOT CURRENTLY USED	499	0.0000	500	0.0000		

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REPORT SPECIFICATION DATA-

     REPORT TYPE NO. 1
     START LIMIT = 2.000+03
     STOP LIMIT = 5.000+03
     VARIABLES TO BE REPORTED (REPORT TYPE NO. 5 ONLY)-    0,   0,   0,   0,   0,   0,   0,   0
```

PREDICTION ANALYSIS
UPLINK COMBINATIONS

RECEIVED POWER (DBM)	PRN MARGIN (DB)	VOICE SNR (DB)	TELEMETRY SNR (DB)	BIT ERROR RATE	VOICE POST SNR (DB)	TELEMETRY POST SNR (DB)
-80.27	.00	9.39	.00	0.000	26.45	23.58
-82.21	.00	9.38	.00	0.000	26.39	23.36
-83.79	.00	9.37	.00	0.000	26.32	23.10
-85.13	.00	9.36	.00	0.000	26.23	22.82
-86.29	.00	9.35	.00	0.000	26.14	22.52
-87.32	.00	9.33	.00	0.000	26.03	22.20
-88.23	.00	9.31	.00	0.000	25.92	21.87

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REPORT SPECIFICATION DATA-

     REPORT TYPE NO. 5
     START LIMIT = 0.000
     STOP LIMIT = 0.000
     VARIABLES TO BE REPORTED (REPORT TYPE NO. 5 ONLY)-  440, 639, 640, 720, 514, 501, 595, 639
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PREDICTION ANALYSIS
UPLINK COMBINATIONS

ID	DESCRIPTION	LINK
440	RECEIVED SIGNAL LEVEL	UP
639	IF SNR	DOWN
640	IF SNR	UP
720	UPVOICE SNR IN POSTDETECTION BW	UP
514	UPDATA MARGIN IN POSTDETECTION BW	UP
501	PROBABILITY OF BIT ERROR RATE	DOWN
595	BACK-UP VOICE SNR IN POSTDETECTION BW	DOWN
639	IF SNR	DOWN

INDEPENDENT VARIABLE = RANGE

INDEPENDENT VARIABLE	440	639	640	720	514	501	595	639
1.000+03	-7.425+01	-2.844+01	2.064+01	2.653+01	1.389+01	9.950-03	-2.447+00	-2.844+01
1.500+03	-7.777+01	-3.196+01	1.795+01	2.650+01	1.376+01	9.950-03	-5.969+00	-3.196+01
2.000+03	-8.027+01	-3.446+01	1.579+01	2.645+01	1.358+01	9.950-03	-8.468+00	-3.446+01
2.500+03	-8.221+01	-3.640+01	1.401+01	2.639+01	1.336+01	9.950-03	-1.041+01	-3.640+01
3.000+03	-8.379+01	-3.799+01	1.252+01	2.632+01	1.310+01	9.950-03	-1.199+01	-3.799+01
3.500+03	-8.513+01	-3.932+01	1.123+01	2.623+01	1.282+01	9.950-03	-1.333+01	-3.932+01
4.000+03	-8.629+01	-4.048+01	1.011+01	2.614+01	1.252+01	9.950-03	-1.449+01	-4.048+01
4.500+03	-8.732+01	-4.151+01	9.113+00	2.603+01	1.220+01	9.950-03	-1.551+01	-4.151+01
5.000+03	-8.823+01	-4.242+01	8.216+00	2.592+01	1.187+01	9.950-03	-1.643+01	-4.242+01
5.500+03	-8.906+01	-4.325+01	7.401+00	2.579+01	1.153+01	9.950-03	-1.725+01	-4.325+01
6.000+03	-8.981+01	-4.401+01	6.656+00	2.566+01	1.118+01	9.950-03	-1.801+01	-4.401+01
6.500+03	-9.051+01	-4.470+01	5.969+00	2.552+01	1.084+01	9.950-03	-1.871+01	-4.470+01

OUTPUT PARAMETERS LISTING

PARAMETER DEFINITION	NO.	DOWNLINK VALUE	NO.	UPLINK VALUE	UNITS	COMPUTER MNEMONIC
TURNED AROUND PRN MODULATION INDEX	301	0.0000	302	0.0000	RAD	ALPHA
TURNED AROUND UPDATA MODULATION INDEX	303	0.0000	304	0.0000	RAD	BET
BIOMED PHASE DEVIATION WITH VOICE ON CARRIER FOR SUB NO 1	305	0.0000	306	0.0000	RAD	BETEVA
BIOMED PHASE DEVIATION WITH VOICE ON CARRIER FOR SUB NO 2	307	0.0000	308	0.0000	RAD	BETEVA
BIOMED PHASE DEVIATION WITH VOICE ON CARRIER FOR SUB NO 3	309	0.0000	310	0.0000	RAD	BETEVA
BIOMED PHASE DEVIATION WITH VOICE ON CARRIER FOR SUB NO 4	311	0.0000	312	0.0000	RAD	BETEVA
BIOMED PHASE DEVIATION WITH VOICE ON CARRIER FOR SUB NO 5	313	0.0000	314	0.0000	RAD	BETEVA
BIOMED PHASE DEVIATION WITH VOICE ON CARRIER FOR SUB NO 6	315	0.0000	316	0.0000	RAD	BETEVA
BIOMED PHASE DEVIATION WITH VOICE ON CARRIER FOR SUB NO 7	317	0.0000	318	0.0000	RAD	BETEVA
BIOMED PHASE DEVIATION WITH VOICE ON CARRIER FOR SUB NO 8	319	0.0000	320	0.0000	RAD	BETEVA
COMPOSITE MODULATION LEVEL	321	0.0000	322	0.0000	--	COMOLE
BIOMED SUB. BELOW FM THRESH DEGRAD (WITH MOD) SUB NO 1	323	0.0000	324	0.0000	RATIO	DMMSF
BIOMED SUB. BELOW FM THRESH DEGRAD (WITH MOD) SUB NO 2	325	0.0000	326	0.0000	RATIO	DMMSF
BIOMED SUB. BELOW FM THRESH DEGRAD (WITH MOD) SUB NO 3	327	0.0000	328	0.0000	RATIO	DMMSF
BIOMED SUB. BELOW FM THRESH DEGRAD (WITH MOD) SUB NO 4	329	0.0000	330	0.0000	RATIO	DMMSF
BIOMED SUBCARRIER BELOW FM THRESH DEGRAD FOR SUB. 1	331	0.0000	332	0.0000	RATIO	DNMSF
BIOMED SUBCARRIER BELOW FM THRESH DEGRAD FOR SUB. 2	333	0.0000	334	0.0000	RATIO	DNMSF
BIOMED SUBCARRIER BELOW FM THRESH DEGRAD FOR SUB. 3	335	0.0000	336	0.0000	RATIO	DNMSF
BIOMED SUBCARRIER BELOW FM THRESH DEGRAD FOR SUB. 4	337	0.0000	338	0.0000	RATIO	DNMSF
BIOMED SUBCARRIER BELOW FM THRESH DEGRAD FOR SUB. 1	339	0.0000	340	0.0000	DB	DNMSFB
BIOMED SUBCARRIER BELOW FM THRESH DEGRAD FOR SUB. 2	341	0.0000	342	0.0000	DB	DNMSFB
BIOMED SUBCARRIER BELOW FM THRESH DEGRAD FOR SUB. 3	343	0.0000	344	0.0000	DB	DNMSFB
BIOMED SUBCARRIER BELOW FM THRESH DEGRAD FOR SUB. 4	345	0.0000	346	0.0000	DB	DNMSFB
PLAYBACK VOICE BELOW FM THRESHOLD DEGRAD IN POST BW	347	0.0000	348	0.0000	RATIO	DPBV
PLAYBACK VOICE BELOW FM THRESHOLD DEGRAD IN POST BW	349	0.0000	350	0.0000	DB	DPBVDB
UPDATA BELOW FM THRESHOLD DEGRAD IN POST BW	351	0.0000	352	1.0000+00	RATIO	DTB
UPDATA BELOW FM THRESHOLD DEGRAD IN POST BW	353	0.0000	354	0.0000	DB	DTBDB
SPLIT PHASE TLM BELOW FM THRESHOLD DEGRAD IN POST BW	355	0.0000	356	0.0000	RATIO	DTP
SPLIT PHASE TLM BELOW FM THRESHOLD DEGRAD IN POST BW	357	0.0000	358	0.0000	DB	DTPDB
SPLIT PHASE TLM BELOW FM THRESH DEGRAD IN POST BW(BER CAL)	359	0.0000	360	0.0000	RATIO	DTPR
SPLIT PHASE TLM BELOW FM THRESH DEGRAD IN POST BW(BER CAL)	361	0.0000	362	0.0000	DB	DTPRDB
FM MODE PCM TLM BELOW THRESH DEGRAD IN PRED BW	363	0.0000	364	0.0000	RATIO	DTSF
FM MODE PCM TLM BELOW THRESH DEGRAD IN PRED BW	365	0.0000	366	0.0000	DB	DTSFDB

PARAMETER DEFINITION	NO.	DOWNLINK VALUE	NO.	UPLINK VALUE	UNITS	COMPUTER MNEMONIC
FM MODE PCM TLM BELOW THRESH DEGRAD IN PRED BW (BER CAL)	367	0.0000	368	0.0000	RATIO	DTSFR
FM MODE PCM TLM BELOW THRESH DEGRAD IN PRED BW (BER CAL)	369	0.0000	370	0.0000	DB	DTSFRB
UPVOICE BELOW FM THRESHOLD DEGRAD IN POST BW	371	0.0000	372	1.0000+00	RATIO	DVB
UPVOICE BELOW FM THRESHOLD DEGRAD IN POST BW	373	0.0000	374	0.0000	DB	DVBDB
FM MODE VOICE BELOW THRESHOLD DEGRAD IN POST BW	375	0.0000	376	0.0000	RATIO	DVF
FM MODE VOICE BELOW THRESHOLD DEGRAD IN POST BW	377	0.0000	378	0.0000	DB	DVFDB
FM MODE VOICE BELOW THRESHOLD DEGRAD IN PRED BW	379	0.0000	380	0.0000	RATIO	DVSF
FM MODE VOICE BELOW THRESHOLD DEGRAD IN PRED BW	381	0.0000	382	0.0000	DB	DVSFDB
TELEVISION BELOW FM THRESHOLD DEGRAD IN POST BW	383	0.0000	384	0.0000	RATIO	DXE
TELEVISION BELOW FM THRESHOLD DEGRAD IN POST BW	385	0.0000	386	0.0000	DB	DXEDB
LIMITER LOSSES	387	7.8540-01	388	1.0000+00	WATTS	ELLELL
TRANSPONDER CONSTANT	389	0.0000	390	0.0000		ENIF
BIOMED SUB. FREQ. DEVIATION OF VOICE SUB. FOR SUB. 1	391	0.0000	392	0.0000	HZ	FREDEV
BIOMED SUB. FREQ. DEVIATION OF VOICE SUB. FOR SUB. 3	393	0.0000	394	0.0000	HZ	FREDEV
BIOMED SUB. FREQ. DEVIATION OF VOICE SUB. FOR SUB. 5	395	0.0000	396	0.0000	HZ	FREDEV
BIOMED SUB. FREQ. DEVIATION OF VOICE SUB. FOR SUB. 7	397	0.0000	398	0.0000	HZ	FREDEV
TURNED AROUND UPVOICE MODULATION INDEX	399	0.0000	400	0.0000	RAD	GAMM
TOTAL LOSSES IN COMMUNICATION LINK	401	1.8123+02	402	1.3051+02	DB	LDB
SPACE LOSS	403	1.8123+02	404	1.8051+02	DB	LSDB
TLM MARGIN FOR BER CALCULATION	405	-3.3232+01	406	1.0837+01	DB	MGTBER
CARRIER POWER	407	1.3363-18	408	2.8718-13	WATTS	PC
CARRIER POWER	409	-1.7874+02	410	-1.2542+02	DB	PCDB
NOISE SPECTRAL DENSITY	411	4.6368-20	412	4.6867-20	W/HZ	PHIF
MODULATION LEVEL RELATIVE TO CHANNEL ONE - CHANNEL 1	413	0.0000	414	0.0000	--	RATIO
MODULATION LEVEL RELATIVE TO CHANNEL ONE - CHANNEL 2	415	0.0000	416	0.0000	--	RATIO
MODULATION LEVEL RELATIVE TO CHANNEL ONE - CHANNEL 3	417	0.0000	418	0.0000	--	RATIO
MODULATION LEVEL RELATIVE TO CHANNEL ONE - CHANNEL 4	419	0.0000	420	0.0000	--	RATIO
MODULATION LEVEL RELATIVE TO CHANNEL ONE - CHANNEL 5	421	0.0000	422	0.0000	--	RATIO
MODULATION LEVEL RELATIVE TO CHANNEL ONE - CHANNEL 6	423	0.0000	424	0.0000	--	RATIO
MODULATION LEVEL RELATIVE TO CHANNEL ONE - CHANNEL 7	425	0.0000	426	0.0000	--	RATIO
MODULATION LEVEL RELATIVE TO CHANNEL ONE - CHANNEL 8	427	0.0000	428	0.0000	--	RATIO
SLANT RANGE BETWEEN SPACECRAFT AND GROUND STATION	429	6.5000+03	430	6.5000+03	NM	RNM
UPVOICE SNR FOR ABOVE FM THRESH IN POST BW	431	0.0000	432	3.5672+02	RATIO	SNVOP

PARAMETER DEFINITION	NO.	DOWNLINK VALUE	NO.	UPLINK VALUE	UNITS	COMPUTER MNEMONIC
UPVOICE SNR FOR ABOVE FM THRESH IN POST BW	433	0.0000	434	2.5523+01	DB	SNVOPB
RECEIVED SIGNAL LEVEL	435	7.5397-18	436	8.8919-13	WATTS	SR
RECEIVED SIGNAL LEVEL	437	-1.7123+02	438	-1.2051+02	DB	SRDB
RECEIVED SIGNAL LEVEL	439	-1.4123+02	440	-9.0510+01	DBM	SRDBM
TRANSMITTED POWER	441	1.0000+01	442	1.0000+01	DBW	STDB
EFFECTIVE SYSTEM NOISE TEMPERATURE	443	3.3600+03	444	3.3962+03	DEG	T
TURNED AROUND THERMAL NOISE MODULATION INDEX	445	0.0000	446	0.0000	RAD	XI
THESE LOCATIONS ARE NOT CURRENTLY USED	447	0.0000	448	0.0000		
THESE LOCATIONS ARE NOT CURRENTLY USED	449	0.0000	450	0.0000		
THESE LOCATIONS ARE NOT CURRENTLY USED	451	0.0000	452	0.0000		
THESE LOCATIONS ARE NOT CURRENTLY USED	453	0.0000	454	0.0000		
THESE LOCATIONS ARE NOT CURRENTLY USED	455	0.0000	456	0.0000		
THESE LOCATIONS ARE NOT CURRENTLY USED	457	0.0000	458	0.0000		
THESE LOCATIONS ARE NOT CURRENTLY USED	459	0.0000	460	0.0000		
THESE LOCATIONS ARE NOT CURRENTLY USED	461	0.0000	462	0.0000		
THESE LOCATIONS ARE NOT CURRENTLY USED	463	0.0000	464	0.0000		
THESE LOCATIONS ARE NOT CURRENTLY USED	465	0.0000	466	0.0000		
THESE LOCATIONS ARE NOT CURRENTLY USED	467	0.0000	468	0.0000		
THESE LOCATIONS ARE NOT CURRENTLY USED	469	0.0000	470	0.0000		
THESE LOCATIONS ARE NOT CURRENTLY USED	471	0.0000	472	0.0000		
THESE LOCATIONS ARE NOT CURRENTLY USED	473	0.0000	474	0.0000		
THESE LOCATIONS ARE NOT CURRENTLY USED	475	0.0000	476	0.0000		
THESE LOCATIONS ARE NOT CURRENTLY USED	477	0.0000	478	0.0000		
THESE LOCATIONS ARE NOT CURRENTLY USED	479	0.0000	480	0.0000		
THESE LOCATIONS ARE NOT CURRENTLY USED	481	0.0000	482	0.0000		
THESE LOCATIONS ARE NOT CURRENTLY USED	483	0.0000	484	0.0000		
THESE LOCATIONS ARE NOT CURRENTLY USED	485	0.0000	486	0.0000		
THESE LOCATIONS ARE NOT CURRENTLY USED	487	0.0000	488	0.0000		
THESE LOCATIONS ARE NOT CURRENTLY USED	489	0.0000	490	0.0000		
THESE LOCATIONS ARE NOT CURRENTLY USED	491	0.0000	492	0.0000		
THESE LOCATIONS ARE NOT CURRENTLY USED	493	0.0000	494	0.0000		
THESE LOCATIONS ARE NOT CURRENTLY USED	495	0.0000	496	0.0000		
THESE LOCATIONS ARE NOT CURRENTLY USED	497	0.0000	498	0.0000		

PARAMETER DEFINITION	NO.	DOWNLINK VALUE	NO.	UPLINK VALUE	UNITS	COMPUTER MNEMONIC
THESE LOCATIONS ARE NOT CURRENTLY USED	499	0.0000	500	C.0000		
PROBABILITY OF BIT ERROR RATE	501	9.9500-03	502	0.0000	--	BER
BACK-UP VOICE MARGIN PREDETECTION BW	503	-2.8705+01	504	C.0000	DB	MGBE
CARRIER MARGIN IN LOOP BW	505	-2.3854+01	506	2.9422+01	DB	MGC
EMERGENCY KEY MARGIN IN PREDETECTION BW	507	0.0000	508	0.0000	DB	MGKE
PRN RANGING MARGIN	509	0.0000	510	0.0000	DB	MGP
PM MODE TLM MARGIN IN PREDETECTION BW	511	0.0000	512	1.8273+01	DB	MGTE
UPDATA MARGIN IN POSTDETECTION BW	513	0.0000	514	1.0837+01	DB	MGTO
SPLIT PHASE TLM MARGIN IN POSTDETECTION BW	515	0.0000	516	C.0000	DB	MGTPR
PCM TLM MARGIN IN PREDETECTION BW WITH VOICE ON CARRIER	517	-3.3232+01	518	0.0000	DB	MGTSB
FM MODE PCM TLM MARGIN IN PREDETECTION BW (BER CAL)	519	0.0000	520	0.0000	DB	MGTSFR
PM MODE VOICE MARGIN IN PREDETECTION BW	521	0.0000	522	7.2743+00	DB	MGVE
PM MODE VOICE MARGIN IN POSTDETECTION BW	523	0.0000	524	1.5523+01	DB	MGVO
FM MODE VOICE MARGIN IN POSTDETECTION BW	525	0.0000	526	0.0000	DB	MGVOF
FM MODE VOICE MARGIN IN PREDETECTION BW	527	0.0000	528	0.0000	DB	MGVSF
BACKUP VOICE MODULATION LOSS	529	4.9716-01	530	0.0000	RATIO	MLBV
CARRIER MODULATION LOSS WITH VOICE AND BIOMED SUBCARRIER	531	1.7723-01	532	0.0000	RATIO	MLCVBS
DOWNLINK CARRIER MODULATION LOSS	533	0.0000	534	0.0000	RATIO	MLDC
DOWNLINK KEYING MODULATION LOSS	535	0.0000	536	0.0000	RATIO	MLDK
DOWNLINK PM MODE HI BIT RATE TLM MODULATION LOSS	537	0.0000	538	0.0000	RATIO	MLDPHT
DOWNLINK PM MODE LOW BIT RATETLM MODULATION LOSS	539	0.0000	540	0.0000	RATIO	MLDPLT
DOWNLINK PRN MODULATION LOSS	541	0.0000	542	0.0000	RATIO	MLDPRN
DOWNLINK PM MODE VOICE MODULATION LOSS	543	0.0000	544	0.0000	RATIO	MLDPV
DOWNLINK LOW BIT RATE TLM WITH VOC MODULATION LOSS	545	6.7332-02	546	0.0000	RATIO	MLDVLT
EVA MODULATION LOSS - CHANNEL 1	547	0.0000	548	0.0000	RATIO	MLEVA
EVA MODULATION LOSS - CHANNEL 2	549	0.0000	550	0.0000	RATIO	MLEVA
EVA MODULATION LOSS - CHANNEL 3	551	0.0000	552	0.0000	RATIO	MLEVA
EVA MODULATION LOSS - CHANNEL 4	553	0.0000	554	0.0000	RATIO	MLEVA
EVA MODULATION LOSS - CHANNEL 5	555	0.0000	556	0.0000	RATIO	MLEVA
EVA MODULATION LOSS - CHANNEL 6	557	0.0000	558	0.0000	RATIO	MLEVA
EVA MODULATION LOSS - CHANNEL 7	559	0.0000	560	0.0000	RATIO	MLEVA
EVA MODULATION LOSS - CHANNEL 8	561	0.0000	562	0.0000	RATIO	MLEVA
HLB MODULATION LOSS	563	C.0000	564	0.0000	RATIO	MLHLB

PARAMETER DEFINITION	NO.	DOWNLINK VALUE	NO.	UPLINK VALUE	UNITS	COMPUTER MNEMONIC
UPLINK CARRIER MODULATION LOSS	565	0.0000	566	3.2297-01	RATIO	MLUC
UPLINK PM MODE TLM MODULATION LOSS	567	0.0000	568	1.2270-01	RATIO	MLUPT
UPLINK PM MODE VOICE MODULATION LOSS	569	0.0000	570	2.1362-01	RATIO	MLUPV
NOISE FIGURE	571	1.1586+01	572	1.1586+01	RATIO	NOISEF
CARRIER POWER	573	-1.4874+02	574	-9.5419+01	DBM	PCDBM
NOISE SPECTRAL DENSITY	575	-1.9334+02	576	-1.9329+02	DB	PHIFDB
DOWNLINK BIOMED SNR IN POSTDETECTION BW - CHANNEL 1	577	0.0000	578	0.0000	RATIO	SNBD
DOWNLINK BIOMED SNR IN POSTDETECTION BW - CHANNEL 2	579	0.0000	580	0.0000	RATIO	SNBD
DOWNLINK BIOMED SNR IN POSTDETECTION BW - CHANNEL 3	581	0.0000	582	0.0000	RATIO	SNBD
DOWNLINK BIOMED SNR IN POSTDETECTION BW - CHANNEL 4	583	0.0000	584	0.0000	RATIO	SNBD
DOWNLINK BIOMED SNR IN POSTDETECTION BW - CHANNEL 1	585	0.0000	586	0.0000	DB	SNBDDB
DOWNLINK BIOMED SNR IN POSTDETECTION BW - CHANNEL 2	587	0.0000	588	0.0000	DB	SNBDDB
DOWNLINK BIOMED SNR IN POSTDETECTION BW - CHANNEL 3	589	0.0000	590	0.0000	DB	SNBDDB
DOWNLINK BIOMED SNR IN POSTDETECTION BW - CHANNEL 4	591	0.0000	592	0.0000	DB	SNBDDB
BACK-UP VOICE SNR IN POSTDETECTION BW	593	1.3473-02	594	0.0000	RATIO	SNBE
BACK-UP VOICE SNR IN POSTDETECTION BW	595	-1.8705+01	596	0.0000	DB	SNBEDB
CARRIER TO NOISE RATIO IN LOOP BW	597	4.1170-02	598	8.7535+03	RATIO	SNC
CARRIER TO NOISE RATIO IN LOOP BW	599	-1.3854+01	600	9.9950+00	DB	SNCDB
BIOMED SUB. SNR IN PRED BW WITH VOICE ON CARRIER SUB 1	601	0.0000	602	0.0000	RATIO	SNESB
BIOMED SUB. SNR IN PRED BW WITH VOICE ON CARRIER SUB 2	603	0.0000	604	0.0000	RATIO	SNESB
BIOMED SUB. SNR IN PRED BW WITH VOICE ON CARRIER SUB 3	605	0.0000	606	0.0000	RATIO	SNESB
BIOMED SUB. SNR IN PRED BW WITH VOICE ON CARRIER SUB 4	607	0.0000	608	0.0000	RATIO	SNESB
BIOMED SUB. SNR IN PRED BW WITH VOICE ON CARRIER SUB 5	609	0.0000	610	0.0000	RATIO	SNESB
BIOMED SUB. SNR IN PRED BW WITH VOICE ON CARRIER SUB 6	611	0.0000	612	0.0000	RATIO	SNESB
BIOMED SUB. SNR IN PRED BW WITH VOICE ON CARRIER SUB 7	613	0.0000	614	0.0000	RATIO	SNESB
BIOMED SUB. SNR IN PRED BW WITH VOICE ON CARRIER SUB 8	615	0.0000	616	0.0000	RATIO	SNESB
BIOMED SUB. SNR IN PRED BW WITH VOICE ON CARRIER SUB 1	617	0.0000	618	0.0000	DB	SNESBB
BIOMED SUB. SNR IN PRED BW WITH VOICE ON CARRIER SUB 2	619	0.0000	620	0.0000	DB	SNESBB
BIOMED SUB. SNR IN PRED BW WITH VOICE ON CARRIER SUB 3	621	0.0000	622	0.0000	DB	SNESBB
BIOMED SUB. SNR IN PRED BW WITH VOICE ON CARRIER SUB 4	623	0.0000	624	0.0000	DB	SNESBB
BIOMED SUB. SNR IN PRED BW WITH VOICE ON CARRIER SUB 5	625	0.0000	626	0.0000	DB	SNESBB
BIOMED SUB. SNR IN PRED BW WITH VOICE ON CARRIER SUB 6	627	0.0000	628	0.0000	DB	SNESBB
BIOMED SUB. SNR IN PRED BW WITH VOICE ON CARRIER SUB 7	629	0.0000	630	0.0000	DB	SNESBB

PARAMETER DEFINITION	NO.	DOWNLINK VALUE	NO.	UPLINK VALUE	UNITS	COMPUTER MNEMONIC
BIOMED SUB. SNR IN PRED BW WITH VOICE ON CARRIER SUB 8	631	0.0000	632	0.0000	DB	SNESBB
HLB SNR IN PREDETECTION BW WITH VOICE ON CARRIER	633	0.0000	634	0.0000	RATIO	SNHSB
HLB SNR IN PREDETECTION BW WITH VOICE ON CARRIER	635	0.0000	636	0.0000	DB	SNHSBB
IF SNR	637	3.3876-05	638	3.9526+00	RATIO	SNIF
IF SNR	639	-4.4701+01	640	5.9688+00	DB	SNIFDB
EMERGENCY KEY SNR IN PREDETECTION BW	641	0.0000	642	0.0000	RATIO	SNKE
EMERGENCY KEY SNR IN PREDETECTION BW	643	0.0000	644	0.0000	DB	SNKEDB
BIOMED SUB. SNR IN PRED BW (WITH MODULATION) SUB 1	645	0.0000	646	0.0000	RATIO	SNMM
BIOMED SUB. SNR IN PRED BW (WITH MODULATION) SUB 2	647	0.0000	648	0.0000	RATIO	SNMM
BIOMED SUB. SNR IN PRED BW (WITH MODULATION) SUB 3	649	0.0000	650	0.0000	RATIO	SNMM
BIOMED SUB. SNR IN PRED BW (WITH MODULATION) SUB 4	651	0.0000	652	0.0000	RATIO	SNMM
BIOMED SUB. SNR IN PRED BW (WITH MODULATION) SUB 1	653	0.0000	654	0.0000	DB	SNMMDB
BIOMED SUB. SNR IN PRED BW (WITH MODULATION) SUB 2	655	0.0000	656	0.0000	DB	SNMMDB
BIOMED SUB. SNR IN PRED BW (WITH MODULATION) SUB 3	657	0.0000	658	0.0000	DB	SNMMDB
BIOMED SUB. SNR IN PRED BW (WITH MODULATION) SUB 4	659	0.0000	660	0.0000	DB	SNMMDB
BIOMED SUB. SNR IN PRED BW (WITHOUT MODULATION) SUB 1	661	0.0000	662	0.0000	RATIO	SNMSF
BIOMED SUB. SNR IN PRED BW (WITHOUT MODULATION) SUB 2	663	0.0000	664	0.0000	RATIO	SNMSF
BIOMED SUB. SNR IN PRED BW (WITHOUT MODULATION) SUB 3	665	0.0000	666	0.0000	RATIO	SNMSF
BIOMED SUB. SNR IN PRED BW (WITHOUT MODULATION) SUB 4	667	0.0000	668	0.0000	RATIO	SNMSF
BIOMED SUB. SNR IN PRED BW (WITHOUT MODULATION) SUB 1	669	0.0000	670	0.0000	DB	SNMSFB
BIOMED SUB. SNR IN PRED BW (WITHOUT MODULATION) SUB 2	671	0.0000	672	0.0000	DB	SNMSFB
BIOMED SUB. SNR IN PRED BW (WITHOUT MODULATION) SUB 3	673	0.0000	674	0.0000	DB	SNMSFB
BIOMED SUB. SNR IN PRED BW (WITHOUT MODULATION) SUB 4	675	0.0000	676	0.0000	DB	SNMSFB
PRN RANGING SNR	677	0.0000	678	0.0000	RATIO	SNP
PRN RANGING SNR	679	0.0000	680	0.0000	DB	SNPDB
PLAYBACK VOICE SNR IN POSTDETECTION BW	681	0.0000	682	0.0000	RATIO	SNPBV
PLAYBACK VOICE SNR IN POSTDETECTION BW	683	0.0000	684	0.0000	DB	SNPBVB
PM MODE TLM SNR IN PREDETECTION BW	685	0.0000	686	6.7182+02	RATIO	SNTE
PM MODE TLM SNR IN PREDETECTION BW	687	0.0000	688	2.8273+01	DB	SNTEDB
FM MODE PCM TLM SNR IN PREDETECTION BW (BER CAL)	689	0.0000	690	0.0000	RATIO	SNTFR
FM MODE PCM TLM SNR IN PREDETECTION BW (BER CAL)	691	0.0000	692	0.0000	DB	SNTFRB
PM MODE TLM SNR IN POSTDETECTION BW	693	0.0000	694	1.2125+02	RATIO	SNTO
PM MODE TLM SNR IN POSTDETECTION BW	695	0.0000	696	2.0837+01	DB	SNTODB

PARAMETER DEFINITION	NO.	DOWNLINK VALUE	NO.	UPLINK VALUE	UNITS	COMPUTER MNEMONIC
SPLIT PHASE TLM SNR IN POSTDETECTION BW	697	0.0000	698	0.0000	RATIO	SNTP
SPLIT PHASE TLM SNR IN POSTDETECTION BW	699	0.0000	700	0.0000	DB	SNTPDB
SPLIT PHASE TLM SNR IN POSTDETECTION BW (BER CAL)	701	0.0000	702	0.0000	RATIO	SNTPR
SPLIT PHASE TLM SNR IN POSTDETECTION BW (BER CAL)	703	0.0000	704	0.0000	DB	SNTPRB
PCM TLM SNR IN PREDETECTION WITH VOICE ON CARRIER	705	4.7508-03	706	0.0000	RATIO	SNTSB
PCM TLM SNR IN PREDETECTION WITH VOICE ON CARRIER	707	-2.3232+01	708	0.0000	DB	SNTSBB
FM MODE PCM TLM SNR IN PREDETECTION BW	709	0.0000	710	0.0000	RATIO	SNTSF
FM MODE PCM TLM SNR IN PREDETECTION BW	711	0.0000	712	0.0000	DB	SNTSFB
PM MODE VOICE SNR IN PREDETECTION BW	713	0.0000	714	5.3387+01	RATIO	SNVE
PM MODE VOICE SNR IN PREDETECTION BW	715	0.0000	716	9.2544+00	DB	SNVEDB
UPVOICE SNR IN POSTDETECTION BW	717	0.0000	718	3.5672+02	RATIO	SNVO
UPVOICE SNR IN POSTDETECTION BW	719	0.0000	720	2.5523+01	DB	SNVODB
PM AND FM MODE VOICE SNR IN POSTDETECTION BW	721	0.0000	722	0.0000	RATIO	SNVOF
PM AND FM MODE VOICE SNR IN POSTDETECTION BW	723	0.0000	724	0.0000	DB	SNVOFB
FM MODE VOICE SNR IN PREDETECTION BW	725	0.0000	726	0.0000	RATIO	SNVSF
FM MODE VOICE SNR IN PREDETECTION BW	727	0.0000	728	0.0000	DB	SNVSFB
TELEVISION SNR IN POSTDETECTION BW	729	0.0000	730	0.0000	RATIO	SNXE
TELEVISION SNR IN POSTDETECTION BW	731	0.0000	732	0.0000	DB	SNXEDB
THESE LOCATIONS ARE NOT CURRENTLY USED	733	0.0000	734	0.0000		
THESE LOCATIONS ARE NOT CURRENTLY USED	735	0.0000	736	0.0000		
THESE LOCATIONS ARE NOT CURRENTLY USED	737	0.0000	738	0.0000		
THESE LOCATIONS ARE NOT CURRENTLY USED	739	0.0000	740	0.0000		
THESE LOCATIONS ARE NOT CURRENTLY USED	741	0.0000	742	0.0000		
THESE LOCATIONS ARE NOT CURRENTLY USED	743	0.0000	744	0.0000		
THESE LOCATIONS ARE NOT CURRENTLY USED	745	0.0000	746	0.0000		
THESE LOCATIONS ARE NOT CURRENTLY USED	747	0.0000	748	0.0000		
THESE LOCATIONS ARE NOT CURRENTLY USED	749	0.0000	750	0.0000		
THESE LOCATIONS ARE NOT CURRENTLY USED	751	0.0000	752	0.0000		
THESE LOCATIONS ARE NOT CURRENTLY USED	753	0.0000	754	0.0000		
THESE LOCATIONS ARE NOT CURRENTLY USED	755	0.0000	756	0.0000		
THESE LOCATIONS ARE NOT CURRENTLY USED	757	0.0000	758	0.0000		
THESE LOCATIONS ARE NOT CURRENTLY USED	759	0.0000	760	0.0000		
THESE LOCATIONS ARE NOT CURRENTLY USED	761	0.0000	762	0.0000		

PARAMETER DEFINITION	NO.	DOWNLINK VALUE	NO.	UPLINK VALUE	UNITS	COMPUTER MNEMONIC
THESE LOCATIONS ARE NOT CURRENTLY USED	763	0.0000	764	0.0000		
THESE LOCATIONS ARE NOT CURRENTLY USED	765	0.0000	766	0.0000		
THESE LOCATIONS ARE NOT CURRENTLY USED	767	0.0000	768	0.0000		
THESE LOCATIONS ARE NOT CURRENTLY USED	769	0.0000	770	0.0000		
THESE LOCATIONS ARE NOT CURRENTLY USED	771	0.0000	772	0.0000		
THESE LOCATIONS ARE NOT CURRENTLY USED	773	0.0000	774	0.0000		
THESE LOCATIONS ARE NOT CURRENTLY USED	775	0.0000	776	0.0000		
THESE LOCATIONS ARE NOT CURRENTLY USED	777	0.0000	778	0.0000		
THESE LOCATIONS ARE NOT CURRENTLY USED	779	0.0000	780	0.0000		
THESE LOCATIONS ARE NOT CURRENTLY USED	781	0.0000	782	0.0000		
THESE LOCATIONS ARE NOT CURRENTLY USED	783	0.0000	784	0.0000		
THESE LOCATIONS ARE NOT CURRENTLY USED	785	0.0000	786	0.0000		
THESE LOCATIONS ARE NOT CURRENTLY USED	787	0.0000	788	0.0000		
THESE LOCATIONS ARE NOT CURRENTLY USED	789	0.0000	790	0.0000		
THESE LOCATIONS ARE NOT CURRENTLY USED	791	0.0000	792	0.0000		
THESE LOCATIONS ARE NOT CURRENTLY USED	793	0.0000	794	0.0000		
THESE LOCATIONS ARE NOT CURRENTLY USED	795	0.0000	796	0.0000		
THESE LOCATIONS ARE NOT CURRENTLY USED	797	0.0000	798	0.0000		
THESE LOCATIONS ARE NOT CURRENTLY USED	799	0.0000	800	0.0000		

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PROBLEM SET DATA-

    NUMBER OF PROBLEMS =  2
    DATA TAPE I.D. NUMBER =  8
    SAVE FACTOR =  .000
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PROBLEM SPECIFICATION DATA-

     NUMBER OF LINKS = 1
     NUMBER OF REPORTS DESIRED =  1
     NUMBER OF PAGES PER REPORT =  2
     NUMBER OF LINES PER PAGE = 10
     NUMBER OF LINES PER REPORT = 20
     DATA LOCATED IN FILE NO.  2
     PRINT FLAG = 0

LINK SPECIFICATION DATA-

     LM/FM/9B/S          DOWNLINK.  BLOCK SEQUENCE =   1,   6,   7,   8,  24,  15,  16,  20,  30,  31,
                                                      25, -32,  34,   0,   0,   0,   0,   0,   0,   0.
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INPUT PARAMETERS LISTING

PARAMETER DEFINITION	NO.	DOWNLINK VALUE	NO.	UPLINK VALUE	UNITS	COMPUTER MNEMONIC
NOISE SPECTRAL DENSITY CONSTANT A	1	3.3600+03	2	0.0000	DEG	A
NOISE SPECTRAL DENSITY CONSTANT B	3	0.0000	4	0.0000	--	B
FM BIOMED POSTDETECTION NOISE BANDWIDTH - CHANNEL 1	5	3.0000+01	6	0.0000	HZ	BB
FM BIOMED POSTDETECTION NOISE BANDWIDTH - CHANNEL 2	7	6.0000+01	8	0.0000	HZ	BB
FM BIOMED POSTDETECTION NOISE BANDWIDTH - CHANNEL 3	9	0.0000	10	0.0000	HZ	BB
FM BIOMED POSTDETECTION NOISE BANDWIDTH - CHANNEL 4	11	0.0000	12	0.0000	HZ	BB
BACK-UP VOICE POSTDETECTION NOISE BW	13	0.0000	14	0.0000	HZ	BBE
PM MODE CARRIER LOOP NOISE BW	15	0.0000	16	0.0000	HZ	BC
BIOMED EFFECTIVE BASEBAND CLICK BANDWIDTHS - CHANNEL 1	17	3.0000+01	18	0.0000	HZ	BD
BIOMED EFFECTIVE BASEBAND CLICK BANDWIDTHS - CHANNEL 2	19	6.0000+01	20	0.0000	HZ	BD
BIOMED EFFECTIVE BASEBAND CLICK BANDWIDTHS - CHANNEL 3	21	0.0000	22	0.0000	HZ	BD
BIOMED EFFECTIVE BASEBAND CLICK BANDWIDTHS - CHANNEL 4	23	0.0000	24	0.0000	HZ	BD
BIOMED PRED NOISE BW WITH VOICE ON CARRIER FOR SUB. NO. 1	25	0.0000	26	0.0000	HZ	BEE
BIOMED PRED NOISE BW WITH VOICE ON CARRIER FOR SUB. NO. 2	27	0.0000	28	0.0000	HZ	BEE
BIOMED PRED NOISE BW WITH VOICE ON CARRIER FOR SUB. NO. 3	29	0.0000	30	0.0000	HZ	BEE
BIOMED PRED NOISE BW WITH VOICE ON CARRIER FOR SUB. NO. 4	31	0.0000	32	0.0000	HZ	BEE
BIOMED PRED NOISE BW WITH VOICE ON CARRIER FOR SUB. NO. 5	33	0.0000	34	0.0000	HZ	BEE
BIOMED PRED NOISE BW WITH VOICE ON CARRIER FOR SUB. NO. 6	35	0.0000	36	0.0000	HZ	BEE
BIOMED PRED NOISE BW WITH VOICE ON CARRIER FOR SUB. NO. 7	37	0.0000	38	0.0000	HZ	BEE
BIOMED PRED NOISE BW WITH VOICE ON CARRIER FOR SUB. NO. 8	39	0.0000	40	0.0000	HZ	BEE
HLB PRED NOISE BW WITH VOICE ON CARRIER	41	0.0000	42	0.0000	HZ	BHE
IF NOISE BANDWIDTH	43	4.8000+06	44	0.0000	HZ	BIF
EMERGENCY KEY PREDETECTION NOISE BW	45	0.0000	46	0.0000	HZ	BKE
VOICE EFFECTIVE BASEBAND CLICK BANDWIDTH	47	1.6800+04	48	0.0000	HZ	BLF
BIOMED EFFECTIVE CLICK BANDWIDTH - SUB. NO. 1	49	5.8600+02	50	0.0000	HZ	BLM
BIOMED EFFECTIVE CLICK BANDWIDTH - SUB. NO. 2	51	5.8600+02	52	0.0000	HZ	BLM
BIOMED EFFECTIVE CLICK BANDWIDTH - SUB. NO. 3	53	0.0000	54	0.0000	HZ	BLM
BIOMED EFFECTIVE CLICK BANDWIDTH - SUB. NO. 4	55	0.0000	56	0.0000	HZ	BLM
PLAY BACK VOICE EFFECTIVE CLICK BANDWIDTH	57	0.0000	58	0.0000	HZ	BLPBV
SPLIT PHASE TLM EFFECTIVE CLICK BANDWIDTH	59	0.0000	60	0.0000	HZ	BLTP
TELEVISION EFFECTIVE CLICK BANDWITH	61	0.0000	62	0.0000	HZ	BLX
BIOMED SUBCARRIER PRED NOISE BW FOR SUB. NO. 1	63	5.8600+02	64	0.0000	HZ	BMSF
BIOMED SUBCARRIER PRED NOISE BW FOR SUB. NO. 2	65	1.1020+03	66	0.0000	HZ	BMSF

PARAMETER DEFINITION	NO.	DOWNLINK VALUE	NO.	UPLINK VALUE	UNITS	COMPUTER MNEMONIC
BIOMED SUBCARRIER PRED NOISE BW FOR SUB. NO. 3	67	0.0000	68	0.0000	HZ	BMSF
BIOMED SUBCARRIER PRED NOISE BW FOR SUB. NO. 4	69	0.0000	70	0.0000	HZ	BMSF
PLAYBACK VOICE PREDETECTION NOISE BW	71	0.0000	72	0.0000	HZ	BPBVE
PLAYBACK VOICE POSTDETECTION NOISE BW	73	0.0000	74	0.0000	HZ	BPBVO
PRN RANGING BANDWIDTH	75	0.0000	76	0.0000	HZ	BPK
TRANSPONDER VIDEO BANDWIDTH	77	0.0000	78	0.0000	HZ	BR
PM MODE PCM TELEMETRY PREDETECTION NOISE BW	79	0.0000	80	0.0000	HZ	BTE
FM MODE PCM TELEMETRY PREDETECTION NOISE BW	81	1.5500+05	82	0.0000	HZ	BTEF
UPDATA POSTDETECTION NOISE BW	83	0.0000	84	0.0000	HZ	BTO
SPLIT PHASE TLM PREDETECTION NOISE BW	85	0.0000	86	0.0000	HZ	BTPE
SPLIT PHASE TLM POSTDETECTION NOISE BW	87	0.0000	88	0.0000	HZ	BTPO
PM MODE VOICE PREDETECTION NOISE BW	89	0.0000	90	0.0000	HZ	BVE
FM MODE VOICE PREDETECTION NOISE BW	91	4.1760+04	92	0.0000	HZ	BVEF
PM MODE VOICE POSTDETECTION NOISE BW	93	0.0000	94	0.0000	HZ	BVO
FM MODE VOICE POSTDETECTION NOISE BW	95	3.4700+03	96	0.0000	HZ	BVOF
TLM SUBCARRIER EFFECTIVE CLICK BANDWIDTH	97	4.3200+06	98	0.0000	HZ	BWTSF
VOICE SUBCARRIER EFFECTIVE CLICK BANDWIDTH	99	4.3200+06	100	0.0000	HZ	BWVSF
TELEVISION POSTDETECTION NOISE BW	101	0.0000	102	0.0000	HZ	BXE
BIOMED SUBCARRIER CENTER FREQUENCY FOR SUB. NO. 1	103	3.9000+03	104	0.0000	HZ	CMSF
BIOMED SUBCARRIER CENTER FREQUENCY FOR SUB. NO. 2	105	7.3500+03	106	0.0000	HZ	CMSF
BIOMED SUBCARRIER CENTER FREQUENCY FOR SUB. NO. 3	107	0.0000	108	0.0000	HZ	CMSF
BIOMED SUBCARRIER CENTER FREQUENCY FOR SUB. NO. 4	109	0.0000	110	0.0000	HZ	CMSF
FM MODE PCM TLM SUBCARRIER CENTER FREQUENCY	111	1.0240+06	112	0.0000	HZ	CTSF
FM MODE VOICE SUBCARRIER CENTER FREQUENCY	113	1.2500+06	114	0.0000	HZ	CVSF
FM BIOMED SUBCARRIER FREQUENCY DEVIATION SUB. 1	115	3.0000+01	116	0.0000	HZ	DELFB
FM BIOMED SUBCARRIER FREQUENCY DEVIATION SUB. 2	117	6.0000+01	118	0.0000	HZ	DELFB
FM BIOMED SUBCARRIER FREQUENCY DEVIATION SUB. 3	119	0.0000	120	0.0000	HZ	DELFB
FM BIOMED SUBCARRIER FREQUENCY DEVIATION SUB. 4	121	0.0000	122	0.0000	HZ	DELFB
DELTA RANGE INCREMENT	123	5.0000+02	124	0.0000	NM	DELNM
DELTA RECEIVED SIGNAL LEVEL INCREMENT	125	0.0000	126	0.0000	DBM	DELSR
VOICE DEGRADATION DUE TO NON-RECT OUTPUT BW	127	6.0000-01	128	0.0000	--	DFK
PLAYBACK VOICE DEGRAD FACTOR DUE TO NON-RECT OUTPUT BW	129	0.0000	130	0.0000	--	DFKPBV
PCM TLM DEGRAD FACTOR DUE TO NON-RECT OUTPUT BW	131	8.0000-01	132	0.0000	--	DFKT

PARAMETER DEFINITION	NO.	DOWNLINK VALUE	NO.	UPLINK VALUE	UNITS	COMPUTER MNEMONIC
SPLIT PHASE TLM DEGRAD FACTOR DUE TO NON-RECT OUTPUT BW	133	0.0000	134	0.0000	--	DFKTP
TELEVISION DEGRAD FACTOR DUE TO NON-RECT OUTPUT BW	135	0.0000	136	0.0000	--	DFKX
TRANSMITTING FREQUENCY	137	2.2825+03	138	0.0000	MHZ	FMC
PLAYBACK VOICE FREQUENCY DEVIATION OF CARRIER	139	0.0000	140	0.0000	HZ	FPBV
FM MODE PCM TLM SUBCARRIER FREQUENCY DEVIATION OF CARRIER	141	4.5100+05	142	0.0000	HZ	FTF
SPLIT PHASE TELEMETRY FREQUENCY DEVIATION OF CARRIER	143	0.0000	144	0.0000	HZ	FTP
UPDATA SUBCARRIER FREQUENCY DEVIATION OF CARRIER	145	0.0000	146	0.0000	HZ	FTS
VOICE SUBCARRIER FREQUENCY DEVIATION OF CARRIER	147	2.2500+05	148	0.0000	HZ	FVF
UPVOICE SUBCARRIER FREQUENCY DEVIATION OF CARRIER	149	0.0000	150	0.0000	HZ	FVS
FREQUENCY DEVIATION OF VOICE SUBCARRIER	151	3.0000+03	152	0.0000	HZ	FVSF
TELEVISION FREQUENCY DEVIATION OF CARRIER	153	0.0000	154	0.0000	HZ	FXF
LOSSES DUE TO SPACECRAFT ATTITUDE	155	0.0000	156	0.0000	DB	GAMMA
RECEIVER ANTENNA GAIN	157	0.0000	158	0.0000	DB	GR
TRANSMITTER ANTENNA GAIN	159	5.0000+01	160	0.0000	DB	GT
BOLTZMANN'S CONSTANT	161	1.3800-23	162	0.0000	--	K
BIOMED DEGRADATION DUE TO NON-RECT OUTPUT BANDWIDTH	163	8.0000-01	164	0.0000	--	KB
CIRCUIT LOSSES	165	0.0000	166	0.0000	DB	LC
MODULATION LEVEL CHANNEL 1	167	1.0000+00	168	0.0000	--	MODLEV
MODULATION LEVEL CHANNEL 2	169	1.0000+00	170	0.0000	--	MODLEV
MODULATION LEVEL CHANNEL 3	171	0.0000	172	0.0000	--	MODLEV
MODULATION LEVEL CHANNEL 4	173	0.0000	174	0.0000	--	MODLEV
MODULATION LEVEL CHANNEL 5	175	0.0000	176	0.0000	--	MODLEV
MODULATION LEVEL CHANNEL 6	177	0.0000	178	0.0000	--	MODLEV
MODULATION LEVEL CHANNEL 7	179	0.0000	180	0.0000	--	MODLEV
MODULATION LEVEL CHANNEL 8	181	0.0000	182	0.0000	--	MODLEV
NUMBER OF EVA SUBCARRIERS WITH VOICE ON CARRIER	183	2.0000+00	184	0.0000	--	NEMU
BACK-UP VOICE PHASE DEVIATION	185	0.0000	186	0.0000	RAD	PBE
COMPOSIT PHASE DEVIATION	187	0.0000	188	0.0000	RAD	PDEV
EVA PHASE DEVIATION WITH VOICE ON CARRIER	189	0.0000	190	0.0000	RAD	PE
HLB PHASE DEVIATION WITH VOICE ON CARRIER	191	0.0000	192	0.0000	RAD	PH
STATIC PHASE ERROR IN CARRIER LOOP	193	0.0000	194	0.0000	RAD	PHIO
EMERGENCY KEY PHASE DEVIATION OF CARRIER	195	0.0000	196	0.0000	RAD	PK
PRN RANGING PHASE DEVIATION OF CARRIER	197	0.0000	198	0.0000	RAD	PP

PARAMETER DEFINITION	NO.	DOWNLINK VALUE	NO.	UPLINK VALUE	UNITS	COMPUTER MNEMONIC
PCM TLM SUBCARRIER PHASE DEVIATION OF CARRIER	199	0.0000	200	0.0000	RAD	PT
VOICE SUBCARRIER PHASE DEVIATION OF CARRIER	201	0.0000	202	0.0000	RAD	PV
REQUIRED BACK-UP VOICE SNR IN POSTDETECTION BW	203	0.0000	204	0.0000	DB	RBE
REQUIRED CARRIER-TO-NOISE RATIO IN CARRIER LOOP BW	205	0.0000	206	0.0000	DB	RC
RMS TO PEAK FACTOR FOR BIOMED MODULATION SIGNAL - CHANNEL 1	207	1.0000+00	208	0.0000		RHOB
RMS TO PEAK FACTOR FOR BIOMED MODULATION SIGNAL - CHANNEL 2	209	1.0000+00	210	0.0000		RHOB
RMS TO PEAK FACTOR FOR BIOMED MODULATION SIGNAL - CHANNEL 3	211	0.0000	212	0.0000		RHOB
RMS TO PEAK FACTOR FOR BIOMED MODULATION SIGNAL - CHANNEL 4	213	0.0000	214	0.0000		RHOB
RMS TO PEAK FACTOR FOR PLAYBACK VOICE	215	0.0000	216	0.0000	--	RHOPBV
RMS TO PEAK FACTOR FOR PCM TLM	217	0.0000	218	0.0000	--	RHOT
RMS TO PEAK FACTOR FOR SPLIT PHASE TLM	219	0.0000	220	0.0000	--	RHOTP
RMS TO PEAK FACTOR FOR VOICE	221	7.0700-01	222	0.0000	--	RHOV
RMS TO PEAK FACTOR FOR TELEVISION	223	0.0000	224	0.0000	--	RHOX
REQUIRED EMERGENCY KEY SNR IN PREDETECTION BW	225	0.0000	226	0.0000	DB	RKE
REQUIRED PRN SNR	227	0.0000	228	0.0000	DB	RPK
PM MODE REQUIRED PCM TELEMETRY SNR IN PREDETECTION BW	229	0.0000	230	0.0000	DB	RTE
PM MODE REQUIRED PCM TELEMETRY SNR IN POSTDETECTION BW	231	0.0000	232	0.0000	DB	RTO
REQUIRED SPLIT PHASE TLM SNR IN POSTDETECTION BW	233	0.0000	234	0.0000	DB	RTPR
REQUIRED PCM TLM SNR IN PRED BW WITH VOICE ON CARRIER	235	0.0000	236	0.0000	DB	RTSB
FM MODE REQUIRED PCM TLM SNR IN PREDETECTION BW	237	1.0000+01	238	0.0000	DB	RTSFR
PM MODE REQUIRED VOICE SNR IN PREDETECTION BW	239	0.0000	240	0.0000	DB	RVE
REQUIRED UP VOICE SNR IN POSTDETECTION BW	241	0.0000	242	0.0000	DB	RVO
FM MODE REQUIRED VOICE SNR IN POSTDETECTION BW	243	1.0000+01	244	0.0000	DB	RVOF
FM MODE REQUIRED VOICE SNR IN PREDETECTION BW	245	1.0000+01	246	0.0000	DB	RVSF
COMPOSITE SNR	247	1.0000+01	248	0.0000	DB	SNRCOM
TRANSMITTED SNR ROUTINE CONSTANT	249	1.0000+00	250	0.0000	PURE	SNRCST
MAXIMUM TRANSMISSION SNR OF THE LINK	251	1.2000+01	252	0.0000	DB	SNTRDB
TRANSMITTING SIGNAL POWER	253	1.0000+01	254	0.0000	WATTS	ST
TAPER CIRCUIT CONSTANT A	255	-1.4710+02	256	0.0000	--	TAPERA
TAPER CIRCUIT CONSTANT B	257	4.1830-02	258	0.0000	--	TAPERB
TRANSPONDER GAIN CONSTANT	259	0.0000	260	0.0000	--	TRC
THESE LOCATIONS ARE NOT CURRENTLY USED	261	0.0000	262	0.0000		
THESE LOCATIONS ARE NOT CURRENTLY USED	263	0.0000	264	0.0000		

PARAMETER DEFINITION	NO.	DOWNLINK VALUE	NO.	UPLINK VALUE	UNITS	COMPUTER MNEMONIC
THESE LOCATIONS ARE NOT CURRENTLY USED	265	0.0000	266	0.0000		
THESE LOCATIONS ARE NOT CURRENTLY USED	267	0.0000	268	0.0000		
THESE LOCATIONS ARE NOT CURRENTLY USED	269	0.0000	270	0.0000		
THESE LOCATIONS ARE NOT CURRENTLY USED	271	0.0000	272	0.0000		
THESE LOCATIONS ARE NOT CURRENTLY USED	273	0.0000	274	0.0000		
THESE LOCATIONS ARE NOT CURRENTLY USED	275	0.0000	276	0.0000		
THESE LOCATIONS ARE NOT CURRENTLY USED	277	0.0000	278	0.0000		
THESE LOCATIONS ARE NOT CURRENTLY USED	279	0.0000	280	0.0000		
THESE LOCATIONS ARE NOT CURRENTLY USED	281	0.0000	282	0.0000		
THESE LOCATIONS ARE NOT CURRENTLY USED	283	0.0000	284	0.0000		
THESE LOCATIONS ARE NOT CURRENTLY USED	285	0.0000	286	0.0000		
THESE LOCATIONS ARE NOT CURRENTLY USED	287	0.0000	288	0.0000		
THESE LOCATIONS ARE NOT CURRENTLY USED	289	0.0000	290	0.0000		
THESE LOCATIONS ARE NOT CURRENTLY USED	291	0.0000	292	0.0000		
THESE LOCATIONS ARE NOT CURRENTLY USED	293	0.0000	294	0.0000		
THESE LOCATIONS ARE NOT CURRENTLY USED	295	0.0000	296	0.0000		
THESE LOCATIONS ARE NOT CURRENTLY USED	297	0.0000	298	0.0000		
THESE LOCATIONS ARE NOT CURRENTLY USED	299	0.0000	300	0.0000		
TURNED AROUND PRN MODULATION INDEX	301	0.0000	302	0.0000	RAD	ALPHA
TURNED AROUND UPDATA MODULATION INDEX	303	0.0000	304	0.0000	RAD	BET
BIOMED PHASE DEVIATION WITH VOICE ON CARRIER FOR SUB NO 1	305	0.0000	306	0.0000	RAD	BETEVA
BIOMED PHASE DEVIATION WITH VOICE ON CARRIER FOR SUB NO 2	307	0.0000	308	0.0000	RAD	BETEVA
BIOMED PHASE DEVIATION WITH VOICE ON CARRIER FOR SUB NO 3	309	0.0000	310	0.0000	RAD	BETEVA
BIOMED PHASE DEVIATION WITH VOICE ON CARRIER FOR SUB NO 4	311	0.0000	312	0.0000	RAD	BETEVA
BIOMED PHASE DEVIATION WITH VOICE ON CARRIER FOR SUB NO 5	313	0.0000	314	0.0000	RAD	BETEVA
BIOMED PHASE DEVIATION WITH VOICE ON CARRIER FOR SUB NO 6	315	0.0000	316	0.0000	RAD	BETEVA
BIOMED PHASE DEVIATION WITH VOICE ON CARRIER FOR SUB NO 7	317	0.0000	318	0.0000	RAD	BETEVA
BIOMED PHASE DEVIATION WITH VOICE ON CARRIER FOR SUB NO 8	319	0.0000	320	0.0000	RAD	BETEVA
COMPOSITE MODULATION LEVEL	321	0.0000	322	0.0000	--	COMOLE
BIOMED SUB. BELOW FM THRESH DEGRAD (WITH MOD) SUB NO 1	323	0.0000	324	0.0000	RATIO	DMMSF
BIOMED SUB. BELOW FM THRESH DEGRAD (WITH MOD) SUB NO 2	325	0.0000	326	0.0000	RATIO	DMMSF
BIOMED SUB. BELOW FM THRESH DEGRAD (WITH MOD) SUB NO 3	327	0.0000	328	0.0000	RATIO	DMMSF
BIOMED SUB. BELOW FM THRESH DEGRAD (WITH MOD) SUB NO 4	329	0.0000	330	0.0000	RATIO	DMMSF

PARAMETER DEFINITION	NO.	DOWNLINK VALUE	NO.	UPLINK VALUE	UNITS	COMPUTER MNEMONIC
BIOMED SUBCARRIER BELOW FM THRESH DEGRAD FOR SUB. 1	331	0.0000	332	0.0000	RATIO	DNMSF
BIOMED SUBCARRIER BELOW FM THRESH DEGRAD FOR SUB. 2	333	0.0000	334	0.0000	RATIO	DNMSF
BIOMED SUBCARRIER BELOW FM THRESH DEGRAD FOR SUB. 3	335	0.0000	336	0.0000	RATIO	DNMSF
BIOMED SUBCARRIER BELOW FM THRESH DEGRAD FOR SUB. 4	337	0.0000	338	0.0000	RATIO	DNMSF
BIOMED SUBCARRIER BELOW FM THRESH DEGRAD FOR SUB. 1	339	0.0000	340	0.0000	DB	DNMSFB
BIOMED SUBCARRIER BELOW FM THRESH DEGRAD FOR SUB. 2	341	0.0000	342	0.0000	DB	DNMSFB
BIOMED SUBCARRIER BELOW FM THRESH DEGRAD FOR SUB. 3	343	0.0000	344	0.0000	DB	DNMSFB
BIOMED SUBCARRIER BELOW FM THRESH DEGRAD FOR SUB. 4	345	0.0000	346	0.0000	DB	DNMSFB
PLAYBACK VOICE BELOW FM THRESHOLD DEGRAD IN POST BW	347	0.0000	348	0.0000	RATIO	DPBV
PLAYBACK VOICE BELOW FM THRESHOLD DEGRAD IN POST BW	349	0.0000	350	0.0000	DB	DPBVDB
UPDATA BELOW FM THRESHOLD DEGRAD IN POST BW	351	0.0000	352	0.0000	RATIO	DTB
UPDATA BELOW FM THRESHOLD DEGRAD IN POST BW	353	0.0000	354	0.0000	DB	DTBDB
SPLIT PHASE TLM BELOW FM THRESHOLD DEGRAD IN POST BW	355	0.0000	356	0.0000	RATIO	DTP
SPLIT PHASE TLM BELOW FM THRESHOLD DEGRAD IN POST BW	357	0.0000	358	0.0000	DB	DTPDB
SPLIT PHASE TLM BELOW FM THRESH DEGRAD IN POST BW(BER CAL)	359	0.0000	360	0.0000	RATIO	DTPR
SPLIT PHASE TLM BELOW FM THRESH DEGRAD IN POST BW(BER CAL)	361	0.0000	362	0.0000	DB	DTPRDB
FM MODE PCM TLM BELOW THRESH DEGRAD IN PRED BW	363	0.0000	364	0.0000	RATIO	DTSF
FM MODE PCM TLM BELOW THRESH DEGRAD IN PRED BW	365	0.0000	366	0.0000	DB	DTSFDB
FM MODE PCM TLM BELOW THRESH DEGRAD IN PRED BW (BER CAL)	367	0.0000	368	0.0000	RATIO	DTSFR
FM MODE PCM TLM BELOW THRESH DEGRAD IN PRED BW (BER CAL)	369	0.0000	370	0.0000	DB	DTSFRB
UPVOICE BELOW FM THRESHOLD DEGRAD IN POST BW	371	0.0000	372	0.0000	RATIO	DVB
UPVOICE BELOW FM THRESHOLD DEGRAD IN POST BW	373	0.0000	374	0.0000	DB	DVBDB
FM MODE VOICE BELOW THRESHOLD DEGRAD IN POST BW	375	0.0000	376	0.0000	RATIO	DVF
FM MODE VOICE BELOW THRESHOLD DEGRAD IN POST BW	377	0.0000	378	0.0000	DB	DVFDB
FM MODE VOICE BELOW THRESHOLD DEGRAD IN PRED BW	379	0.0000	380	0.0000	RATIO	DVSF
FM MODE VOICE BELOW THRESHOLD DEGRAD IN PRED BW	381	0.0000	382	0.0000	DB	DVSFDB
TELEVISION BELOW FM THRESHOLD DEGRAD IN POST BW	383	0.0000	384	0.0000	RATIO	DXE
TELEVISION BELOW FM THRESHOLD DEGRAD IN POST BW	385	0.0000	386	0.0000	DB	DXEDB
LIMITER LOSSES	387	0.0000	388	0.0000	WATTS	ELLELL
TRANSPONDER CONSTANT	389	0.0000	390	0.0000		ENIF
BIOMED SUB. FREQ. DEVIATION OF VOICE SUB. FOR SUB. 1	391	0.0000	392	0.0000	HZ	FREDEV
BIOMED SUB. FREQ. DEVIATION OF VOICE SUB. FOR SUB. 3	393	0.0000	394	0.0000	HZ	FREDEV
BIOMED SUB. FREQ. DEVIATION OF VOICE SUB. FOR SUB. 5	395	0.0000	396	0.0000	HZ	FREDEV

PARAMETER DEFINITION	NO.	DOWNLINK VALUE	NO.	UPLINK VALUE	UNITS	COMPUTER MNEMONIC
BIOMED SUB. FREQ. DEVIATION OF VOICE SUB. FOR SUB. 7	397	0.0000	398	0.0000	HZ	FREDEV
TURNED AROUND UPVOICE MODULATION INDEX	399	0.0000	400	0.0000	RAD	GAMM
TOTAL LOSSES IN COMMUNICATION LINK	401	0.0000	402	0.0000	DB	LDB
SPACE LOSS	403	0.0000	404	0.0000	DB	LSDB
TLM MARGIN FOR BER CALCULATION	405	0.0000	406	0.0000	DB	MGTBER
CARRIER POWER	407	0.0000	408	0.0000	WATTS	PC
CARRIER POWER	409	0.0000	410	0.0000	DB	PCDB
NOISE SPECTRAL DENSITY	411	0.0000	412	0.0000	W/HZ	PHIF
MODULATION LEVEL RELATIVE TO CHANNEL ONE - CHANNEL 1	413	0.0000	414	0.0000	--	RATIO
MODULATION LEVEL RELATIVE TO CHANNEL ONE - CHANNEL 2	415	0.0000	416	0.0000	--	RATIO
MODULATION LEVEL RELATIVE TO CHANNEL ONE - CHANNEL 3	417	0.0000	418	0.0000	--	RATIO
MODULATION LEVEL RELATIVE TO CHANNEL ONE - CHANNEL 4	419	0.0000	420	0.0000	--	RATIO
MODULATION LEVEL RELATIVE TO CHANNEL ONE - CHANNEL 5	421	0.0000	422	0.0000	--	RATIO
MODULATION LEVEL RELATIVE TO CHANNEL ONE - CHANNEL 6	423	0.0000	424	0.0000	--	RATIO
MODULATION LEVEL RELATIVE TO CHANNEL ONE - CHANNEL 7	425	0.0000	426	0.0000	--	RATIO
MODULATION LEVEL RELATIVE TO CHANNEL ONE - CHANNEL 8	427	0.0000	428	0.0000	--	RATIO
SLANT RANGE BETWEEN SPACECRAFT AND GROUND STATION	429	5.0000+02	430	0.0000	NM	RNM
UPVOICE SNR FOR ABOVE FM THRESH IN POST BW	431	0.0000	432	0.0000	RATIO	SNVOP
UPVOICE SNR FOR ABOVE FM THRESH IN POST BW	433	0.0000	434	0.0000	DB	SNVOPB
RECEIVED SIGNAL LEVEL	435	0.0000	436	0.0000	WATTS	SR
RECEIVED SIGNAL LEVEL	437	0.0000	438	0.0000	DB	SRDB
RECEIVED SIGNAL LEVEL	439	0.0000	440	0.0000	DBM	SRDBM
TRANSMITTED POWER	441	0.0000	442	0.0000	DBW	STDB
EFFECTIVE SYSTEM NOISE TEMPERATURE	443	0.0000	444	0.0000	DEG	T
TURNED AROUND THERMAL NOISE MODULATION INDEX	445	0.0000	446	0.0000	RAD	XI
THESE LOCATIONS ARE NOT CURRENTLY USED	447	0.0000	448	0.0000		
THESE LOCATIONS ARE NOT CURRENTLY USED	449	0.0000	450	0.0000		
THESE LOCATIONS ARE NOT CURRENTLY USED	451	0.0000	452	0.0000		
THESE LOCATIONS ARE NOT CURRENTLY USED	453	0.0000	454	0.0000		
THESE LOCATIONS ARE NOT CURRENTLY USED	455	0.0000	456	0.0000		
THESE LOCATIONS ARE NOT CURRENTLY USED	457	0.0000	458	0.0000		
THESE LOCATIONS ARE NOT CURRENTLY USED	459	0.0000	460	0.0000		
THESE LOCATIONS ARE NOT CURRENTLY USED	461	0.0000	462	0.0000		

PARAMETER DEFINITION	NO.	DOWNLINK VALUE	NO.	UPLINK VALUE	UNITS	COMPUTER MNEMONIC
THESE LOCATIONS ARE NOT CURRENTLY USED	463	0.0000	464	0.0000		
THESE LOCATIONS ARE NOT CURRENTLY USED	465	0.0000	466	0.0000		
THESE LOCATIONS ARE NOT CURRENTLY USED	467	0.0000	468	0.0000		
THESE LOCATIONS ARE NOT CURRENTLY USED	469	0.0000	470	0.0000		
THESE LOCATIONS ARE NOT CURRENTLY USED	471	0.0000	472	0.0000		
THESE LOCATIONS ARE NOT CURRENTLY USED	473	0.0000	474	0.0000		
THESE LOCATIONS ARE NOT CURRENTLY USED	475	0.0000	476	0.0000		
THESE LOCATIONS ARE NOT CURRENTLY USED	477	0.0000	478	0.0000		
THESE LOCATIONS ARE NOT CURRENTLY USED	479	0.0000	480	0.0000		
THESE LOCATIONS ARE NOT CURRENTLY USED	481	0.0000	482	0.0000		
THESE LOCATIONS ARE NOT CURRENTLY USED	483	0.0000	484	0.0000		
THESE LOCATIONS ARE NOT CURRENTLY USED	485	0.0000	486	0.0000		
THESE LOCATIONS ARE NOT CURRENTLY USED	487	0.0000	488	0.0000		
THESE LOCATIONS ARE NOT CURRENTLY USED	489	0.0000	490	0.0000		
THESE LOCATIONS ARE NOT CURRENTLY USED	491	0.0000	492	0.0000		
THESE LOCATIONS ARE NOT CURRENTLY USED	493	0.0000	494	0.0000		
THESE LOCATIONS ARE NOT CURRENTLY USED	495	0.0000	496	0.0000		
THESE LOCATIONS ARE NOT CURRENTLY USED	497	0.0000	498	0.0000		
THESE LOCATIONS ARE NOT CURRENTLY USED	499	0.0000	500	0.0000		

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REPORT SPECIFICATION DATA-

     REPORT TYPE NO. 3
     START LIMIT = 0.000
     STOP LIMIT = 0.000
     VARIABLES TO BE REPORTED (REPORT TYPE NO. 5 ONLY)-    0,   0,   0,   0,   0,   0,   0,   0
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PREDICTION ANALYSIS
DOWNLINK COMBINATIONS

RECEIVED POWER (DBM)	FM VOICE SNR PRE/POST (DB)	FM TELE METRY SNR (DB)	FM TELEVI SION SNR (DB)	BIT ERROR RATE	FM EVA BIOMED SNR (DB) PREDETECTION 1/3	PREDETECTION 2/4	POSTDETECTION 1/2	POSTDETECTION 2/4
-74.97	22.04	25.36	.00	1.000-08	-9.33	2.43	2.63	13.14
	31.12				.00	.00	.00	.00
-78.49	18.52	21.84	.00	1.000-08	-12.85	-1.10	.74	8.18
	27.60				.00	.00	.00	.00
-80.99	16.02	19.34	.00	1.000-08	-15.35	-3.60	-.78	5.95
	25.10				.00	.00	.00	.00
-82.93	14.08	17.41	.00	1.000-08	-17.29	-5.53	-2.12	4.64
	23.16				.00	.00	.00	.00
-84.51	12.50	15.82	.00	1.000-08	-18.87	-7.12	-3.32	3.72
	21.58				.00	.00	.00	.00
-85.85	11.16	14.48	.00	1.000-08	-20.21	-8.46	-4.40	3.00
	20.24				.00	.00	.00	.00
-87.01	9.99	13.31	.00	1.000-08	-21.37	-9.62	-5.37	2.38
	19.05				.00	.00	.00	.00
-88.03	8.95	12.25	.00	1.000-08	-22.42	-10.66	-6.28	1.83
	17.88				.00	.00	.00	.00
-88.95	7.98	11.23	.00	7.451-08	-23.39	-11.64	-7.15	1.30
	16.45				.00	.00	.00	.00
-89.78	7.04	10.18	.00	6.512-06	-24.35	-12.58	-8.02	.77
	14.50				.00	.00	.00	.00

RECEIVED POWER (DBM)	FM VOICE SNR PRE/POST (DB)	FM TELEMETRY SNR (DB)	FM TELEVISION SNR (DB)	BIT ERROR RATE	FM EVA BIOMED SNR (DB) PREDETECTION 1/3	PREDETECTION 2/4	POSTDETECTION 1/2	POSTDETECTION 2/4
-90.53	6.11	9.10	.00	1.63E-04	-25.30	-13.52	-8.90	.22
	12.06				.00	.00	.00	.00
-91.23	5.20	8.01	.00	1.40E-03	-26.25	-14.44	-9.79	-.36
	9.47				.00	.00	.00	.00
-91.87	4.31	6.95	.00	9.95E-03	-27.19	-15.34	-10.69	-.95
	7.05				.00	.00	.00	.00
-92.47	3.46	5.93	.00	9.95E-03	-28.09	-16.21	-11.55	-1.54
	4.96				.00	.00	.00	.00
-93.03	2.66	4.99	.00	9.95E-03	-28.94	-17.02	-12.37	-2.12
	3.22				.00	.00	.00	.00
-93.56	1.92	4.12	.00	9.95E-03	-29.73	-17.78	-13.14	-2.68
	1.79				.00	.00	.00	.00
-94.05	1.23	3.33	.00	9.95E-03	-30.46	-18.48	-13.85	-3.22
	.62				.00	.00	.00	.00
-94.52	.59	2.62	.00	9.95E-03	-31.12	-19.12	-14.50	-3.73
	-.34				.00	.00	.00	.00
-94.97	.01	1.97	.00	9.95E-03	-31.72	-19.71	-15.09	-4.21
	-1.13				.00	.00	.00	.00
-95.39	-.53	1.38	.00	9.95E-03	-32.27	-20.25	-15.63	-4.65
	-1.80				.00	.00	.00	.00

OUTPUT PARAMETERS LISTING

PARAMETER DEFINITION	NO.	DOWNLINK VALUE	NO.	UPLINK VALUE	UNITS	COMPUTER MNEMONIC
TURNED AROUND PRN MODULATION INDEX	301	0.0000	302	0.0000	RAD	ALPHA
TURNED AROUND UPDATA MODULATION INDEX	303	0.0000	304	0.0000	RAD	BET
BIOMED PHASE DEVIATION WITH VOICE ON CARRIER FOR SUB NO 1	305	0.0000	306	0.0000	RAD	BETEVA
BIOMED PHASE DEVIATION WITH VOICE ON CARRIER FOR SUB NO 2	307	0.0000	308	0.0000	RAD	BETEVA
BIOMED PHASE DEVIATION WITH VOICE ON CARRIER FOR SUB NO 3	309	0.0000	310	0.0000	RAD	BETEVA
BIOMED PHASE DEVIATION WITH VOICE ON CARRIER FOR SUB NO 4	311	0.0000	312	0.0000	RAD	BETEVA
BIOMED PHASE DEVIATION WITH VOICE ON CARRIER FOR SUB NO 5	313	0.0000	314	0.0000	RAD	BETEVA
BIOMED PHASE DEVIATION WITH VOICE ON CARRIER FOR SUB NO 6	315	0.0000	316	0.0000	RAD	BETEVA
BIOMED PHASE DEVIATION WITH VOICE ON CARRIER FOR SUB NO 7	317	0.0000	318	0.0000	RAD	BETEVA
BIOMED PHASE DEVIATION WITH VOICE ON CARRIER FOR SUB NO 9	319	0.0000	320	0.0000	RAD	BETEVA
COMPOSITE MODULATION LEVEL	321	1.4214+00	322	0.0000	--	COMOLE
BIOMED SUB. BELOW FM THRESH DEGRAD (WITH MOD) SUB NO 1	323	1.2299+00	324	0.0000	RATIO	DMMSF
BIOMED SUB. BELOW FM THRESH DEGRAD (WITH MOD) SUB NO 2	325	1.0647+00	326	0.0000	RATIO	DMMSF
BIOMED SUB. BELOW FM THRESH DEGRAD (WITH MOD) SUB NO 3	327	0.0000	328	0.0000	RATIO	DMMSF
BIOMED SUB. BELOW FM THRESH DEGRAD (WITH MOD) SUB NO 4	329	0.0000	330	0.0000	RATIO	DMMSF
BIOMED SUBCARRIER BELOW FM THRESH DEGRAD FOR SUB. 1	331	1.0905+00	332	0.0000	RATIO	DNMSF
BIOMED SUBCARRIER BELOW FM THRESH DEGRAD FOR SUB. 2	333	1.0255+00	334	0.0000	RATIO	DNMSF
BIOMED SUBCARRIER BELOW FM THRESH DEGRAD FOR SUB. 3	335	0.0000	336	0.0000	RATIO	DNMSF
BIOMED SUBCARRIER BELOW FM THRESH DEGRAD FOR SUB. 4	337	0.0000	338	0.0000	RATIO	DNMSF
BIOMED SUBCARRIER BELOW FM THRESH DEGRAD FOR SUB. 1	339	3.7608-01	340	0.0000	DB	DNMSFB
BIOMED SUBCARRIER BELOW FM THRESH DEGRAD FOR SUB. 2	341	1.0922-01	342	0.0000	DB	DNMSFB
BIOMED SUBCARRIER BELOW FM THRESH DEGRAD FOR SUB. 3	343	0.0000	344	0.0000	DB	DNMSFB
BIOMED SUBCARRIER BELOW FM THRESH DEGRAD FOR SUB. 4	345	0.0000	346	0.0000	DB	DNMSFB
PLAYBACK VOICE BELOW FM THRESHOLD DEGRAD IN POST BW	347	0.0000	348	0.0000	RATIO	DPBV
PLAYBACK VOICE BELOW FM THRESHOLD DEGRAD IN POST BW	349	0.0000	350	0.0000	DB	DPBVDB
UPDATA BELOW FM THRESHOLD DEGRAD IN POST BW	351	0.0000	352	0.0000	RATIO	DTB
UPDATA BELOW FM THRESHOLD DEGRAD IN POST BW	353	0.0000	354	0.0000	DB	DTBDB
SPLIT PHASE TLM BELOW FM THRESHOLD DEGRAD IN POST BW	355	0.0000	356	0.0000	RATIO	DTP
SPLIT PHASE TLM BELOW FM THRESHOLD DEGRAD IN POST BW	357	0.0000	358	0.0000	DB	DTPDB
SPLIT PHASE TLM BELOW FM THRESH DEGRAD IN POST BW(BER CAL)	359	0.0000	360	0.0000	RATIO	DTPR
SPLIT PHASE TLM BELOW FM THRESH DEGRAD IN POST BW(BER CAL)	361	0.0000	362	0.0000	DB	DTPRDB
FM MODE PCM TLM BELOW THRESH DEGRAD IN PRED BW	363	2.2700+00	364	0.0000	RATIO	DTSF
FM MODE PCM TLM BELOW THRESH DEGRAD IN PRED BW	365	3.5603+00	366	0.0000	DB	DTSFDB

PARAMETER DEFINITION	NO.	DOWNLINK VALUE	NO.	UPLINK VALUE	UNITS	COMPUTER MNEMONIC
FM MODE PCM TLM BELOW THRESH DEGRAD IN PRED BW (BER CAL)	367	4.6576+00	368	0.0000	RATIO	DTSFR
FM MODE PCM TLM BELOW THRESH DEGRAD IN PRED BW (BER CAL)	369	6.6816+00	370	0.0000	DB	DTSFRB
UPVOICE BELOW FM THRESHOLD DEGRAD IN POST BW	371	0.0000	372	0.0000	RATIO	DVB
UPVOICE BELOW FM THRESHOLD DEGRAD IN POST BW	373	0.0000	374	0.0000	DB	DVBDB
FM MODE VOICE BELOW THRESHOLD DEGRAD IN POST BW	375	1.0827+01	376	0.0000	RATIO	DVF
FM MODE VOICE BELOW THRESHOLD DEGRAD IN POST BW	377	1.0345+01	378	0.0000	DB	DVFDB
FM MODE VOICE BELOW THRESHOLD DEGRAD IN PRED BW	379	1.6392+00	380	0.0000	RATIO	DVSF
FM MODE VOICE BELOW THRESHOLD DEGRAD IN PRED BW	381	2.1464+00	382	0.0000	DB	DVSFDB
TELEVISION BELOW FM THRESHOLD DEGRAD IN POST BW	383	0.0000	384	0.0000	RATIO	DXE
TELEVISION BELOW FM THRESHOLD DEGRAD IN POST BW	385	0.0000	386	0.0000	DB	DXEDB
LIMITER LOSSES	387	1.0000+00	388	0.0000	WATTS	ELLELL
TRANSPONDER CONSTANT	389	0.0000	390	0.0000		ENIF
BIOMED SUB. FREQ. DEVIATION OF VOICE SUB. FOR SUB. 1	391	2.2794+01	392	0.0000	HZ	FREDEV
BIOMED SUB. FREQ. DEVIATION OF VOICE SUB. FOR SUB. 3	393	2.2792+02	394	0.0000	HZ	FREDEV
BIOMED SUB. FREQ. DEVIATION OF VOICE SUB. FOR SUB. 5	395	0.0000	396	0.0000	HZ	FREDEV
BIOMED SUB. FREQ. DEVIATION OF VOICE SUB. FOR SUB. 7	397	0.0000	398	0.0000	HZ	FREDEV
TURNED AROUND UPVOICE MODULATION INDEX	399	0.0000	400	0.0000	RAD	GAMM
TOTAL LOSSES IN COMMUNICATION LINK	401	1.3539+02	402	0.0000	DB	LDB
SPACE LOSS	403	1.8539+02	404	0.0000	DB	LSDB
TLM MARGIN FOR BER CALCULATION	405	-1.1741+01	406	0.0000	DB	MGTBER
CARRIER POWER	407	0.0000	408	0.0000	WATTS	PC
CARRIER POWER	409	0.0000	410	0.0000	DB	PCDB
NOISE SPECTRAL DENSITY	411	4.6368-20	412	0.0000	W/HZ	PHIF
MODULATION LEVEL RELATIVE TO CHANNEL ONE - CHANNEL 1	413	1.0000+00	414	0.0000	--	RATIO
MODULATION LEVEL RELATIVE TO CHANNEL ONE - CHANNEL 2	415	1.0000+00	416	0.0000	--	RATIO
MODULATION LEVEL RELATIVE TO CHANNEL ONE - CHANNEL 3	417	0.0000	418	0.0000	--	RATIO
MODULATION LEVEL RELATIVE TO CHANNEL ONE - CHANNEL 4	419	0.0000	420	0.0000	--	RATIO
MODULATION LEVEL RELATIVE TO CHANNEL ONE - CHANNEL 5	421	0.0000	422	0.0000	--	RATIO
MODULATION LEVEL RELATIVE TO CHANNEL ONE - CHANNEL 6	423	0.0000	424	0.0000	--	RATIO
MODULATION LEVEL RELATIVE TO CHANNEL ONE - CHANNEL 7	425	0.0000	426	0.0000	--	RATIO
MODULATION LEVEL RELATIVE TO CHANNEL ONE - CHANNEL 8	427	0.0000	428	0.0000	--	RATIO
SLANT RANGE BETWEEN SPACECRAFT AND GROUND STATION	429	1.0500+04	430	1.0500+04	NM	RNM
UPVOICE SNR FOR ABOVE FM THRESH IN POST BW	431	0.0000	432	0.0000	RATIO	SNVOP

PARAMETER DEFINITION	NO.	DOWNLINK VALUE	NO.	UPLINK VALUE	UNITS	COMPUTER MNEMONIC
UPVOICE SNR FOR ABOVE FM THRESH IN POST BW	433	0.0000	434	0.0000	DB	SNVOPB
RECEIVED SIGNAL LEVEL	435	2.8894-13	436	0.0000	WATTS	SR
RECEIVED SIGNAL LEVEL	437	-1.2539+02	438	0.0000	DB	SRDB
RECEIVED SIGNAL LEVEL	439	-9.5392+01	440	0.0000	DBM	SRDBM
TRANSMITTED POWER	441	1.0000+01	442	0.0000	DBW	STDB
EFFECTIVE SYSTEM NOISE TEMPERATURE	443	3.3600+03	444	0.0000	DEG	T
TURNED AROUND THERMAL NOISE MODULATION INDEX	445	0.0000	446	0.0000	RAD	XI
THESE LOCATIONS ARE NOT CURRENTLY USED	447	0.0000	448	0.0000		
THESE LOCATIONS ARE NOT CURRENTLY USED	449	0.0000	450	0.0000		
THESE LOCATIONS ARE NOT CURRENTLY USED	451	0.0000	452	0.0000		
THESE LOCATIONS ARE NOT CURRENTLY USED	453	0.0000	454	0.0000		
THESE LOCATIONS ARE NOT CURRENTLY USED	455	0.0000	456	0.0000		
THESE LOCATIONS ARE NOT CURRENTLY USED	457	0.0000	458	0.0000		
THESE LOCATIONS ARE NOT CURRENTLY USED	459	0.0000	460	0.0000		
THESE LOCATIONS ARE NOT CURRENTLY USED	461	0.0000	462	0.0000		
THESE LOCATIONS ARE NOT CURRENTLY USED	463	0.0000	464	0.0000		
THESE LOCATIONS ARE NOT CURRENTLY USED	465	0.0000	466	0.0000		
THESE LOCATIONS ARE NOT CURRENTLY USED	467	0.0000	468	0.0000		
THESE LOCATIONS ARE NOT CURRENTLY USED	469	0.0000	470	0.0000		
THESE LOCATIONS ARE NOT CURRENTLY USED	471	0.0000	472	0.0000		
THESE LOCATIONS ARE NOT CURRENTLY USED	473	0.0000	474	0.0000		
THESE LOCATIONS ARE NOT CURRENTLY USED	475	0.0000	476	0.0000		
THESE LOCATIONS ARE NOT CURRENTLY USED	477	0.0000	478	0.0000		
THESE LOCATIONS ARE NOT CURRENTLY USED	479	0.0000	480	0.0000		
THESE LOCATIONS ARE NOT CURRENTLY USED	481	0.0000	482	0.0000		
THESE LOCATIONS ARE NOT CURRENTLY USED	483	0.0000	484	0.0000		
THESE LOCATIONS ARE NOT CURRENTLY USED	485	0.0000	486	0.0000		
THESE LOCATIONS ARE NOT CURRENTLY USED	487	0.0000	488	0.0000		
THESE LOCATIONS ARE NOT CURRENTLY USED	489	0.0000	490	0.0000		
THESE LOCATIONS ARE NOT CURRENTLY USED	491	0.0000	492	0.0000		
THESE LOCATIONS ARE NOT CURRENTLY USED	493	0.0000	494	0.0000		
THESE LOCATIONS ARE NOT CURRENTLY USED	495	0.0000	496	0.0000		
THESE LOCATIONS ARE NOT CURRENTLY USED	497	0.0000	498	0.0000		

PARAMETER DEFINITION	NO.	DOWNLINK VALUE	NO.	UPLINK VALUE	UNITS	COMPUTER MNEMONIC
THESE LOCATIONS ARE NOT CURRENTLY USED	499	0.0000	500	0.0000		
PROBABILITY OF BIT ERROR RATE	501	9.9500-03	502	0.0000	--	BER
BACK-UP VOICE MARGIN PREDETECTION BW	503	0.0000	504	0.0000	DB	MGBE
CARRIER MARGIN IN LOOP BW	505	0.0000	506	0.0000	DB	MGC
EMERGENCY KEY MARGIN IN PREDETECTION BW	507	0.0000	508	0.0000	DB	MGKE
PRN RANGING MARGIN	509	0.0000	510	0.0000	DB	MGP
PM MODE TLM MARGIN IN PREDETECTION BW	511	0.0000	512	0.0000	DB	MGTE
UPDATA MARGIN IN POSTDETECTION BW	513	0.0000	514	0.0000	DB	MGTD
SPLIT PHASE TLM MARGIN IN POSTDETECTION BW	515	0.0000	516	0.0000	DB	MGTPR
PCM TLM MARGIN IN PREDETECTION BW WITH VOICE ON CARRIER	517	0.0000	518	0.0000	DB	MGTSB
FM MODE PCM TLM MARGIN IN PREDETECTION BW (BER CAL)	519	-1.1741+01	520	0.0000	DB	MGTSFR
PM MODE VOICE MARGIN IN PREDETECTION BW	521	0.0000	522	0.0000	DB	MGVE
PM MODE VOICE MARGIN IN POSTDETECTION BW	523	-1.7955+00	524	0.0000	DB	MGVD
FM MODE VOICE MARGIN IN POSTDETECTION BW	525	-1.1796+01	526	0.0000	DB	MGVDF
FM MODE VOICE MARGIN IN PREDETECTION BW	527	-1.0532+01	528	0.0000	DB	MGVSF
BACKUP VOICE MODULATION LOSS	529	0.0000	530	0.0000	RATIO	MLBV
CARRIER MODULATION LOSS WITH VOICE AND BIOMED SUBCARRIER	531	0.0000	532	0.0000	RATIO	MLCVBS
DOWNLINK CARRIER MODULATION LOSS	533	0.0000	534	0.0000	RATIO	MLDC
DOWNLINK KEYING MODULATION LOSS	535	0.0000	536	0.0000	RATIO	MLDK
DOWNLINK PM MODE HI BIT RATE TLM MODULATION LOSS	537	0.0000	538	0.0000	RATIO	MLDPHT
DOWNLINK PM MODE LOW BIT RATETLM MODULATION LOSS	539	0.0000	540	0.0000	RATIO	MLDPLT
DOWNLINK PRN MODULATION LOSS	541	0.0000	542	0.0000	RATIO	MLDPRN
DOWNLINK PM MODE VOICE MODULATION LOSS	543	0.0000	544	0.0000	RATIO	MLDPV
DOWNLINK LOW BIT RATE TLM WITH VOC MODULATION LOSS	545	0.0000	546	0.0000	RATIO	MLDVLT
EVA MODULATION LOSS - CHANNEL 1	547	0.0000	548	0.0000	RATIO	MLEVA
EVA MODULATION LOSS - CHANNEL 2	549	0.0000	550	0.0000	RATIO	MLEVA
EVA MODULATION LOSS - CHANNEL 3	551	0.0000	552	0.0000	RATIO	MLEVA
EVA MODULATION LOSS - CHANNEL 4	553	0.0000	554	0.0000	RATIO	MLEVA
EVA MODULATION LOSS - CHANNEL 5	555	0.0000	556	0.0000	RATIO	MLEVA
EVA MODULATION LOSS - CHANNEL 6	557	0.0000	558	0.0000	RATIO	MLEVA
EVA MODULATION LOSS - CHANNEL 7	559	0.0000	560	0.0000	RATIO	MLEVA
EVA MODULATION LOSS - CHANNEL 8	561	0.0000	562	0.0000	RATIO	MLEVA
HLB MODULATION LOSS	563	0.0000	564	0.0000	RATIO	MLHLB

PARAMETER DEFINITION	NO.	DOWNLINK VALUE	NO.	UPLINK VALUE	UNITS	COMPUTER MNEMONIC
UPLINK CARRIER MODULATION LOSS	565	0.0000	566	0.0000	RATIO	MLUC
UPLINK PM MODE TLM MODULATION LOSS	567	0.0000	568	0.0000	RATIO	MLUPT
UPLINK PM MODE VOICE MODULATION LOSS	569	0.0000	570	0.0000	RATIO	MLUPV
NOISE FIGURE	571	1.1586+01	572	0.0000	RATIO	NOISEF
CARRIER POWER	573	0.0000	574	0.0000	DBM	PCDBM
NOISE SPECTRAL DENSITY	575	-1.9334+02	576	0.0000	DB	PHIFDB
DOWNLINK BIOMED SNR IN POSTDETECTION BW - CHANNEL 1	577	2.7354-02	578	0.0000	RATIO	SNBD
DOWNLINK BIOMED SNR IN POSTDETECTION BW - CHANNEL 2	579	3.4252-01	580	0.0000	RATIO	SNBD
DOWNLINK BIOMED SNR IN POSTDETECTION BW - CHANNEL 3	581	0.0000	582	0.0000	RATIO	SNBD
DOWNLINK BIOMED SNR IN POSTDETECTION BW - CHANNEL 4	583	0.0000	584	0.0000	RATIO	SNBD
DOWNLINK BIOMED SNR IN POSTDETECTION BW - CHANNEL 1	585	-1.5630+01	586	0.0000	DB	SNBDDB
DOWNLINK BIOMED SNR IN POSTDETECTION BW - CHANNEL 2	587	-4.6531+00	588	0.0000	DB	SNBDDB
DOWNLINK BIOMED SNR IN POSTDETECTION BW - CHANNEL 3	589	0.0000	590	0.0000	DB	SNBDDB
DOWNLINK BIOMED SNR IN POSTDETECTION BW - CHANNEL 4	591	0.0000	592	0.0000	DB	SNBDDB
BACK-UP VOICE SNR IN POSTDETECTION BW	593	0.0000	594	0.0000	RATIO	SNBE
BACK-UP VOICE SNR IN POSTDETECTION BW	595	0.0000	596	0.0000	DB	SNBEDB
CARRIER TO NOISE RATIO IN LOOP BW	597	0.0000	598	0.0000	RATIO	SNC
CARRIER TO NOISE RATIO IN LOOP BW	599	0.0000	600	0.0000	DB	SNCDB
BIOMED SUB. SNR IN PRED BW WITH VOICE ON CARRIER SUB 1	601	0.0000	602	0.0000	RATIO	SNESB
BIOMED SUB. SNR IN PRED BW WITH VOICE ON CARRIER SUB 2	603	0.0000	604	0.0000	RATIO	SNESB
BIOMED SUB. SNR IN PRED BW WITH VOICE ON CARRIER SUB 3	605	0.0000	606	0.0000	RATIO	SNESB
BIOMED SUB. SNR IN PRED BW WITH VOICE ON CARRIER SUB 4	607	0.0000	608	0.0000	RATIO	SNESB
BIOMED SUB. SNR IN PRED BW WITH VOICE ON CARRIER SUB 5	609	0.0000	610	0.0000	RATIO	SNESB
BIOMED SUB. SNR IN PRED BW WITH VOICE ON CARRIER SUB 6	611	0.0000	612	0.0000	RATIO	SNESB
BIOMED SUB. SNR IN PRED BW WITH VOICE ON CARRIER SUB 7	613	0.0000	614	0.0000	RATIO	SNESB
BIOMED SUB. SNR IN PRED BW WITH VOICE ON CARRIER SUB 8	615	0.0000	616	0.0000	RATIO	SNESB
BIOMED SUB. SNR IN PRED BW WITH VOICE ON CARRIER SUB 1	617	0.0000	618	0.0000	DB	SNESBB
BIOMED SUB. SNR IN PRED BW WITH VOICE ON CARRIER SUB 2	619	0.0000	620	0.0000	DB	SNESBB
BIOMED SUB. SNR IN PRED BW WITH VOICE ON CARRIER SUB 3	621	0.0000	622	0.0000	DB	SNESBB
BIOMED SUB. SNR IN PRED BW WITH VOICE ON CARRIER SUB 4	623	0.0000	624	0.0000	DB	SNESBB
BIOMED SUB. SNR IN PRED BW WITH VOICE ON CARRIER SUB 5	625	0.0000	626	0.0000	DB	SNESBB
BIOMED SUB. SNR IN PRED BW WITH VOICE ON CARRIER SUB 6	627	0.0000	628	0.0000	DB	SNESBB
BIOMED SUB. SNR IN PRED BW WITH VOICE ON CARRIER SUB 7	629	0.0000	630	0.0000	DB	SNESBB

PARAMETER DEFINITION	NO.	DOWNLINK VALUE	NO.	UPLINK VALUE	UNITS	COMPUTER MNEMONIC
BIOMED SUB. SNR IN PRED BW WITH VOICE ON CARRIER SUB 8	631	0.0000	632	0.0000	DB	SNESBB
HLB SNR IN PREDETECTION BW WITH VOICE ON CARRIER	633	0.0000	634	0.0000	RATIO	SNHSB
HLB SNR IN PREDETECTION BW WITH VOICE ON CARRIER	635	0.0000	636	0.0000	DB	SNHSBB
IF SNR	637	1.2982+00	638	0.0000	RATIO	SNIF
IF SNR	639	1.1334+00	640	0.0000	DB	SNIFDB
EMERGENCY KEY SNR IN PREDETECTION BW	641	0.0000	642	0.0000	RATIO	SNKE
EMERGENCY KEY SNR IN PREDETECTION BW	643	0.0000	644	0.0000	DB	SNKEDB
BIOMED SUB. SNR IN PRED BW (WITH MODULATION) SUB 1	645	5.2539-04	646	0.0000	RATIO	SNMM
BIOMED SUB. SNR IN PRED BW (WITH MODULATION) SUB 2	647	9.0840-03	648	0.0000	RATIO	SNMM
BIOMED SUB. SNR IN PRED BW (WITH MODULATION) SUB 3	649	0.0000	650	0.0000	RATIO	SNMM
BIOMED SUB. SNR IN PRED BW (WITH MODULATION) SUB 4	651	0.0000	652	0.0000	RATIO	SNMM
BIOMED SUB. SNR IN PRED BW (WITH MODULATION) SUB 1	653	-3.3061+01	654	0.0000	DB	SNMMDB
BIOMED SUB. SNR IN PRED BW (WITH MODULATION) SUB 2	655	-2.0685+01	656	0.0000	DB	SNMMDB
BIOMED SUB. SNR IN PRED BW (WITH MODULATION) SUB 3	657	0.0000	658	0.0000	DB	SNMMDB
BIOMED SUB. SNR IN PRED BW (WITH MODULATION) SUB 4	659	0.0000	660	0.0000	DB	SNMMDB
BIOMED SUB. SNR IN PRED BW (WITHOUT MODULATION) SUB 1	661	5.9258-04	662	0.0000	RATIO	SNMSF
BIOMED SUB. SNR IN PRED BW (WITHOUT MODULATION) SUB 2	663	9.4319-03	664	0.0000	RATIO	SNMSF
BIOMED SUB. SNR IN PRED BW (WITHOUT MODULATION) SUB 3	665	0.0000	666	0.0000	RATIO	SNMSF
BIOMED SUB. SNR IN PRED BW (WITHOUT MODULATION) SUB 4	667	0.0000	668	0.0000	RATIO	SNMSF
BIOMED SUB. SNR IN PRED BW (WITHOUT MODULATION) SUB 1	669	-3.2273+01	670	0.0000	DB	SNMSFB
BIOMED SUB. SNR IN PRED BW (WITHOUT MODULATION) SUB 2	671	-2.0254+01	672	0.0000	DB	SNMSFB
BIOMED SUB. SNR IN PRED BW (WITHOUT MODULATION) SUB 3	673	0.0000	674	0.0000	DB	SNMSFB
BIOMED SUB. SNR IN PRED BW (WITHOUT MODULATION) SUB 4	675	0.0000	676	0.0000	DB	SNMSFB
PRN RANGING SNR	677	0.0000	678	0.0000	RATIO	SNP
PRN RANGING SNR	679	0.0000	680	0.0000	DB	SNPDB
PLAYBACK VOICE SNR IN POSTDETECTION BW	681	0.0000	682	0.0000	RATIO	SNPBV
PLAYBACK VOICE SNR IN POSTDETECTION BW	683	0.0000	684	0.0000	DB	SNPBVB
PM MODE TLM SNR IN PREDETECTION BW	685	0.0000	686	0.0000	RATIO	SNTE
PM MODE TLM SNR IN PREDETECTION BW	687	0.0000	688	0.0000	DB	SNTEDB
FM MODE PCM TLM SNR IN PREDETECTION BW (BER CAL)	689	6.6973-01	690	0.0000	RATIO	SNTFR
FM MODE PCM TLM SNR IN PREDETECTION BW (BER CAL)	691	-1.7410+00	692	0.0000	DB	SNTFRB
PM MODE TLM SNR IN POSTDETECTION BW	693	0.0000	694	0.0000	RATIO	SNTO
PM MODE TLM SNR IN POSTDETECTION BW	695	0.0000	696	0.0000	DB	SNTODB

PARAMETER DEFINITION	NO.	DOWNLINK VALUE	NO.	UPLINK VALUE	UNITS	COMPUTER MNEMONIC
SPLIT PHASE TLM SNR IN POSTDETECTION BW	697	0.0000	698	0.0000	RATIO	SNTP
SPLIT PHASE TLM SNR IN POSTDETECTION BW	699	0.0000	700	0.0000	DB	SNTPDB
SPLIT PHASE TLM SNR IN POSTDETECTION BW (BER CAL)	701	0.0000	702	0.0000	RATIO	SNTPR
SPLIT PHASE TLM SNR IN POSTDETECTION BW (BER CAL)	703	0.0000	704	0.0000	DB	SNTPRB
PCM TLM SNR IN PREDETECTION WITH VOICE ON CARRIER	705	0.0000	706	0.0000	RATIO	SNTSB
PCM TLM SNR IN PREDETECTION WITH VOICE ON CARRIER	707	0.0000	708	0.0000	DB	SNTSBB
FM MODE PCM TLM SNR IN PREDETECTION BW	709	1.3741+00	710	0.0000	RATIO	SNTSF
FM MODE PCM TLM SNR IN PREDETECTION BW	711	1.3803+00	712	0.0000	DB	SNTSFB
PM MODE VOICE SNR IN PREDETECTION BW	713	0.0000	714	0.0000	RATIO	SNVE
PM MODE VOICE SNR IN PREDETECTION BW	715	0.0000	716	0.0000	DB	SNVEDB
UPVOICE SNR IN POSTDETECTION BW	717	0.0000	718	0.0000	RATIO	SNVO
UPVOICE SNR IN POSTDETECTION BW	719	0.0000	720	0.0000	DB	SNVODB
PM AND FM MODE VOICE SNR IN POSTDETECTION BW	721	6.6138-01	722	0.0000	RATIO	SNVOF
PM AND FM MODE VOICE SNR IN POSTDETECTION BW	723	-1.7955+00	724	0.0000	DB	SNVOFB
FM MODE VOICE SNR IN PREDETECTION BW	725	8.8481-01	726	0.0000	RATIO	SNVSF
FM MODE VOICE SNR IN PREDETECTION BW	727	-5.3151-01	728	0.0000	DB	SNVSFB
TELEVISION SNR IN POSTDETECTION BW	729	0.0000	730	0.0000	RATIO	SNXE
TELEVISION SNR IN POSTDETECTION BW	731	0.0000	732	0.0000	DB	SNXEDB
THESE LOCATIONS ARE NOT CURRENTLY USED	733	0.0000	734	0.0000		
THESE LOCATIONS ARE NOT CURRENTLY USED	735	0.0000	736	0.0000		
THESE LOCATIONS ARE NOT CURRENTLY USED	737	0.0000	738	0.0000		
THESE LOCATIONS ARE NOT CURRENTLY USED	739	0.0000	740	0.0000		
THESE LOCATIONS ARE NOT CURRENTLY USED	741	0.0000	742	0.0000		
THESE LOCATIONS ARE NOT CURRENTLY USED	743	0.0000	744	0.0000		
THESE LOCATIONS ARE NOT CURRENTLY USED	745	0.0000	746	0.0000		
THESE LOCATIONS ARE NOT CURRENTLY USED	747	0.0000	748	0.0000		
THESE LOCATIONS ARE NOT CURRENTLY USED	749	0.0000	750	0.0000		
THESE LOCATIONS ARE NOT CURRENTLY USED	751	0.0000	752	0.0000		
THESE LOCATIONS ARE NOT CURRENTLY USED	753	0.0000	754	0.0000		
THESE LOCATIONS ARE NOT CURRENTLY USED	755	0.0000	756	0.0000		
THESE LOCATIONS ARE NOT CURRENTLY USED	757	0.0000	758	0.0000		
THESE LOCATIONS ARE NOT CURRENTLY USED	759	0.0000	760	0.0000		
THESE LOCATIONS ARE NOT CURRENTLY USED	761	0.0000	762	0.0000		

PARAMETER DEFINITION	NO.	DOWNLINK VALUE	NO.	UPLINK VALUE	UNITS	COMPUTER MNEMONIC
THESE LOCATIONS ARE NOT CURRENTLY USED	763	0.0000	764	0.0000		
THESE LOCATIONS ARE NOT CURRENTLY USED	765	0.0000	766	0.0000		
THESE LOCATIONS ARE NOT CURRENTLY USED	767	0.0000	768	0.0000		
THESE LOCATIONS ARE NOT CURRENTLY USED	769	0.0000	770	0.0000		
THESE LOCATIONS ARE NOT CURRENTLY USED	771	0.0000	772	0.0000		
THESE LOCATIONS ARE NOT CURRENTLY USED	773	0.0000	774	0.0000		
THESE LOCATIONS ARE NOT CURRENTLY USED	775	0.0000	776	0.0000		
THESE LOCATIONS ARE NOT CURRENTLY USED	777	0.0000	778	0.0000		
THESE LOCATIONS ARE NOT CURRENTLY USED	779	0.0000	780	0.0000		
THESE LOCATIONS ARE NOT CURRENTLY USED	781	0.0000	782	0.0000		
THESE LOCATIONS ARE NOT CURRENTLY USED	783	0.0000	784	0.0000		
THESE LOCATIONS ARE NOT CURRENTLY USED	785	0.0000	786	0.0000		
THESE LOCATIONS ARE NOT CURRENTLY USED	787	0.0000	788	0.0000		
THESE LOCATIONS ARE NOT CURRENTLY USED	789	0.0000	790	0.0000		
THESE LOCATIONS ARE NOT CURRENTLY USED	791	0.0000	792	0.0000		
THESE LOCATIONS ARE NOT CURRENTLY USED	793	0.0000	794	0.0000		
THESE LOCATIONS ARE NOT CURRENTLY USED	795	0.0000	796	0.0000		
THESE LOCATIONS ARE NOT CURRENTLY USED	797	0.0000	798	0.0000		
THESE LOCATIONS ARE NOT CURRENTLY USED	799	0.0000	800	0.0000		

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PROPLEM SPECIFICATION DATA-

     NUMBER OF LINKS = 1
     NUMBER OF REPORTS DESIRED =  1
     NUMBER OF PAGES PER REPORT =  1
     NUMBER OF LINES PER PAGE = 15
     NUMBER OF LINES PER REPORT = 15
     DATA LOCATED IN FILE NO.  3
     PRINT FLAG = 1

LINK SPECIFICATION DATA-

     LM/FM/9B/S          DOWNLINK.  BLOCK SEQUENCE =   6,   7,   8,  24,  15,  16,  20,  30,  31,  25,
                                                      32,  34,   0,   0,   0,   0,   0,   0,   0,   0.
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INPUT PARAMETERS LISTING

PARAMETER DEFINITION	NO.	DOWNLINK VALUE	NO.	UPLINK VALUE	UNITS	COMPUTER MNEMONIC
NOISE SPECTRAL DENSITY CONSTANT A	1	3.3600+03	2	0.0000	DEG	A
NOISE SPECTRAL DENSITY CONSTANT B	3	0.0000	4	0.0000	--	B
FM BIOMED POSTDETECTION NOISE BANDWIDTH - CHANNEL 1	5	3.0000+01	6	0.0000	HZ	BB
FM BIOMED POSTDETECTION NOISE BANDWIDTH - CHANNEL 2	7	6.0000+01	8	0.0000	HZ	BB
FM BIOMED POSTDETECTION NOISE BANDWIDTH - CHANNEL 3	9	0.0000	10	0.0000	HZ	BB
FM BIOMED POSTDETECTION NOISE BANDWIDTH - CHANNEL 4	11	0.0000	12	0.0000	HZ	BB
BACK-UP VOICE POSTDETECTION NOISE BW	13	0.0000	14	0.0000	HZ	BBF
PM MODE CARRIER LOOP NOISE BW	15	0.0000	16	0.0000	HZ	BC
BIOMED EFFECTIVE BASEBAND CLICK BANDWIDTHS - CHANNEL 1	17	3.0000+01	18	0.0000	HZ	BD
BIOMED EFFECTIVE BASEBAND CLICK BANDWIDTHS - CHANNEL 2	19	6.0000+01	20	0.0000	HZ	BD
BIOMED EFFECTIVE BASEBAND CLICK BANDWIDTHS - CHANNEL 3	21	0.0000	22	0.0000	HZ	BD
BIOMED EFFECTIVE BASEBAND CLICK BANDWIDTHS - CHANNEL 4	23	0.0000	24	0.0000	HZ	BD
BIOMED PRED NOISE BW WITH VOICE ON CARRIER FOR SUB. NO. 1	25	0.0000	26	0.0000	HZ	BEE
BIOMED PRED NOISE BW WITH VOICE ON CARRIER FOR SUB. NO. 2	27	0.0000	28	0.0000	HZ	BEE
BIOMED PRED NOISE BW WITH VOICE ON CARRIER FOR SUB. NO. 3	29	0.0000	30	0.0000	HZ	BEE
BIOMED PRED NOISE BW WITH VOICE ON CARRIER FOR SUB. NO. 4	31	0.0000	32	0.0000	HZ	BEE
BIOMED PRED NOISE BW WITH VOICE ON CARRIER FOR SUB. NO. 5	33	0.0000	34	0.0000	HZ	BEE
BIOMED PRED NOISE BW WITH VOICE ON CARRIER FOR SUB. NO. 6	35	0.0000	36	0.0000	HZ	BEE
BIOMED PRED NOISE BW WITH VOICE ON CARRIER FOR SUB. NO. 7	37	0.0000	38	0.0000	HZ	BEE
BIOMED PRED NOISE BW WITH VOICE ON CARRIER FOR SUB. NO. 8	39	0.0000	40	0.0000	HZ	BEE
HLB PRED NOISE BW WITH VOICE ON CARRIER	41	0.0000	42	0.0000	HZ	BHE
IF NOISE BANDWIDTH	43	4.8000+06	44	0.0000	HZ	BIF
EMERGENCY KEY PREDETECTION NOISE BW	45	0.0000	46	0.0000	HZ	BKE
VOICE EFFECTIVE BASEBAND CLICK BANDWIDTH	47	1.6800+04	48	0.0000	HZ	BLF
BIOMED EFFECTIVE CLICK BANDWIDTH - SUB. NO. 1	49	5.8600+02	50	0.0000	HZ	BLM
BIOMED EFFECTIVE CLICK BANDWIDTH - SUB. NO. 2	51	5.9600+02	52	0.0000	HZ	BLM
BIOMED EFFECTIVE CLICK BANDWIDTH - SUB. NO. 3	53	0.0000	54	0.0000	HZ	BLM
BIOMED EFFECTIVE CLICK BANDWIDTH - SUB. NO. 4	55	0.0000	56	0.0000	HZ	BLM
PLAY BACK VOICE EFFECTIVE CLICK BANDWIDTH	57	0.0000	58	0.0000	HZ	BLPBV
SPLIT PHASE TLM EFFECTIVE CLICK BANDWIDTH	59	0.0000	60	0.0000	HZ	BLTP
TELEVISION EFFECTIVE CLICK BANDWITH	61	0.0000	62	0.0000	HZ	BLX
BIOMED SUBCARRIER PRED NOISE BW FOR SUB. NO. 1	63	5.8600+02	64	0.0000	HZ	BMSF
BIOMED SUBCARRIER PRED NOISE BW FOR SUB. NO. 2	65	1.1020+03	66	0.0000	HZ	BMSF

PARAMETER DEFINITION	NO.	DOWNLINK VALUE	NO.	UPLINK VALUE	UNITS	COMPUTER MNEMONIC
BIOMED SUBCARRIER PRED NOISE BW FOR SUB. NO. 3	67	0.0000	68	0.0000	HZ	BMSF
BIOMED SUBCARRIER PRED NOISE BW FOR SUB. NO. 4	69	0.0000	70	0.0000	HZ	BMSF
PLAYBACK VOICE PREDETECTION NOISE BW	71	0.0000	72	0.0000	HZ	BPBVE
PLAYBACK VOICE POSTDETECTION NOISE BW	73	0.0000	74	0.0000	HZ	BPBVO
PRN RANGING BANDWIDTH	75	0.0000	76	0.0000	HZ	BPK
TRANSPONDER VIDEO BANDWIDTH	77	0.0000	78	0.0000	HZ	BR
PM MODE PCM TELEMETRY PREDETECTION NOISE BW	79	0.0000	80	0.0000	HZ	BTE
FM MODE PCM TELEMETRY PREDETECTION NOISE BW	81	1.5500+05	82	0.0000	HZ	BTEF
UPDATA POSTDETECTION NOISE BW	83	0.0000	84	0.0000	HZ	BTO
SPLIT PHASE TLM PREDETECTION NOISE BW	85	0.0000	86	0.0000	HZ	BTPE
SPLIT PHASE TLM POSTDETECTION NOISE BW	87	0.0000	88	0.0000	HZ	BTPO
PM MODE VOICE PREDETECTION NOISE BW	89	0.0000	90	0.0000	HZ	BVE
FM MODE VOICE PREDETECTION NOISE BW	91	4.1760+04	92	0.0000	HZ	BVEF
PM MODE VOICE POSTDETECTION NOISE BW	93	0.0000	94	0.0000	HZ	BVO
FM MODE VOICE POSTDETECTION NOISE BW	95	3.4700+03	96	0.0000	HZ	BVOF
TLM SUBCARRIER EFFECTIVE CLICK BANDWIDTH	97	4.3200+06	98	0.0000	HZ	BWTSF
VOICE SUBCARRIER EFFECTIVE CLICK BANDWIDTH	99	4.3200+06	100	0.0000	HZ	BWVSF
TELEVISION POSTDETECTION NOISE BW	101	0.0000	102	0.0000	HZ	BXE
BIOMED SUBCARRIER CENTER FREQUENCY FOR SUB. NO. 1	103	3.9000+03	104	0.0000	HZ	CMSF
BIOMED SUBCARRIER CENTER FREQUENCY FOR SUB. NO. 2	105	7.3500+03	106	0.0000	HZ	CMSF
BIOMED SUBCARRIER CENTER FREQUENCY FOR SUB. NO. 3	107	0.0000	108	0.0000	HZ	CMSF
BIOMED SUBCARRIER CENTER FREQUENCY FOR SUB. NO. 4	109	0.0000	110	0.0000	HZ	CMSF
FM MODE PCM TLM SUBCARRIER CENTER FREQUENCY	111	1.0240+06	112	0.0000	HZ	CTSF
FM MODE VOICE SUBCARRIER CENTER FREQUENCY	113	1.2500+06	114	0.0000	HZ	CVSF
FM BIOMED SUBCARRIER FREQUENCY DEVIATION SUB. 1	115	3.0000+01	116	0.0000	HZ	DELFB
FM BIOMED SUBCARRIER FREQUENCY DEVIATION SUB. 2	117	6.0000+01	118	0.0000	HZ	DELFB
FM BIOMED SUBCARRIER FREQUENCY DEVIATION SUB. 3	119	0.0000	120	0.0000	HZ	DELFB
FM BIOMED SUBCARRIER FREQUENCY DEVIATION SUB. 4	121	0.0000	122	0.0000	HZ	DELFB
DELTA RANGE INCREMENT	123	5.0000+02	124	0.0000	NM	DELNM
DELTA RECEIVED SIGNAL LEVEL INCREMENT	125	5.0000+00	126	0.0000	DBM	DELSR
VOICE DEGRADATION DUE TO NON-RECT OUTPUT BW	127	6.0000-01	128	0.0000	--	DFK
PLAYBACK VOICE DEGRAD FACTOR DUE TO NON-RECT OUTPUT BW	129	0.0000	130	0.0000	--	DFKPBV
PCM TLM DEGRAD FACTOR DUE TO NON-RECT OUTPUT BW	131	8.0000-01	132	0.0000	--	DFKT

PARAMETER DEFINITION	NO.	DOWNLINK VALUE	NO.	UPLINK VALUE	UNITS	COMPUTER MNEMONIC
SPLIT PHASE TLM DEGRAD FACTOR DUE TO NON-RECT OUTPUT BW	133	0.0000	134	0.0000	--	DFKTP
TELEVISION DEGRAD FACTOR DUE TO NON-RECT OUTPUT BW	135	0.0000	136	0.0000	--	DFKX
TRANSMITTING FREQUENCY	137	2.2825+03	138	0.0000	MHZ	FMC
PLAYBACK VOICE FREQUENCY DEVIATION OF CARRIER	139	0.0000	140	0.0000	HZ	FPBV
FM MODE PCM TLM SUBCARRIER FREQUENCY DEVIATION OF CARRIER	141	4.5100+05	142	0.0000	HZ	FTF
SPLIT PHASE TELEMETRY FREQUENCY DEVIATION OF CARRIER	143	0.0000	144	0.0000	HZ	FTP
UPDATA SUBCARRIER FREQUENCY DEVIATION OF CARRIER	145	0.0000	146	0.0000	HZ	FTS
VOICE SUBCARRIER FREQUENCY DEVIATION OF CARRIER	147	2.2500+05	148	0.0000	HZ	FVF
UPVOICE SUBCARRIER FREQUENCY DEVIATION OF CARRIER	149	0.0000	150	0.0000	HZ	FVS
FREQUENCY DEVIATION OF VOICE SUBCARRIER	151	3.0000+03	152	0.0000	HZ	FVSF
TELEVISION FREQUENCY DEVIATION OF CARRIER	153	0.0000	154	0.0000	HZ	FXF
LOSSES DUE TO SPACECRAFT ATTITUDE	155	0.0000	156	0.0000	DB	GAMMA
RECEIVER ANTENNA GAIN	157	0.0000	158	0.0000	DB	GR
TRANSMITTER ANTENNA GAIN	159	5.0000+01	160	0.0000	DB	GT
BOLTZMANN'S CONSTANT	161	1.3800-23	162	0.0000	--	K
BIOMED DEGRADATION DUE TO NON-RECT OUTPUT BANDWIDTH	163	8.0000-01	164	0.0000	--	KB
CIRCUIT LOSSES	165	0.0000	166	0.0000	DB	LC
MODULATION LEVEL CHANNEL 1	167	1.0000+00	168	0.0000	--	MODLEV
MODULATION LEVEL CHANNEL 2	169	1.0000+00	170	0.0000	--	MODLEV
MODULATION LEVEL CHANNEL 3	171	0.0000	172	0.0000	--	MODLEV
MODULATION LEVEL CHANNEL 4	173	0.0000	174	0.0000	--	MODLEV
MODULATION LEVEL CHANNEL 5	175	0.0000	176	0.0000	--	MODLEV
MODULATION LEVEL CHANNEL 6	177	0.0000	178	0.0000	--	MODLEV
MODULATION LEVEL CHANNEL 7	179	0.0000	180	0.0000	--	MODLEV
MODULATION LEVEL CHANNEL 8	181	0.0000	182	0.0000	--	MODLEV
NUMBER OF EVA SUBCARRIERS WITH VOICE ON CARRIER	183	2.0000+00	184	0.0000	--	NEMU
BACK-UP VOICE PHASE DEVIATION	185	0.0000	186	0.0000	RAD	PBE
COMPOSIT PHASE DEVIATION	187	0.0000	188	0.0000	RAD	PDEV
EVA PHASE DEVIATION WITH VOICE ON CARRIER	189	0.0000	190	0.0000	RAD	PE
HLB PHASE DEVIATION WITH VOICE ON CARRIER	191	0.0000	192	0.0000	RAD	PH
STATIC PHASE ERROR IN CARRIER LOOP	193	0.0000	194	0.0000	RAD	PHIO
EMERGENCY KEY PHASE DEVIATION OF CARRIER	195	0.0000	196	0.0000	RAD	PK
PRN RANGING PHASE DEVIATION OF CARRIER	197	0.0000	198	0.0000	RAD	PP

PARAMETER DEFINITION	NO.	DOWNLINK VALUE	NO.	UPLINK VALUE	UNITS	COMPUTER MNEMONIC
PCM TLM SUBCARRIER PHASE DEVIATION OF CARRIER	199	0.0000	200	0.0000	RAD	PT
VOICE SUBCARRIER PHASE DEVIATION OF CARRIER	201	0.0000	202	0.0000	RAD	PV
REQUIRED BACK-UP VOICE SNR IN POSTDETECTION BW	203	0.0000	204	0.0000	DB	RBE
REQUIRED CARRIER-TO-NOISE RATIO IN CARRIER LOOP BW	205	0.0000	206	0.0000	DB	RC
RMS TO PEAK FACTOR FOR BIOMED MODULATION SIGNAL - CHANNEL 1	207	1.0000+00	208	0.0000		RHOB
RMS TO PEAK FACTOR FOR BIOMED MODULATION SIGNAL - CHANNEL 2	209	1.0000+00	210	0.0000		RHOB
RMS TO PEAK FACTOR FOR BIOMED MODULATION SIGNAL - CHANNEL 3	211	0.0000	212	0.0000		RHOB
RMS TO PEAK FACTOR FOR BIOMED MODULATION SIGNAL - CHANNEL 4	213	0.0000	214	0.0000		RHOB
RMS TO PEAK FACTOR FOR PLAYBACK VOICE	215	0.0000	216	0.0000	--	RHOPBV
RMS TO PEAK FACTOR FOR PCM TLM	217	0.0000	218	0.0000	--	RHOT
RMS TO PEAK FACTOR FOR SPLIT PHASE TLM	219	0.0000	220	0.0000	--	RHOTP
RMS TO PEAK FACTOR FOR VOICE	221	7.0700-01	222	0.0000	--	RHOV
RMS TO PEAK FACTOR FOR TELEVISION	223	0.0000	224	0.0000	--	RHOX
REQUIRED EMERGENCY KEY SNR IN PREDETECTION BW	225	0.0000	226	0.0000	DB	RKE
REQUIRED PRN SNR	227	0.0000	228	0.0000	DB	RPK
PM MODE REQUIRED PCM TELEMETRY SNR IN PREDETECTION BW	229	0.0000	230	0.0000	DB	RTE
PM MODE REQUIRED PCM TELEMETRY SNR IN POSTDETECTION BW	231	0.0000	232	0.0000	DB	RTD
REQUIRED SPLIT PHASE TLM SNR IN POSTDETECTION BW	233	0.0000	234	0.0000	DB	RTPR
REQUIRED PCM TLM SNR IN PRED BW WITH VOICE ON CARRIER	235	0.0000	236	0.0000	DB	RTSB
FM MODE REQUIRED PCM TLM SNR IN PREDETECTION BW	237	1.0000+01	238	0.0000	DB	RTSFR
PM MODE REQUIRED VOICE SNR IN PREDETECTION BW	239	0.0000	240	0.0000	DB	RVE
REQUIRED UP VOICE SNR IN POSTDETECTION BW	241	0.0000	242	0.0000	DB	RVD
FM MODE REQUIRED VOICE SNR IN POSTDETECTION BW	243	1.0000+01	244	0.0000	DB	RVOF
FM MODE REQUIRED VOICE SNR IN PREDETECTION BW	245	1.0000+01	246	0.0000	DB	RVSF
COMPOSITE SNR	247	1.0000+01	248	0.0000	DB	SNRCOM
TRANSMITTED SNR ROUTINE CONSTANT	249	1.0000+00	250	0.0000	PURE	SNRCST
MAXIMUM TRANSMISSION SNR OF THE LINK	251	1.2000+01	252	0.0000	DB	SNTRDB
TRANSMITTING SIGNAL POWER	253	1.0000+01	254	0.0000	WATTS	ST
TAPER CIRCUIT CONSTANT A	255	-1.4710+02	256	0.0000	--	TAPERA
TAPER CIRCUIT CONSTANT B	257	4.1830-02	258	0.0000	--	TAPERB
TRANSPONDER GAIN CONSTANT	259	0.0000	260	0.0000	--	TRC
THESE LOCATIONS ARE NOT CURRENTLY USED	261	0.0000	262	0.0000		
THESE LOCATIONS ARE NOT CURRENTLY USED	263	0.0000	264	0.0000		

PARAMETER DEFINITION	NO.	DOWNLINK VALUE	NO.	UPLINK VALUE	UNITS	COMPUTER MNEMONIC
THESE LOCATIONS ARE NOT CURRENTLY USED	265	0.0000	266	0.0000		
THESE LOCATIONS ARE NOT CURRENTLY USED	267	0.0000	268	0.0000		
THESE LOCATIONS ARE NOT CURRENTLY USED	269	0.0000	270	0.0000		
THESE LOCATIONS ARE NOT CURRENTLY USED	271	0.0000	272	0.0000		
THESE LOCATIONS ARE NOT CURRENTLY USED	273	0.0000	274	0.0000		
THESE LOCATIONS ARE NOT CURRENTLY USED	275	0.0000	276	0.0000		
THESE LOCATIONS ARE NOT CURRENTLY USED	277	0.0000	278	0.0000		
THESE LOCATIONS ARE NOT CURRENTLY USED	279	0.0000	280	0.0000		
THESE LOCATIONS ARE NOT CURRENTLY USED	281	0.0000	282	0.0000		
THESE LOCATIONS ARE NOT CURRENTLY USED	283	0.0000	284	0.0000		
THESE LOCATIONS ARE NOT CURRENTLY USED	285	0.0000	286	0.0000		
THESE LOCATIONS ARE NOT CURRENTLY USED	287	0.0000	288	0.0000		
THESE LOCATIONS ARE NOT CURRENTLY USED	289	0.0000	290	0.0000		
THESE LOCATIONS ARE NOT CURRENTLY USED	291	0.0000	292	0.0000		
THESE LOCATIONS ARE NOT CURRENTLY USED	293	0.0000	294	0.0000		
THESE LOCATIONS ARE NOT CURRENTLY USED	295	0.0000	296	0.0000		
THESE LOCATIONS ARE NOT CURRENTLY USED	297	0.0000	298	0.0000		
THESE LOCATIONS ARE NOT CURRENTLY USED	299	0.0000	300	0.0000		
TURNED AROUND PRN MODULATION INDEX	301	0.0000	302	0.0000	RAD	ALPHA
TURNED AROUND UPDATA MODULATION INDEX	303	0.0000	304	0.0000	RAD	BET
BIOMED PHASE DEVIATION WITH VOICE ON CARRIER FOR SUB NO 1	305	0.0000	306	0.0000	RAD	BETEVA
BIOMED PHASE DEVIATION WITH VOICE ON CARRIER FOR SUB NO 2	307	0.0000	308	0.0000	RAD	BETEVA
BIOMED PHASE DEVIATION WITH VOICE ON CARRIER FOR SUB NO 3	309	0.0000	310	0.0000	RAD	BETEVA
BIOMED PHASE DEVIATION WITH VOICE ON CARRIER FOR SUB NO 4	311	0.0000	312	0.0000	RAD	BETEVA
BIOMED PHASE DEVIATION WITH VOICE ON CARRIER FOR SUB NO 5	313	0.0000	314	0.0000	RAD	BETEVA
BIOMED PHASE DEVIATION WITH VOICE ON CARRIER FOR SUB NO 6	315	0.0000	316	0.0000	RAD	BETEVA
BIOMED PHASE DEVIATION WITH VOICE ON CARRIER FOR SUB NO 7	317	0.0000	318	0.0000	RAD	BETEVA
BIOMED PHASE DEVIATION WITH VOICE ON CARRIER FOR SUB NO 8	319	0.0000	320	0.0000	RAD	BETEVA
COMPOSITE MODULATION LEVEL	321	0.0000	322	0.0000	--	COMOLE
BIOMED SUB. BELOW FM THRESH DEGRAD (WITH MOD) SUB NO 1	323	0.0000	324	0.0000	RATIO	DMMSF
BIOMED SUB. BELOW FM THRESH DEGRAD (WITH MOD) SUB NO 2	325	0.0000	326	0.0000	RATIO	DMMSF
BIOMED SUB. BELOW FM THRESH DEGRAD (WITH MOD) SUB NO 3	327	0.0000	328	0.0000	RATIO	DMMSF
BIOMED SUB. BELOW FM THRESH DEGRAD (WITH MOD) SUB NO 4	329	0.0000	330	0.0000	RATIO	DMMSF

PARAMETER DEFINITION	NO.	DOWNLINK VALUE	NO.	UPLINK VALUE	UNITS	COMPUTER MNEMONIC
BIOMED SUBCARRIER BELOW FM THRESH DEGRAD FOR SUB. 1	331	0.0000	332	0.0000	RATIO	DNMSF
BIOMED SUBCARRIER BELOW FM THRESH DEGRAD FOR SUB. 2	333	0.0000	334	0.0000	RATIO	DNMSF
BIOMED SUBCARRIER BELOW FM THRESH DEGRAD FOR SUB. 3	335	0.0000	336	0.0000	RATIO	DNMSF
BIOMED SUBCARRIER BELOW FM THRESH DEGRAD FOR SUB. 4	337	0.0000	338	0.0000	RATIO	DNMSF
BIOMED SUBCARRIER BELOW FM THRESH DEGRAD FOR SUB. 1	339	0.0000	340	0.0000	DB	DNMSFB
BIOMED SUBCARRIER BELOW FM THRESH DEGRAD FOR SUB. 2	341	0.0000	342	0.0000	DB	DNMSFB
BIOMED SUBCARRIER BELOW FM THRESH DEGRAD FOR SUB. 3	343	0.0000	344	0.0000	DB	DNMSFB
BIOMED SUBCARRIER BELOW FM THRESH DEGRAD FOR SUB. 4	345	0.0000	346	0.0000	DB	DNMSFB
PLAYBACK VOICE BELOW FM THRESHOLD DEGRAD IN POST BW	347	0.0000	348	0.0000	RATIO	DPBV
PLAYBACK VOICE BELOW FM THRESHOLD DEGRAD IN POST BW	349	0.0000	350	0.0000	DB	DPBVDB
UPDATA BELOW FM THRESHOLD DEGRAD IN POST BW	351	0.0000	352	0.0000	RATIO	DTB
UPDATA BELOW FM THRESHOLD DEGRAD IN POST BW	353	0.0000	354	0.0000	DB	DTBDB
SPLIT PHASE TLM BELOW FM THRESHOLD DEGRAD IN POST BW	355	0.0000	356	0.0000	RATIO	DTP
SPLIT PHASE TLM BELOW FM THRESHOLD DEGRAD IN POST BW	357	0.0000	358	0.0000	DB	DTPDB
SPLIT PHASE TLM BELOW FM THRESH DEGRAD IN POST BW(BER CAL)	359	0.0000	360	0.0000	RATIO	DTPR
SPLIT PHASE TLM BELOW FM THRESH DEGRAD IN POST BW(BER CAL)	361	0.0000	362	0.0000	DB	DTPRDB
FM MODE PCM TLM BELOW THRESH DEGRAD IN PRED BW	363	0.0000	364	0.0000	RATIO	DTSF
FM MODE PCM TLM BELOW THRESH DEGRAD IN PRED BW	365	0.0000	366	0.0000	DB	DTSFDB
FM MODE PCM TLM BELOW THRESH DEGRAD IN PRED BW (BER CAL)	367	0.0000	368	0.0000	RATIO	DTSFR
FM MODE PCM TLM BELOW THRESH DEGRAD IN PRED BW (BER CAL)	369	0.0000	370	0.0000	DB	DTSFRB
UPVOICE BELOW FM THRESHOLD DEGRAD IN POST BW	371	0.0000	372	0.0000	RATIO	DVB
UPVOICE BELOW FM THRESHOLD DEGRAD IN POST BW	373	0.0000	374	0.0000	DB	DVBDB
FM MODE VOICE BELOW THRESHOLD DEGRAD IN POST BW	375	0.0000	376	0.0000	RATIO	DVF
FM MODE VOICE BELOW THRESHOLD DEGRAD IN POST BW	377	0.0000	378	0.0000	DB	DVFDB
FM MODE VOICE BELOW THRESHOLD DEGRAD IN PRED BW	379	0.0000	380	0.0000	RATIO	DVSF
FM MODE VOICE BELOW THRESHOLD DEGRAD IN PRED BW	381	0.0000	382	0.0000	DB	DVSFDB
TELEVISION BELOW FM THRESHOLD DEGRAD IN POST BW	383	0.0000	384	0.0000	RATIO	DXE
TELEVISION BELOW FM THRESHOLD DEGRAD IN POST BW	385	0.0000	386	0.0000	DB	DXEDB
LIMITER LOSSES	387	0.0000	388	0.0000	WATTS	ELLELL
TRANSPONDER CONSTANT	389	0.0000	390	0.0000		ENIF
BIOMED SUB. FREQ. DEVIATION OF VOICE SUB. FOR SUB. 1	391	0.0000	392	0.0000	HZ	FREDEV
BIOMED SUB. FREQ. DEVIATION OF VOICE SUB. FOR SUB. 3	393	0.0000	394	0.0000	HZ	FREDEV
BIOMED SUB. FREQ. DEVIATION OF VOICE SUB. FOR SUB. 5	395	0.0000	396	0.0000	HZ	FREDEV

PARAMETER DEFINITION	NO.	DOWNLINK VALUE	NO.	UPLINK VALUE	UNITS	COMPUTER MNEMONIC
BIOMED SUB. FREQ. DEVIATION OF VOICE SUB. FOR SUB. 7	397	0.0000	398	0.0000	HZ	FREDEV
TURNED AROUND UPVOICE MODULATION INDEX	399	0.0000	400	0.0000	RAD	GAMM
TOTAL LOSSES IN COMMUNICATION LINK	401	0.0000	402	0.0000	DB	LDB
SPACE LOSS	403	0.0000	404	0.0000	DB	LSDB
TLM MARGIN FOR BER CALCULATION	405	0.0000	406	0.0000	DB	MGTBER
CARRIER POWER	407	0.0000	408	0.0000	WATTS	PC
CARRIER POWER	409	0.0000	410	0.0000	DB	PCDB
NOISE SPECTRAL DENSITY	411	0.0000	412	0.0000	W/HZ	PHIF
MODULATION LEVEL RELATIVE TO CHANNEL ONE - CHANNEL 1	413	0.0000	414	0.0000	--	RATIO
MODULATION LEVEL RELATIVE TO CHANNEL ONE - CHANNEL 2	415	0.0000	416	0.0000	--	RATIO
MODULATION LEVEL RELATIVE TO CHANNEL ONE - CHANNEL 3	417	0.0000	418	0.0000	--	RATIO
MODULATION LEVEL RELATIVE TO CHANNEL ONE - CHANNEL 4	419	0.0000	420	0.0000	--	RATIO
MODULATION LEVEL RELATIVE TO CHANNEL ONE - CHANNEL 5	421	0.0000	422	0.0000	--	RATIO
MODULATION LEVEL RELATIVE TO CHANNEL ONE - CHANNEL 6	423	0.0000	424	0.0000	--	RATIO
MODULATION LEVEL RELATIVE TO CHANNEL ONE - CHANNEL 7	425	0.0000	426	0.0000	--	RATIO
MODULATION LEVEL RELATIVE TO CHANNEL ONE - CHANNEL 8	427	0.0000	428	0.0000	--	RATIO
SLANT RANGE BETWEEN SPACECRAFT AND GROUND STATION	429	0.0000	430	0.0000	NM	RNM
UPVOICE SNR FOR ABOVE FM THRESH IN POST BW	431	0.0000	432	0.0000	RATIO	SNVOP
UPVOICE SNR FOR ABOVE FM THRESH IN POST BW	433	0.0000	434	0.0000	DB	SNVOPB
RECEIVED SIGNAL LEVEL	435	0.0000	436	0.0000	WATTS	SR
RECEIVED SIGNAL LEVEL	437	0.0000	438	0.0000	DB	SRDB
RECEIVED SIGNAL LEVEL	439	-1.4000+02	440	0.0000	DBM	SRDBM
TRANSMITTED POWER	441	0.0000	442	0.0000	DBW	STDB
EFFECTIVE SYSTEM NOISE TEMPERATURE	443	0.0000	444	0.0000	DEG	T
TURNED AROUND THERMAL NOISE MODULATION INDEX	445	0.0000	446	0.0000	RAD	XI
THESE LOCATIONS ARE NOT CURRENTLY USED	447	0.0000	448	0.0000		
THESE LOCATIONS ARE NOT CURRENTLY USED	449	0.0000	450	0.0000		
THESE LOCATIONS ARE NOT CURRENTLY USED	451	0.0000	452	0.0000		
THESE LOCATIONS ARE NOT CURRENTLY USED	453	0.0000	454	0.0000		
THESE LOCATIONS ARE NOT CURRENTLY USED	455	0.0000	456	0.0000		
THESE LOCATIONS ARE NOT CURRENTLY USED	457	0.0000	458	0.0000		
THESE LOCATIONS ARE NOT CURRENTLY USED	459	0.0000	460	0.0000		
THESE LOCATIONS ARE NOT CURRENTLY USED	461	0.0000	462	0.0000		

PARAMETER DEFINITION	NO.	DOWNLINK VALUE	NO.	UPLINK VALUE	UNITS	COMPUTER MNEMONIC
THESE LOCATIONS ARE NOT CURRENTLY USED	463	0.0000	464	0.0000		
THESE LOCATIONS ARE NOT CURRENTLY USED	465	0.0000	466	0.0000		
THESE LOCATIONS ARE NOT CURRENTLY USED	467	0.0000	468	0.0000		
THESE LOCATIONS ARE NOT CURRENTLY USED	469	0.0000	470	0.0000		
THESE LOCATIONS ARE NOT CURRENTLY USED	471	0.0000	472	0.0000		
THESE LOCATIONS ARE NOT CURRENTLY USED	473	0.0000	474	0.0000		
THESE LOCATIONS ARE NOT CURRENTLY USED	475	0.0000	476	0.0000		
THESE LOCATIONS ARE NOT CURRENTLY USED	477	0.0000	478	0.0000		
THESE LOCATIONS ARE NOT CURRENTLY USED	479	0.0000	480	0.0000		
THESE LOCATIONS ARE NOT CURRENTLY USED	481	0.0000	482	0.0000		
THESE LOCATIONS ARE NOT CURRENTLY USED	483	0.0000	484	0.0000		
THESE LOCATIONS ARE NOT CURRENTLY USED	485	0.0000	486	0.0000		
THESE LOCATIONS ARE NOT CURRENTLY USED	487	0.0000	488	0.0000		
THESE LOCATIONS ARE NOT CURRENTLY USED	489	0.0000	490	0.0000		
THESE LOCATIONS ARE NOT CURRENTLY USED	491	0.0000	492	0.0000		
THESE LOCATIONS ARE NOT CURRENTLY USED	493	0.0000	494	0.0000		
THESE LOCATIONS ARE NOT CURRENTLY USED	495	0.0000	496	0.0000		
THESE LOCATIONS ARE NOT CURRENTLY USED	497	0.0000	498	0.0000		
THESE LOCATIONS ARE NOT CURRENTLY USED	499	0.0000	500	0.0000		

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REPORT SPECIFICATION DATA-

     REPORT TYPE NO. 3
     START LIMIT = 0.000
     STOP LIMIT = 0.000
     VARIABLES TO BE REPORTED (REPORT TYPE NO. 5 ONLY)-    0,   0,   0,   0,   0,   0,   0,   0
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PREDICTION ANALYSIS
DOWNLINK COMBINATIONS

RECEIVED POWER (DBM)	FM VOICE SNR PRE/POST (DB)	FM TELEMETRY SNR (DB)	FM TELEVISION SNR (DB)	BIT ERROR RATE	FM EVA BIOMED SNR (DB) PREDETECTION 1/3	PREDETECTION 2/4	POSTDETECTION 1/2	POSTDETECTION 2/4
-135.00	-39.04	-35.72	.00	9.950-03	-70.41	-58.66	-53.70	-42.22
	-30.00				.00	.00	.00	.00
-130.00	-34.05	-30.73	.00	9.950-03	-65.41	-53.66	-48.71	-37.22
	-25.07				.00	.00	.00	.00
-125.00	-29.06	-25.76	.00	9.95C-03	-60.43	-48.68	-43.72	-32.24
	-20.28				.00	.00	.00	.00
-120.00	-24.11	-20.85	.00	9.95C-03	-55.48	-43.72	-38.77	-27.29
	-15.89				.00	.00	.00	.00
-115.00	-19.23	-16.09	.00	9.95C-03	-50.62	-38.85	-33.92	-22.43
	-12.28				.00	.00	.00	.00
-110.00	-14.54	-11.68	.00	9.95C-03	-45.97	-34.17	-29.27	-17.77
	-9.75				.00	.00	.00	.00
-105.00	-9.96	-7.62	.00	9.950-03	-41.48	-29.62	-24.78	-13.29
	-7.86				.00	.00	.00	.00
-100.00	-5.32	-3.48	.00	9.95C-03	-36.99	-25.02	-20.30	-8.89
	-5.73				.00	.00	.00	.00
-95.00	-.03	1.92	.00	9.95C-03	-31.76	-19.75	-15.13	-4.24
	-1.18				.00	.00	.00	.00
-90.00	6.77	9.87	.00	1.87C-05	-24.62	-12.85	-8.27	.61
	13.84				.00	.00	.00	.00
-85.00	12.01	15.33	.00	1.00C-08	-19.36	-7.61	-3.71	3.45
	21.09				.00	.00	.00	.00
-80.00	17.01	20.33	.00	1.00C-08	-14.36	-2.61	-.15	6.75
	26.09				.00	.00	.00	.00
-75.00	22.01	25.33	.00	1.00C-08	-9.36	2.39	2.61	13.09
	31.09				.00	.00	.00	.00
-70.00	27.01	30.33	.00	1.00C-08	-4.36	7.39	5.46	23.31
	36.09				.00	.00	.00	.00
-65.00	32.01	35.33	.00	1.00C-08	.64	12.39	10.35	28.84
	41.09				.00	.00	.00	.00

OUTPUT PARAMETERS LISTING

PARAMETER DEFINITION	NO.	DOWNLINK VALUE	NO.	UPLINK VALUE	UNITS	COMPUTER MNEMONIC
TURNED AROUND PRN MODULATION INDEX	301	0.0000	302	0.0000	RAD	ALPHA
TURNED AROUND UPDATA MODULATION INDEX	303	0.0000	304	0.0000	RAD	BET
BIOMED PHASE DEVIATION WITH VOICE ON CARRIER FOR SUB NO 1	305	0.0000	306	0.0000	RAD	BETEVA
BIOMED PHASE DEVIATION WITH VOICE ON CARRIER FOR SUB NO 2	307	0.0000	308	0.0000	RAD	BETEVA
BIOMED PHASE DEVIATION WITH VOICE ON CARRIER FOR SUB NO 3	309	0.0000	310	0.0000	RAD	BETEVA
BIOMED PHASE DEVIATION WITH VOICE ON CARRIER FOR SUB NO 4	311	0.0000	312	0.0000	RAD	BETEVA
BIOMED PHASE DEVIATION WITH VOICE ON CARRIER FOR SUB NO 5	313	0.0000	314	0.0000	RAD	BETEVA
BIOMED PHASE DEVIATION WITH VOICE ON CARRIER FOR SUB NO 6	315	0.0000	316	0.0000	RAD	BETEVA
BIOMED PHASE DEVIATION WITH VOICE ON CARRIER FOR SUB NO 7	317	0.0000	318	0.0000	RAD	BETEVA
BIOMED PHASE DEVIATION WITH VOICE ON CARRIER FOR SUB NO 8	319	0.0000	320	0.0000	RAD	BETEVA
COMPOSITE MODULATION LEVEL	321	1.4214+00	322	0.0000	--	COMOLE
BIOMED SUB. BELOW FM THRESH DEGRAD (WITH MOD) SUB NO 1	323	1.0000+00	324	0.0000	RATIO	DMMSF
BIOMED SUB. BELOW FM THRESH DEGRAD (WITH MOD) SUB NO 2	325	1.0000+00	326	0.0000	RATIO	DMMSF
BIOMED SUB. BELOW FM THRESH DEGRAD (WITH MOD) SUB NO 3	327	0.0000	328	0.0000	RATIO	DMMSF
BIOMED SUB. BELOW FM THRESH DEGRAD (WITH MOD) SUB NO 4	329	0.0000	330	0.0000	RATIO	DMMSF
BIOMED SUBCARRIER BELOW FM THRESH DEGRAD FOR SUB. 1	331	1.0000+00	332	0.0000	RATIO	DNMSF
BIOMED SUBCARRIER BELOW FM THRESH DEGRAD FOR SUB. 2	333	1.0000+00	334	0.0000	RATIO	DNMSF
BIOMED SUBCARRIER BELOW FM THRESH DEGRAD FOR SUB. 3	335	0.0000	336	0.0000	RATIO	DNMSF
BIOMED SUBCARRIER BELOW FM THRESH DEGRAD FOR SUB. 4	337	0.0000	338	0.0000	RATIO	DNMSF
BIOMED SUBCARRIER BELOW FM THRESH DEGRAD FOR SUB. 1	339	0.0000	340	0.0000	DB	DNMSFB
BIOMED SUBCARRIER BELOW FM THRESH DEGRAD FOR SUB. 2	341	0.0000	342	0.0000	DB	DNMSFB
BIOMED SUBCARRIER BELOW FM THRESH DEGRAD FOR SUB. 3	343	0.0000	344	0.0000	DB	DNMSFB
BIOMED SUBCARRIER BELOW FM THRESH DEGRAD FOR SUB. 4	345	0.0000	346	0.0000	DB	DNMSFB
PLAYBACK VOICE BELOW FM THRESHOLD DEGRAD IN POST BW	347	0.0000	348	0.0000	RATIO	DPBV
PLAYBACK VOICE BELOW FM THRESHOLD DEGRAD IN POST BW	349	0.0000	350	0.0000	DB	DPBVDB
UPDATA BELOW FM THRESHOLD DEGRAD IN POST BW	351	0.0000	352	0.0000	RATIO	DTB
UPDATA BELOW FM THRESHOLD DEGRAD IN POST BW	353	0.0000	354	0.0000	DB	DTBDB
SPLIT PHASE TLM BELOW FM THRESHOLD DEGRAD IN POST BW	355	0.0000	356	0.0000	RATIO	DTP
SPLIT PHASE TLM BELOW FM THRESHOLD DEGRAD IN POST BW	357	0.0000	358	0.0000	DB	DTPDB
SPLIT PHASE TLM BELOW FM THRESH DEGRAD IN POST BW(BER CAL)	359	0.0000	360	0.0000	RATIO	DTPR
SPLIT PHASE TLM BELOW FM THRESH DEGRAD IN POST BW(BER CAL)	361	0.0000	362	0.0000	DB	DTPRDB
FM MODE PCM TLM BELOW THRESH DEGRAD IN PRED BW	363	1.0000+00	364	0.0000	RATIO	DTSF
FM MODE PCM TLM BELOW THRESH DEGRAD IN PRED BW	365	0.0000	366	0.0000	DB	DTSFDB

PARAMETER DEFINITION	NO.	DOWNLINK VALUE	NO.	UPLINK VALUE	UNITS	COMPUTER MNEMONIC
FM MODE PCM TLM BELOW THRESH DEGRAD IN PRED BW (BER CAL)	367	1.0000+00	368	0.0000	RATIO	DTSFR
FM MODE PCM TLM BELOW THRESH DEGRAD IN PRED BW (BER CAL)	369	0.0000	370	0.0000	DB	DTSFRB
UPVOICE BELOW FM THRESHOLD DEGRAD IN POST BW	371	0.0000	372	0.0000	RATIO	DVB
UPVOICE BELOW FM THRESHOLD DEGRAD IN POST BW	373	0.0000	374	0.0000	DB	DVBDB
FM MODE VOICE BELOW THRESHOLD DEGRAD IN POST BW	375	1.0000+00	376	0.0000	RATIO	DVF
FM MODE VOICE BELOW THRESHOLD DEGRAD IN POST BW	377	0.0000	378	0.0000	DB	DVFDB
FM MODE VOICE BELOW THRESHOLD DEGRAD IN PRED BW	379	1.0000+00	380	0.0000	RATIO	DVSF
FM MODE VOICE BELOW THRESHOLD DEGRAD IN PRED BW	381	0.0000	382	0.0000	DB	DVSFDB
TELEVISION BELOW FM THRESHOLD DEGRAD IN POST BW	383	0.0000	384	0.0000	RATIO	DXE
TELEVISION BELOW FM THRESHOLD DEGRAD IN POST BW	385	0.0000	386	0.0000	DB	DXEDB
LIMITER LOSSES	387	1.0000+00	388	0.0000	WATTS	ELLELL
TRANSPONDER CONSTANT	389	0.0000	390	0.0000		ENIF
BIOMED SUB. FREQ. DEVIATION OF VOICE SUB. FOR SUB. 1	391	2.2794+01	392	0.0000	HZ	FREDEV
BIOMED SUB. FREQ. DEVIATION OF VOICE SUB. FOR SUB. 3	393	2.2792+02	394	0.0000	HZ	FREDEV
BIOMED SUB. FREQ. DEVIATION OF VOICE SUB. FOR SUB. 5	395	0.0000	396	0.0000	HZ	FREDEV
BIOMED SUB. FREQ. DEVIATION OF VOICE SUB. FOR SUB. 7	397	0.0000	398	0.0000	HZ	FREDEV
TURNED AROUND UPVOICE MODULATION INDEX	399	0.0000	400	0.0000	RAD	GAMM
TOTAL LOSSES IN COMMUNICATION LINK	401	0.0000	402	0.0000	DB	LDB
SPACE LOSS	403	0.0000	404	0.0000	DB	LSDB
TLM MARGIN FOR PER CALCULATION	405	2.5333+01	406	0.0000	DB	MGTBER
CARRIER POWER	407	0.0000	408	0.0000	WATTS	PC
CARRIER POWER	409	0.0000	410	0.0000	DB	PCDB
NOISE SPECTRAL DENSITY	411	4.6368-20	412	0.0000	W/HZ	PHIF
MODULATION LEVEL RELATIVE TO CHANNEL ONE - CHANNEL 1	413	1.0000+00	414	0.0000	--	RATIO
MODULATION LEVEL RELATIVE TO CHANNEL ONE - CHANNEL 2	415	1.0000+00	416	0.0000	--	RATIO
MODULATION LEVEL RELATIVE TO CHANNEL ONE - CHANNEL 3	417	0.0000	418	0.0000	--	RATIO
MODULATION LEVEL RELATIVE TO CHANNEL ONE - CHANNEL 4	419	0.0000	420	0.0000	--	RATIO
MODULATION LEVEL RELATIVE TO CHANNEL ONE - CHANNEL 5	421	0.0000	422	0.0000	--	RATIO
MODULATION LEVEL RELATIVE TO CHANNEL ONE - CHANNEL 6	423	0.0000	424	0.0000	--	RATIO
MODULATION LEVEL RELATIVE TO CHANNEL ONE - CHANNEL 7	425	0.0000	426	0.0000	--	RATIO
MODULATION LEVEL RELATIVE TO CHANNEL ONE - CHANNEL 8	427	0.0000	428	0.0000	--	RATIO
SLANT RANGE BETWEEN SPACECRAFT AND GROUND STATION	429	0.0000	430	0.0000	NM	RNM
UPVOICE SNR FOR ABOVE FM THRESH IN POST BW	431	0.0000	432	0.0000	RATIO	SNVOP

PARAMETER DEFINITION	NO.	DOWNLINK VALUE	NO.	UPLINK VALUE	UNITS	COMPUTER MNEMONIC
UPVOICE SNR FOR ABOVE FM THRESH IN POST BW	433	0.0000	434	0.0000	DB	SNVOPR
RECEIVED SIGNAL LEVEL	435	3.1623-10	436	3.1623-10	WATTS	SR
RECEIVED SIGNAL LEVEL	437	0.0000	438	0.0000	DB	SRDB
RECEIVED SIGNAL LEVEL	439	-6.5000+01	440	-6.5000+01	DBM	SRDBM
TRANSMITTED POWER	441	0.0000	442	0.0000	DBW	STDB
EFFECTIVE SYSTEM NOISE TEMPERATURE	443	3.3600+03	444	0.0000	DEG	T
TURNED AROUND THERMAL NOISE MODULATION INDEX	445	0.0000	446	0.0000	RAD	XI
THESE LOCATIONS ARE NOT CURRENTLY USED	447	0.0000	448	0.0000		
THESE LOCATIONS ARE NOT CURRENTLY USED	449	0.0000	450	0.0000		
THESE LOCATIONS ARE NOT CURRENTLY USED	451	0.0000	452	0.0000		
THESE LOCATIONS ARE NOT CURRENTLY USED	453	0.0000	454	0.0000		
THESE LOCATIONS ARE NOT CURRENTLY USED	455	0.0000	456	0.0000		
THESE LOCATIONS ARE NOT CURRENTLY USED	457	0.0000	458	0.0000		
THESE LOCATIONS ARE NOT CURRENTLY USED	459	0.0000	460	0.0000		
THESE LOCATIONS ARE NOT CURRENTLY USED	461	0.0000	462	0.0000		
THESE LOCATIONS ARE NOT CURRENTLY USED	463	0.0000	464	0.0000		
THESE LOCATIONS ARE NOT CURRENTLY USED	465	0.0000	466	0.0000		
THESE LOCATIONS ARE NOT CURRENTLY USED	467	0.0000	468	0.0000		
THESE LOCATIONS ARE NOT CURRENTLY USED	469	0.0000	470	0.0000		
THESE LOCATIONS ARE NOT CURRENTLY USED	471	0.0000	472	0.0000		
THESE LOCATIONS ARE NOT CURRENTLY USED	473	0.0000	474	0.0000		
THESE LOCATIONS ARE NOT CURRENTLY USED	475	0.0000	476	0.0000		
THESE LOCATIONS ARE NOT CURRENTLY USED	477	0.0000	478	0.0000		
THESE LOCATIONS ARE NOT CURRENTLY USED	479	0.0000	480	0.0000		
THESE LOCATIONS ARE NOT CURRENTLY USED	481	0.0000	482	0.0000		
THESE LOCATIONS ARE NOT CURRENTLY USED	483	0.0000	484	0.0000		
THESE LOCATIONS ARE NOT CURRENTLY USED	485	0.0000	486	0.0000		
THESE LOCATIONS ARE NOT CURRENTLY USED	487	0.0000	488	0.0000		
THESE LOCATIONS ARE NOT CURRENTLY USED	489	0.0000	490	0.0000		
THESE LOCATIONS ARE NOT CURRENTLY USED	491	0.0000	492	0.0000		
THESE LOCATIONS ARE NOT CURRENTLY USED	493	0.0000	494	0.0000		
THESE LOCATIONS ARE NOT CURRENTLY USED	495	0.0000	496	0.0000		
THESE LOCATIONS ARE NOT CURRENTLY USED	497	0.0000	498	0.0000		

PARAMETER DEFINITION	NO.	DOWNLINK VALUE	NO.	UPLINK VALUE	UNITS	COMPUTER MNEMONIC
THESE LOCATIONS ARE NOT CURRENTLY USED	499	0.0000	500	0.0000		
PROBABILITY OF BIT ERROR RATE	501	1.0000-08	502	0.0000	--	BER
BACK-UP VOICE MARGIN PREDETECTION BW	503	0.0000	504	0.0000	DB	MGBE
CARRIER MARGIN IN LOOP BW	505	0.0000	506	0.0000	DB	MGC
EMERGENCY KEY MARGIN IN PREDETECTION BW	507	0.0000	508	0.0000	DB	MGKE
PRN RANGING MARGIN	509	0.0000	510	0.0000	DB	MGP
PM MODE TLM MARGIN IN PREDETECTION BW	511	0.0000	512	0.0000	DB	MGTE
UPDATA MARGIN IN POSTDETECTION BW	513	0.0000	514	0.0000	DB	MGTD
SPLIT PHASE TLM MARGIN IN POSTDETECTION BW	515	0.0000	516	0.0000	DB	MGTPR
PCM TLM MARGIN IN PREDETECTION BW WITH VOICE ON CARRIER	517	0.0000	518	0.0000	DB	MGTSB
FM MODE PCM TLM MARGIN IN PREDETECTION BW (BER CAL)	519	2.5333+01	520	0.0000	DB	MGTSER
PM MODE VOICE MARGIN IN PREDETECTION BW	521	0.0000	522	0.0000	DB	MGVE
PM MODE VOICE MARGIN IN POSTDETECTION BW	523	4.1088+01	524	0.0000	DB	MGVD
FM MODE VOICE MARGIN IN POSTDETECTION BW	525	3.1088+01	526	0.0000	DB	MGVDE
FM MODE VOICE MARGIN IN PREDETECTION BW	527	2.2007+01	528	0.0000	DB	MGVSE
BACKUP VOICE MODULATION LOSS	529	0.0000	530	0.0000	RATIO	MLBV
CARRIER MODULATION LOSS WITH VOICE AND BIOMED SUBCARRIER	531	0.0000	532	0.0000	RATIO	MLCVBS
DOWNLINK CARRIER MODULATION LOSS	533	0.0000	534	0.0000	RATIO	MLDC
DOWNLINK KEYING MODULATION LOSS	535	0.0000	536	0.0000	RATIO	MLDK
DOWNLINK PM MODE HI BIT RATE TLM MODULATION LOSS	537	0.0000	538	0.0000	RATIO	MLDPHT
DOWNLINK PM MODE LOW BIT RATETLM MODULATION LOSS	539	0.0000	540	0.0000	RATIO	MLDPLT
DOWNLINK PRN MODULATION LOSS	541	0.0000	542	0.0000	RATIO	MLDPRN
DOWNLINK PM MODE VOICE MODULATION LOSS	543	0.0000	544	0.0000	RATIO	MLDPV
DOWNLINK LOW BIT RATE TLM WITH VOC MODULATION LOSS	545	0.0000	546	0.0000	RATIO	MLDVLT
EVA MODULATION LOSS - CHANNEL 1	547	0.0000	548	0.0000	RATIO	MLEVA
EVA MODULATION LOSS - CHANNEL 2	549	0.0000	550	0.0000	RATIO	MLEVA
EVA MODULATION LOSS - CHANNEL 3	551	0.0000	552	0.0000	RATIO	MLEVA
EVA MODULATION LOSS - CHANNEL 4	553	0.0000	554	0.0000	RATIO	MLEVA
EVA MODULATION LOSS - CHANNEL 5	555	0.0000	556	0.0000	RATIO	MLEVA
EVA MODULATION LOSS - CHANNEL 6	557	0.0000	558	0.0000	RATIO	MLEVA
EVA MODULATION LOSS - CHANNEL 7	559	0.0000	560	0.0000	RATIO	MLEVA
EVA MODULATION LOSS - CHANNEL 8	561	0.0000	562	0.0000	RATIO	MLEVA
HLB MODULATION LOSS	563	0.0000	564	0.0000	RATIO	MLHLB

PARAMETER DEFINITION	NO.	DOWNLINK VALUE	NO.	UPLINK VALUE	UNITS	COMPUTER MNEMONIC
UPLINK CARRIER MODULATION LOSS	565	0.0000	566	0.0000	RATIO	MLUC
UPLINK PM MODE TLM MODULATION LOSS	567	0.0000	568	0.0000	RATIO	MLUPT
UPLINK PM MODE VOICE MODULATION LOSS	569	0.0000	570	0.0000	RATIO	MLUPV
NOISE FIGURE	571	1.1586+01	572	0.0000	RATIO	NOISEF
CARRIER POWER	573	0.0000	574	0.0000	DBM	PCDBM
NOISE SPECTRAL DENSITY	575	-1.9334+02	576	0.0000	DB	PHIFDB
DOWNLINK BIOMED SNR IN POSTDETECTION BW - CHANNEL 1	577	1.0845+01	578	0.0000	RATIO	SNBD
DOWNLINK BIOMED SNR IN POSTDETECTION BW - CHANNEL 2	579	7.6489+02	580	0.0000	RATIO	SNBD
DOWNLINK BIOMED SNR IN POSTDETECTION BW - CHANNEL 3	581	0.0000	582	0.0000	RATIO	SNBD
DOWNLINK BIOMED SNR IN POSTDETECTION BW - CHANNEL 4	583	0.0000	584	0.0000	RATIO	SNBD
DOWNLINK BIOMED SNR IN POSTDETECTION BW - CHANNEL 1	585	1.0352+01	586	0.0000	DB	SNBDDB
DOWNLINK BIOMED SNR IN POSTDETECTION BW - CHANNEL 2	587	2.8836+01	588	0.0000	DB	SNBDDB
DOWNLINK BIOMED SNR IN POSTDETECTION BW - CHANNEL 3	589	0.0000	590	0.0000	DB	SNBDDB
DOWNLINK BIOMED SNR IN POSTDETECTION BW - CHANNEL 4	591	0.0000	592	0.0000	DB	SNBDDB
BACK-UP VOICE SNR IN POSTDETECTION BW	593	0.0000	594	0.0000	RATIO	SNBE
BACK-UP VOICE SNR IN POSTDETECTION BW	595	0.0000	596	0.0000	DB	SNBEDB
CARRIER TO NOISE RATIO IN LOOP BW	597	0.0000	598	0.0000	RATIO	SNC
CARRIER TO NOISE RATIO IN LOOP BW	599	0.0000	600	0.0000	DB	SNCDB
BIOMED SUB. SNR IN PRED BW WITH VOICE ON CARRIER SUB 1	601	0.0000	602	0.0000	RATIO	SNESB
BIOMED SUB. SNR IN PRED BW WITH VOICE ON CARRIER SUB 2	603	0.0000	604	0.0000	RATIO	SNESB
BIOMED SUB. SNR IN PRED BW WITH VOICE ON CARRIER SUB 3	605	0.0000	606	0.0000	RATIO	SNESB
BIOMED SUB. SNR IN PRED BW WITH VOICE ON CARRIER SUB 4	607	0.0000	608	0.0000	RATIO	SNESB
BIOMED SUB. SNR IN PRED BW WITH VOICE ON CARRIER SUB 5	609	0.0000	610	0.0000	RATIO	SNESB
BIOMED SUB. SNR IN PRED BW WITH VOICE ON CARRIER SUB 6	611	0.0000	612	0.0000	RATIO	SNESB
BIOMED SUB. SNR IN PRED BW WITH VOICE ON CARRIER SUB 7	613	0.0000	614	0.0000	RATIO	SNESB
BIOMED SUB. SNR IN PRED BW WITH VOICE ON CARRIER SUB 8	615	0.0000	616	0.0000	RATIO	SNESB
BIOMED SUB. SNR IN PRED BW WITH VOICE ON CARRIER SUB 1	617	0.0000	618	0.0000	DB	SNESBB
BIOMED SUB. SNR IN PRED BW WITH VOICE ON CARRIER SUB 2	619	0.0000	620	0.0000	DB	SNESBB
BIOMED SUB. SNR IN PRED BW WITH VOICE ON CARRIER SUB 3	621	0.0000	622	0.0000	DB	SNESBB
BIOMED SUB. SNR IN PRED BW WITH VOICE ON CARRIER SUB 4	623	0.0000	624	0.0000	DB	SNESBB
BIOMED SUB. SNR IN PRED BW WITH VOICE ON CARRIER SUB 5	625	0.0000	626	0.0000	DB	SNESBB
BIOMED SUB. SNR IN PRED BW WITH VOICE ON CARRIER SUB 6	627	0.0000	628	0.0000	DB	SNESBB
BIOMED SUB. SNR IN PRED BW WITH VOICE ON CARRIER SUB 7	629	0.0000	630	0.0000	DB	SNESBB

PARAMETER DEFINITION	NO.	DOWNLINK VALUE	NO.	UPLINK VALUE	UNITS	COMPUTER MNEMONIC
BIOMED SUB. SNR IN PRED BW WITH VOICE ON CARRIER SUB 8	631	0.0000	632	0.0000	DB	SNESBB
HLB SNR IN PREDETECTION BW WITH VOICE ON CARRIER	633	0.0000	634	0.0000	RATIO	SNHSB
HLB SNR IN PREDETECTION BW WITH VOICE ON CARRIER	635	0.0000	636	0.0000	DB	SNHSBB
IF SNR	637	1.4208+03	638	0.0000	RATIO	SNIF
IF SNR	639	3.1525+01	640	0.0000	DB	SNIFDB
EMERGENCY KEY SNR IN PREDETECTION BW	641	0.0000	642	0.0000	RATIO	SNKE
EMERGENCY KEY SNR IN PREDETECTION BW	643	0.0000	644	0.0000	DB	SNKEDB
BIOMED SUB. SNR IN PRED BW (WITH MODULATION) SUB 1	645	1.1593+00	646	0.0000	RATIO	SNMM
BIOMED SUB. SNR IN PRED BW (WITH MODULATION) SUB 2	647	1.7352+01	648	0.0000	RATIO	SNMM
BIOMED SUB. SNR IN PRED BW (WITH MODULATION) SUB 3	649	0.0000	650	0.0000	RATIO	SNMM
BIOMED SUB. SNR IN PRED BW (WITH MODULATION) SUB 4	651	0.0000	652	0.0000	RATIO	SNMM
BIOMED SUB. SNR IN PRED BW (WITH MODULATION) SUB 1	653	6.4195-01	654	0.0000	DB	SNMMDB
BIOMED SUB. SNR IN PRED BW (WITH MODULATION) SUB 2	655	1.2394+01	656	0.0000	DB	SNMMDB
BIOMED SUB. SNR IN PRED BW (WITH MODULATION) SUB 3	657	0.0000	658	0.0000	DB	SNMMDB
BIOMED SUB. SNR IN PRED BW (WITH MODULATION) SUB 4	659	0.0000	660	0.0000	DB	SNMMDB
BIOMED SUB. SNR IN PRED BW (WITHOUT MODULATION) SUB 1	661	1.1593+00	662	0.0000	RATIO	SNMSF
BIOMED SUB. SNR IN PRED BW (WITHOUT MODULATION) SUB 2	663	1.7352+01	664	0.0000	RATIO	SNMSF
BIOMED SUB. SNR IN PRED BW (WITHOUT MODULATION) SUB 3	665	0.0000	666	0.0000	RATIO	SNMSF
BIOMED SUB. SNR IN PRED BW (WITHOUT MODULATION) SUB 4	667	0.0000	668	0.0000	RATIO	SNMSF
BIOMED SUB. SNR IN PRED BW (WITHOUT MODULATION) SUB 1	669	6.4195-01	670	0.0000	DB	SNMSFB
BIOMED SUB. SNR IN PRED BW (WITHOUT MODULATION) SUB 2	671	1.2394+01	672	0.0000	DB	SNMSFB
BIOMED SUB. SNR IN PRED BW (WITHOUT MODULATION) SUB 3	673	0.0000	674	0.0000	DB	SNMSFB
BIOMED SUB. SNR IN PRED BW (WITHOUT MODULATION) SUB 4	675	0.0000	676	0.0000	DB	SNMSFB
PRN RANGING SNR	677	0.0000	678	0.0000	RATIO	SNP
PRN RANGING SNR	679	0.0000	680	0.0000	DB	SNPDB
PLAYBACK VOICE SNR IN POSTDETECTION BW	681	0.0000	682	0.0000	RATIO	SNPBV
PLAYBACK VOICE SNR IN POSTDETECTION BW	683	0.0000	684	0.0000	DB	SNPBVB
PM MODE TLM SNR IN PREDETECTION BW	685	0.0000	686	0.0000	RATIO	SNTE
PM MODE TLM SNR IN PREDETECTION BW	687	0.0000	688	0.0000	DB	SNTEDB
FM MODE PCM TLM SNR IN PREDETECTION BW (BER CAL)	689	3.4140+03	690	0.0000	RATIO	SNTFR
FM MODE PCM TLM SNR IN PREDETECTION BW (BER CAL)	691	3.5333+01	692	0.0000	DB	SNTFRB
PM MODE TLM SNR IN POSTDETECTION BW	693	0.0000	694	0.0000	RATIO	SNTO
PM MODE TLM SNR IN POSTDETECTION BW	695	0.0000	696	0.0000	DB	SNTODB

PARAMETER DEFINITION	NO.	DOWNLINK VALUE	NO.	UPLINK VALUE	UNITS	COMPUTER MNEMONIC
SPLIT PHASE TLM SNR IN POSTDETECTION BW	697	0.0000	698	0.0000	RATIO	SNTP
SPLIT PHASE TLM SNR IN POSTDETECTION BW	699	0.0000	700	0.0000	DB	SNTPDB
SPLIT PHASE TLM SNR IN POSTDETECTION BW (BER CAL)	701	0.0000	702	0.0000	RATIO	SNTPR
SPLIT PHASE TLM SNR IN POSTDETECTION BW (BER CAL)	703	0.0000	704	0.0000	DB	SNTPRB
PCM TLM SNR IN PREDETECTION WITH VOICE ON CARRIER	705	0.0000	706	0.0000	RATIO	SNTSB
PCM TLM SNR IN PREDETECTION WITH VOICE ON CARRIER	707	0.0000	708	0.0000	DB	SNTSBB
FM MODE PCM TLM SNR IN PREDETECTION BW	709	3.4140+03	710	0.0000	RATIO	SNTSF
FM MODE PCM TLM SNR IN PREDETECTION BW	711	3.5333+01	712	0.0000	DB	SNTSFB
PM MODE VOICE SNR IN PREDETECTION BW	713	0.0000	714	0.0000	RATIO	SNVE
PM MODE VOICE SNR IN PREDETECTION BW	715	0.0000	716	0.0000	DB	SNVEDB
UPVOICE SNR IN POSTDETECTION BW	717	0.0000	718	0.0000	RATIO	SNVO
UPVOICE SNR IN POSTDETECTION BW	719	0.0000	720	0.0000	DB	SNVODB
PM AND FM MODE VOICE SNR IN POSTDETECTION BW	721	1.2847+04	722	0.0000	RATIO	SNVOF
PM AND FM MODE VOICE SNR IN POSTDETECTION BW	723	4.1088+01	724	0.0000	DB	SNVOFB
FM MODE VOICE SNR IN PREDETECTION BW	725	1.5874+03	726	0.0000	RATIO	SNVSF
FM MODE VOICE SNR IN PREDETECTION BW	727	3.2007+01	728	0.0000	DB	SNVSFB
TELEVISION SNR IN POSTDETECTION BW	729	0.0000	730	0.0000	RATIO	SNXE
TELEVISION SNR IN POSTDETECTION BW	731	0.0000	732	0.0000	DB	SNXEDB
THESE LOCATIONS ARE NOT CURRENTLY USED	733	0.0000	734	0.0000		
THESE LOCATIONS ARE NOT CURRENTLY USED	735	0.0000	736	0.0000		
THESE LOCATIONS ARE NOT CURRENTLY USED	737	0.0000	738	0.0000		
THESE LOCATIONS ARE NOT CURRENTLY USED	739	0.0000	740	0.0000		
THESE LOCATIONS ARE NOT CURRENTLY USED	741	0.0000	742	0.0000		
THESE LOCATIONS ARE NOT CURRENTLY USED	743	0.0000	744	0.0000		
THESE LOCATIONS ARE NOT CURRENTLY USED	745	0.0000	746	0.0000		
THESE LOCATIONS ARE NOT CURRENTLY USED	747	0.0000	748	0.0000		
THESE LOCATIONS ARE NOT CURRENTLY USED	749	0.0000	750	0.0000		
THESE LOCATIONS ARE NOT CURRENTLY USED	751	0.0000	752	0.0000		
THESE LOCATIONS ARE NOT CURRENTLY USED	753	0.0000	754	0.0000		
THESE LOCATIONS ARE NOT CURRENTLY USED	755	0.0000	756	0.0000		
THESE LOCATIONS ARE NOT CURRENTLY USED	757	0.0000	758	0.0000		
THESE LOCATIONS ARE NOT CURRENTLY USED	759	0.0000	760	0.0000		
THESE LOCATIONS ARE NOT CURRENTLY USED	761	0.0000	762	0.0000		

PARAMETER DEFINITION	NO.	DOWNLINK VALUE	NO.	UPLINK VALUE	UNITS	COMPUTER MNEMONIC
THESE LOCATIONS ARE NOT CURRENTLY USED	763	0.0000	764	0.0000		
THESE LOCATIONS ARE NOT CURRENTLY USED	765	0.0000	766	0.0000		
THESE LOCATIONS ARE NOT CURRENTLY USED	767	0.0000	768	0.0000		
THESE LOCATIONS ARE NOT CURRENTLY USED	769	0.0000	770	0.0000		
THESE LOCATIONS ARE NOT CURRENTLY USED	771	0.0000	772	0.0000		
THESE LOCATIONS ARE NOT CURRENTLY USED	773	0.0000	774	0.0000		
THESE LOCATIONS ARE NOT CURRENTLY USED	775	0.0000	776	0.0000		
THESE LOCATIONS ARE NOT CURRENTLY USED	777	0.0000	778	0.0000		
THESE LOCATIONS ARE NOT CURRENTLY USED	779	0.0000	780	0.0000		
THESE LOCATIONS ARE NOT CURRENTLY USED	781	0.0000	782	0.0000		
THESE LOCATIONS ARE NOT CURRENTLY USED	783	0.0000	784	0.0000		
THESE LOCATIONS ARE NOT CURRENTLY USED	785	0.0000	786	0.0000		
THESE LOCATIONS ARE NOT CURRENTLY USED	787	0.0000	788	0.0000		
THESE LOCATIONS ARE NOT CURRENTLY USED	789	0.0000	790	0.0000		
THESE LOCATIONS ARE NOT CURRENTLY USED	791	0.0000	792	0.0000		
THESE LOCATIONS ARE NOT CURRENTLY USED	793	0.0000	794	0.0000		
THESE LOCATIONS ARE NOT CURRENTLY USED	795	0.0000	796	0.0000		
THESE LOCATIONS ARE NOT CURRENTLY USED	797	0.0000	798	0.0000		
THESE LOCATIONS ARE NOT CURRENTLY USED	799	0.0000	800	0.0000		

```
$BJSCON
BJ       =    .10000000+01,    .00000000+00,    .00000000+00,    .10000000+01,
              .00000000+00,    .00000000+00,    .10000000+01,    .00000000+00,
              .00000000+00,    .10000000+01,    .00000000+00,    .00000000+00,
              .10000000+01,    .00000000+00,    .00000000+00,    .10000000+01,
              .00000000+00,    .00000000+00,
BJBET    =    .00000000+00,    .00000000+00,    .00000000+00,
BJGAM    =    .00000000+00,    .00000000+00,    .00000000+00,
BJXI     =    .00000000+00,    .00000000+00,    .00000000+00,
BJPE     =    .99002497+00,    .99500831-01,    .00000000+00,    .00000000+00,
BJPH     =    .99002497+00,    .99500831-01,    .00000000+00,    .00000000+00,
BJPK     =    .00000000+00,    .00000000+00,    .00000000+00,    .00000000+00,
BJEVA    =    .00000000+00,    .00000000+00,    .00000000+00,    .00000000+00,
              .00000000+00,    .00000000+00,    .00000000+00,    .00000000+00,
              .00000000+00,    .00000000+00,    .00000000+00,    .00000000+00,
              .00000000+00,    .00000000+00,    .00000000+00,    .00000000+00,
              .00000000+00,    .00000000+00,    .00000000+00,    .00000000+00,
              .00000000+00,    .00000000+00,    .00000000+00,    .00000000+00,
              .00000000+00,    .00000000+00,    .00000000+00,    .00000000+00,
              .00000000+00,    .00000000+00,    .00000000+00,    .00000000+00,
$END
```

13636F22

6 XOT TRWPLT

```
                NOIREC = 1
                TITLE=ID=CSM/PM/6/S
                XLABEL=ID=SLANT RANGE (NM)
                YLABEL=ID=RECEIVED SIGNAL LEVEL
                PLOT=430,440,ENDLST
                ENDPLT
                XLABEL=ID=IF SNR (DB)
                YLABEL=ID=POSTDETECTION UPLINK VOICE SNR
                PLOT=640,720,ENDLST
                ENDPLT
                TITLE=ID=CSM/PM/8
                XLABEL=ID=RECEIVED SIGNAL LEVEL (DBM)
                YLABEL=ID=BIT ERROR RATE
                PLOT=439,501,ENDLST
                ENDPLT
                ENDPHA

DD80 PLCT COMPLETED


DD80 PLCT COMPLETED


DD80 PLCT COMPLETED
                TITLE=ID=LM/FM/9B/S
                YLABEL=ID=IF SNR
                PLOT=439,639,ENDLST
                ENDPLT
                XLABEL=ID=IF SNR (DB)
                YLABEL=ID=PREDETECTION VOICE SUBCARRIER SNR
                PLOT=639,727,ENDLST
                ENDPLT
                YLABEL=ID=POSTDETECTION BIOMED SNR SUP. 1
                PLOT=639,585,ENDLST
                ENDPLT
                ENDPHA

DD80 PLCT COMPLETED
```

```
DD80 PLOT COMPLETED

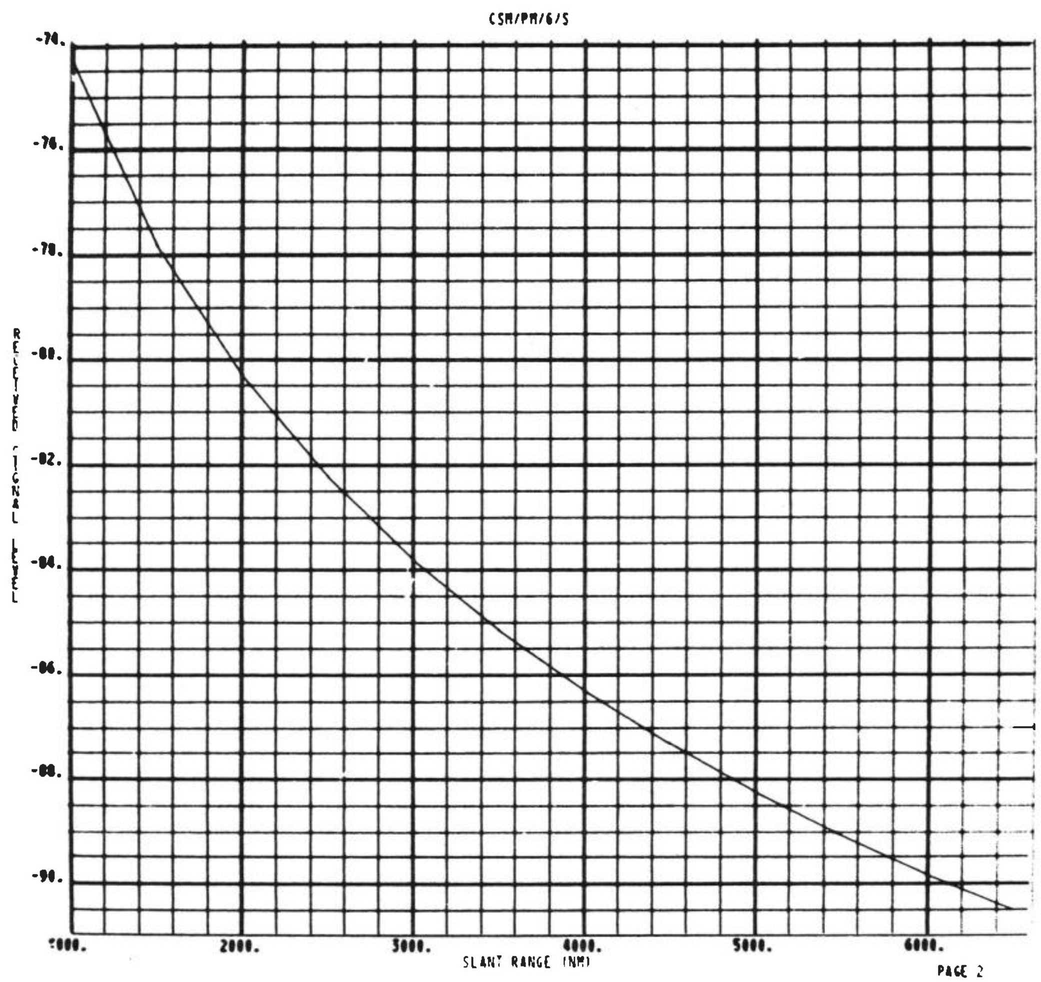
DD80 PLOT COMPLETED
                REPEAT

DD80 PLOT COMPLETED

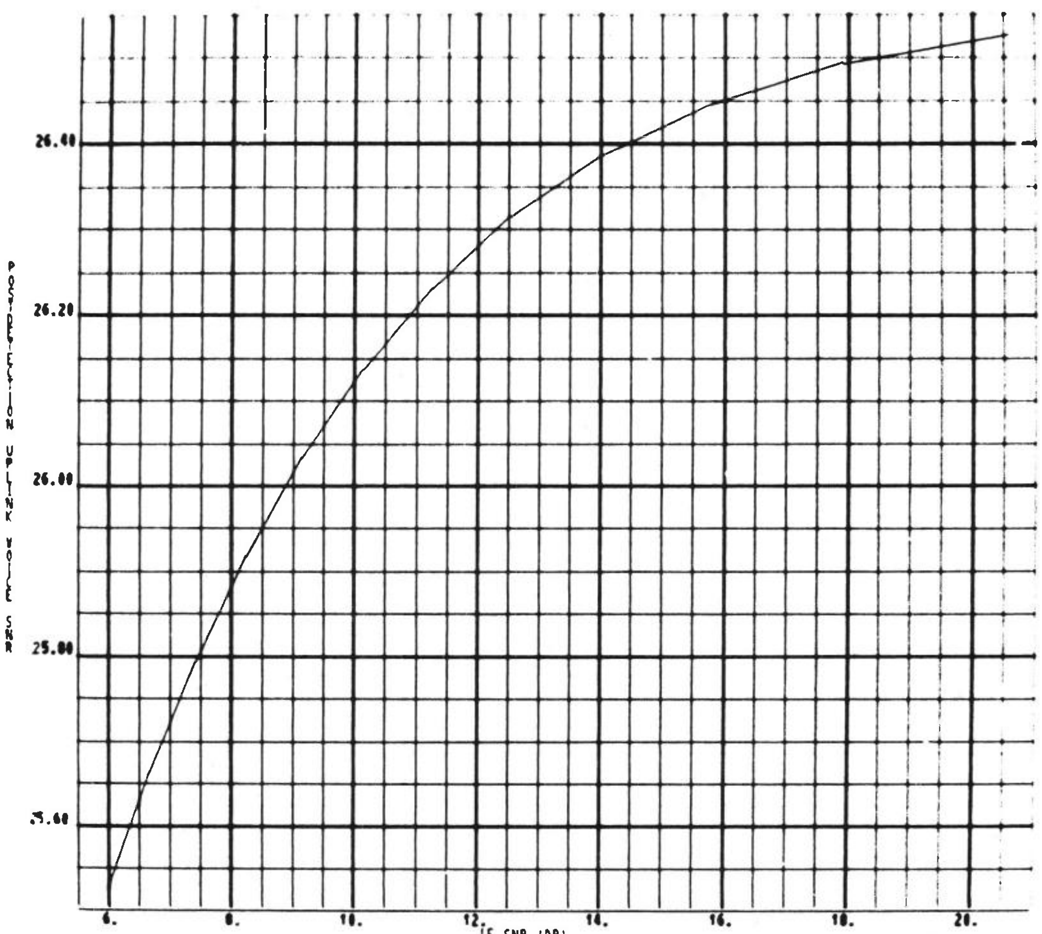
DD80 PLOT COMPLETED

DD80 PLOT COMPLETED
                ENDJOB
```

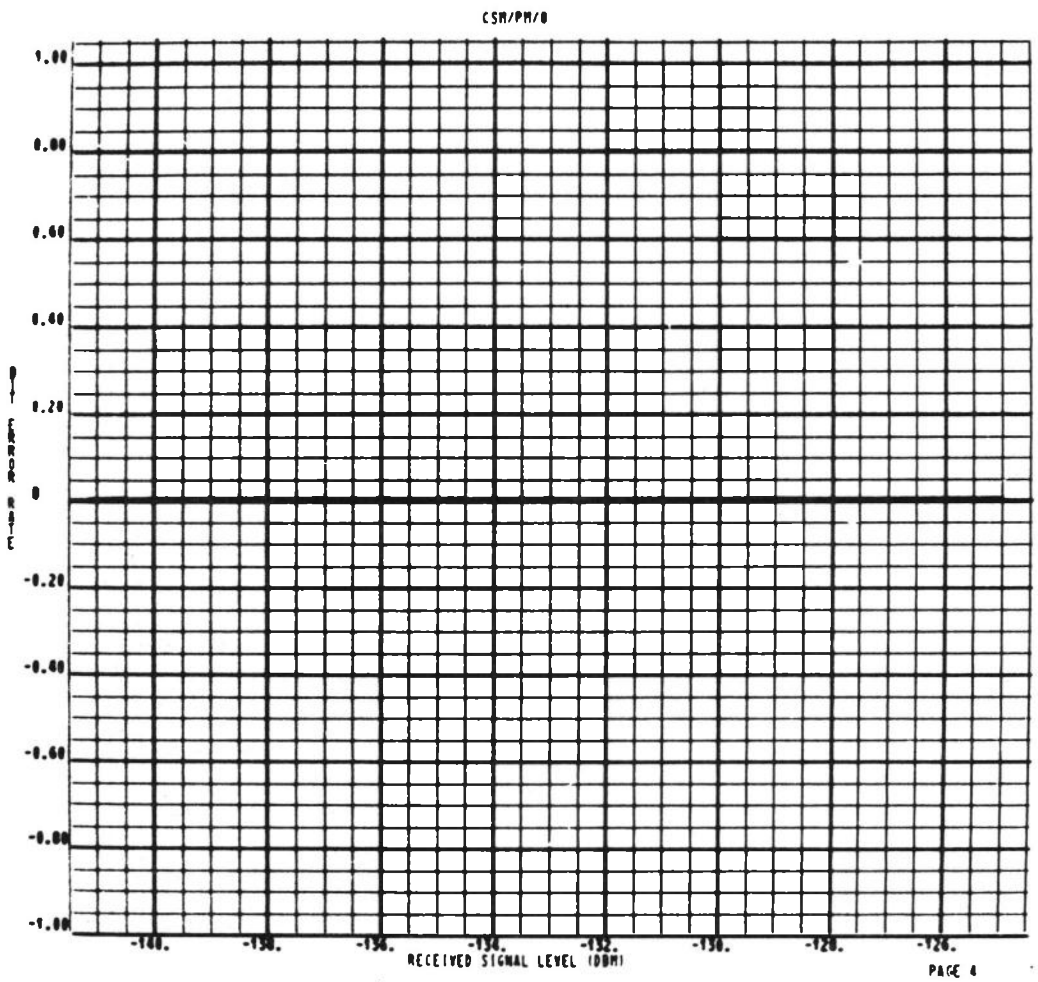
4.4 SAMPLE PLOTS

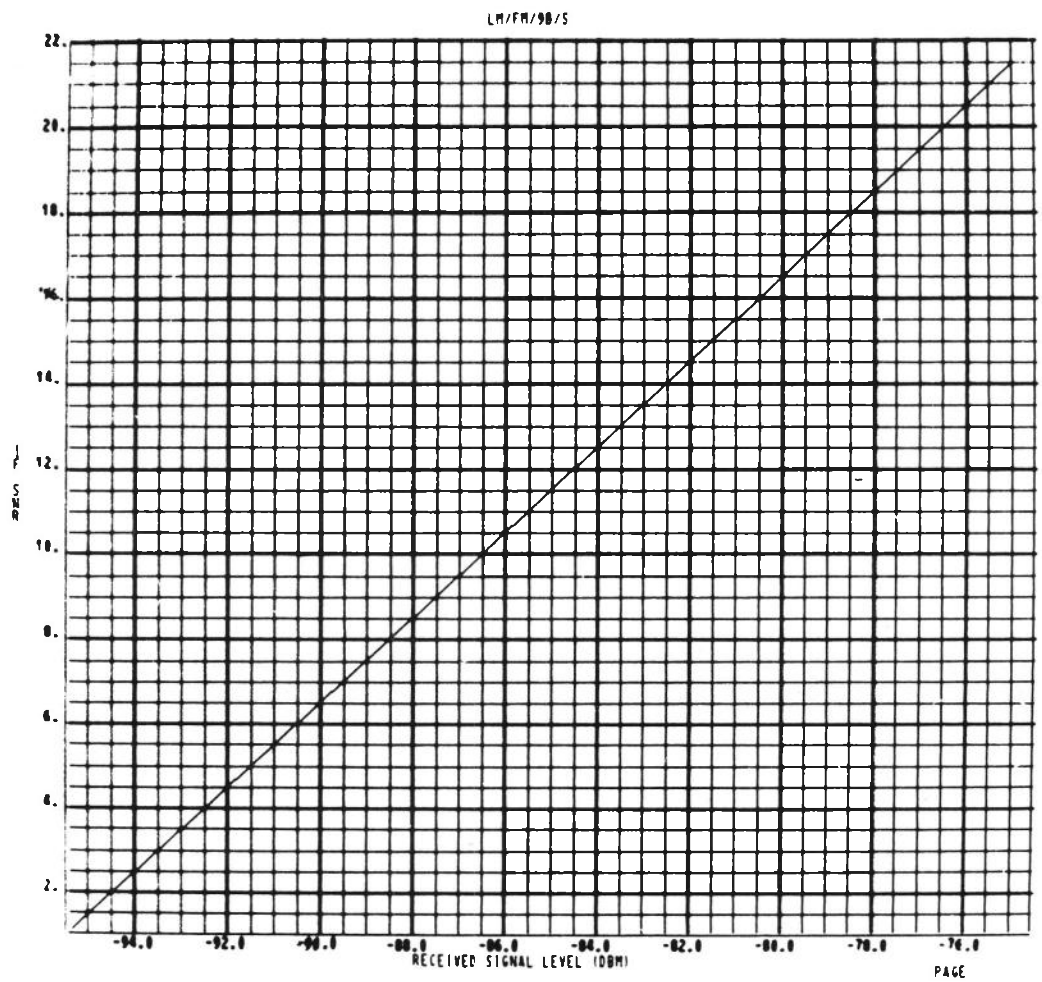


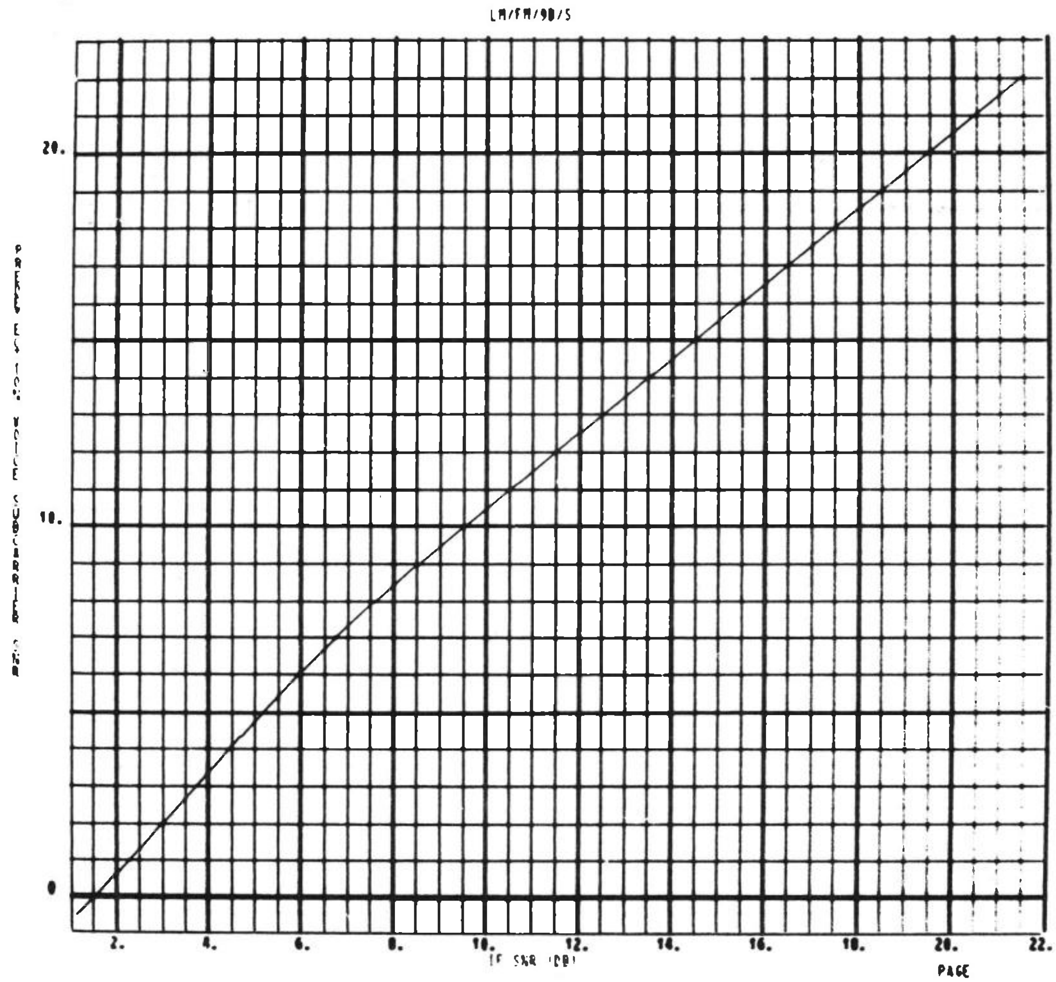
CSM/PM/6/S

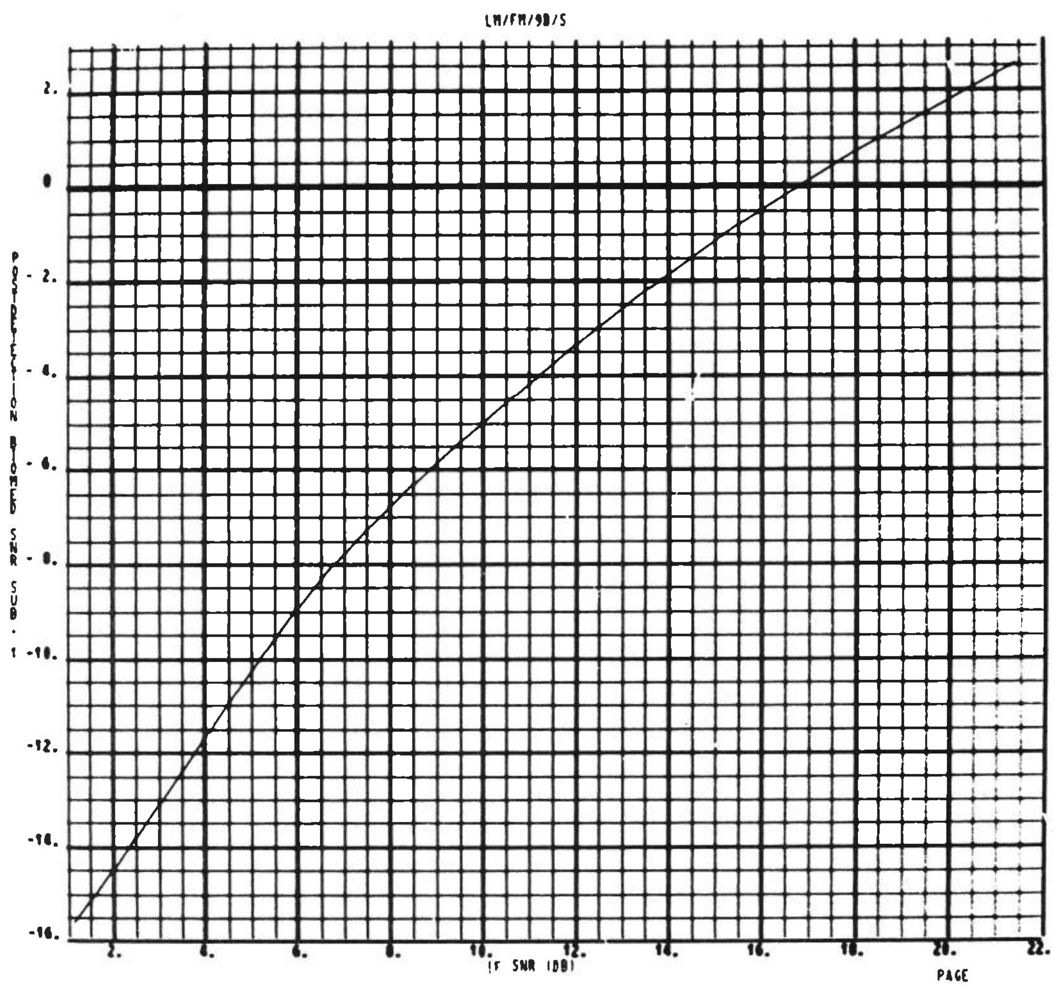


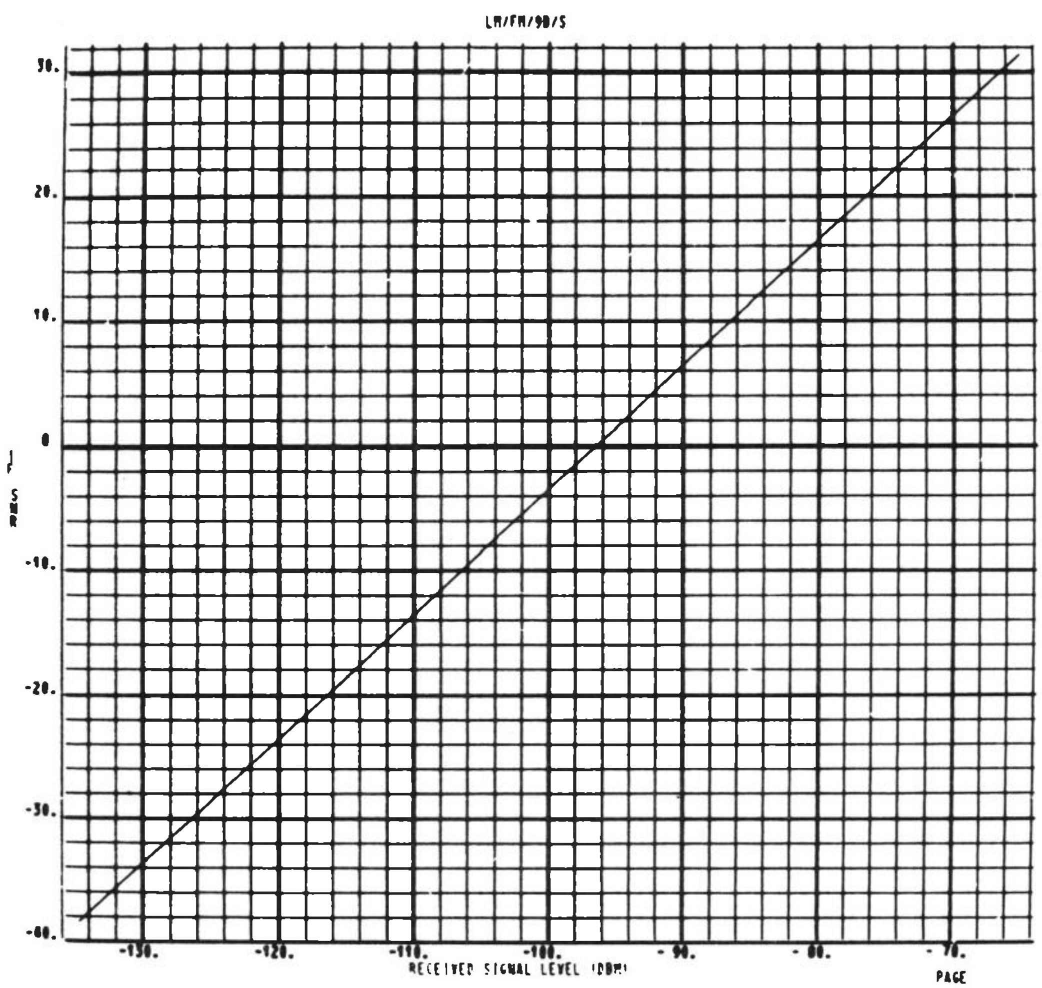
PAGE 3

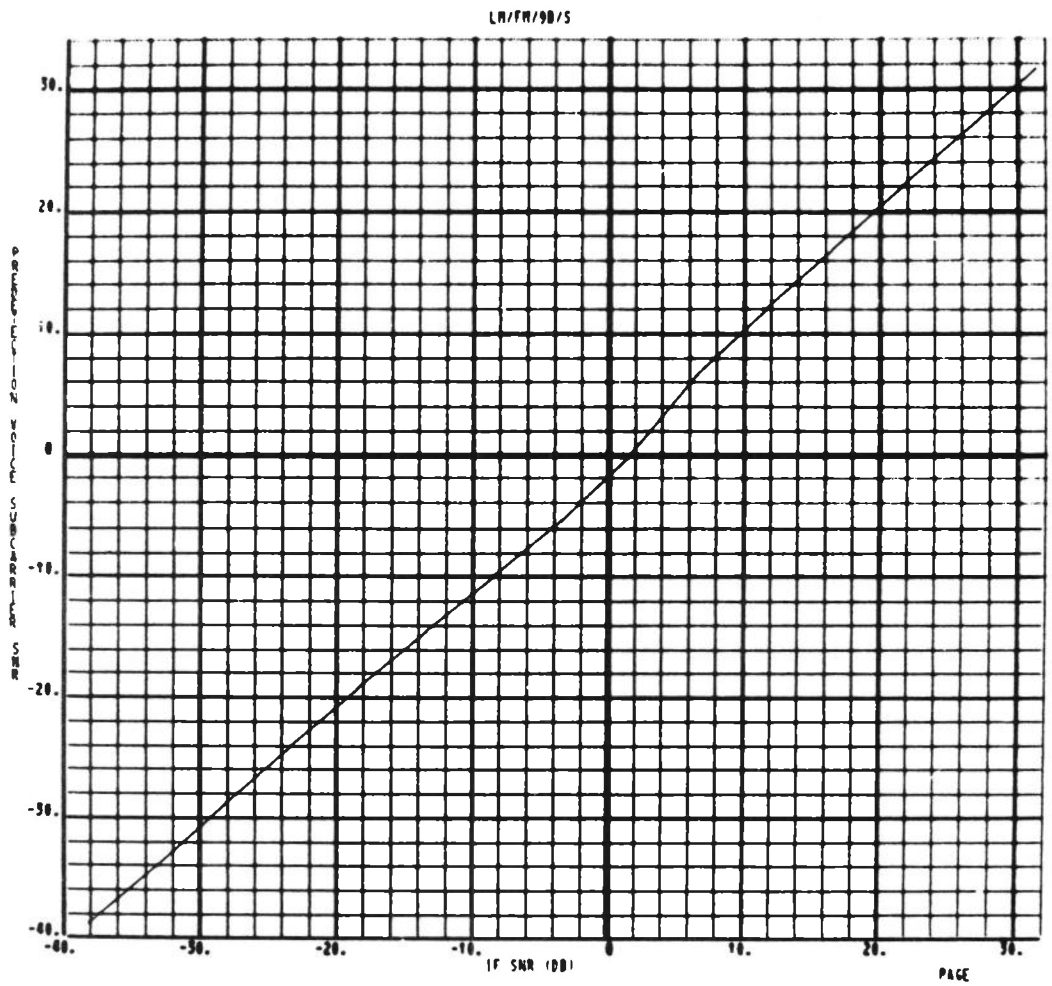

CSM/PM/0
1.00
0.80
0.60
0.40
0.20
0
-0.20
-0.40
-0.60
-0.80
-1.00
BIT ERROR RATE
-140.
-138.
-136.
-134.
-132.
-130.
-128.
-126.
RECEIVED SIGNAL LEVEL (DBM)
PAGE 4

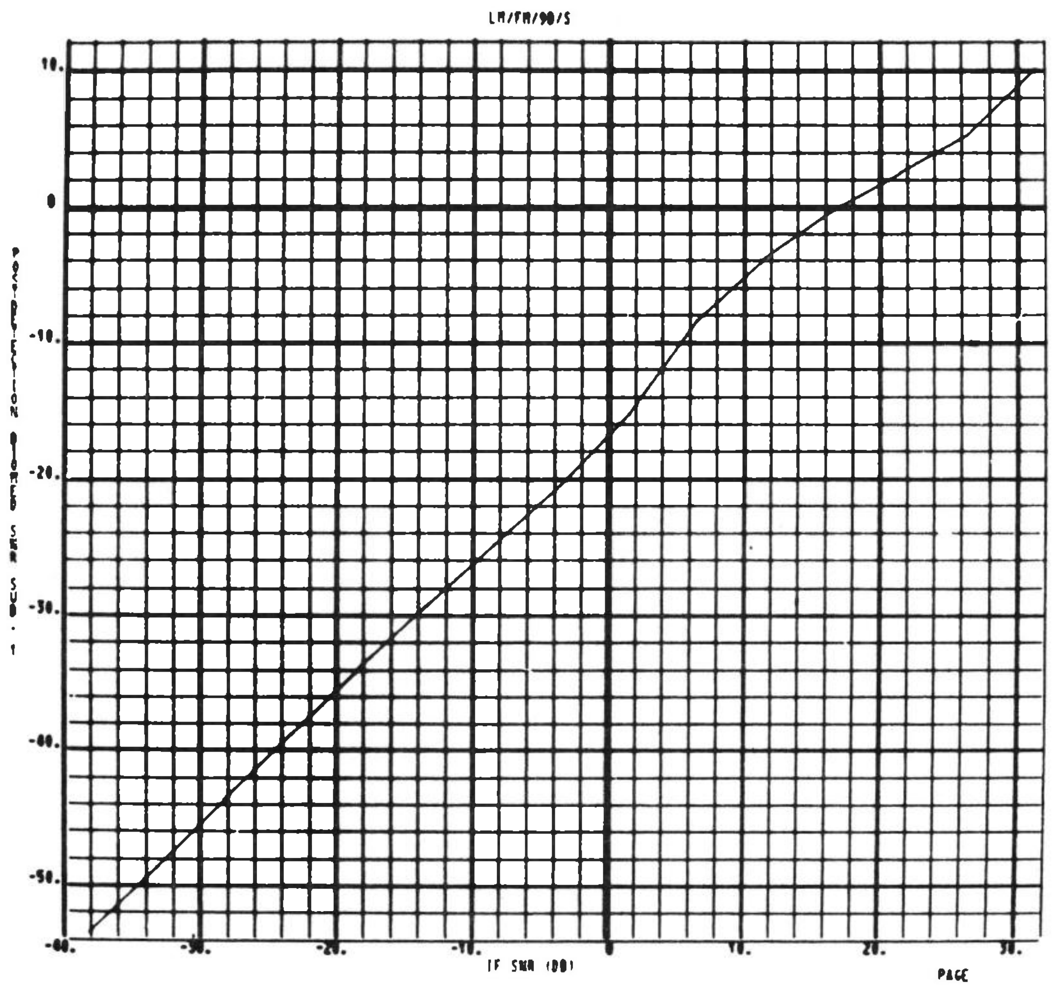

LM/FM/98/S
22.
20.
18.
16.
14.
12.
10.
8.
6.
4.
2.
IF SNR
-94.0
-92.0
-90.0
-88.0
-86.0
-84.0
-82.0
-80.0
-78.0
-76.0
RECEIVED SIGNAL LEVEL (DBM)
PAGE


LM/FM/9D/S
20.
10.
0
2.
4.
6.
8.
10.
12.
14.
16.
18.
20.
22.
IF SNR (DB)
PAGE


LM/FM/9D/S
POSTDETECTION BIOMED SNR SUB 1
2.
0
-2.
-4.
-6.
-8.
-10.
-12.
-14.
-16.
2.
4.
6.
8.
10.
12.
14.
16.
18.
20.
22.
IF SNR (DB)
PAGE


LM/FM/9D/S
30.
20.
10.
0
-10.
-20.
-30.
-40.
SNR
-130.
-120.
-110.
-100.
- 90.
- 80.
- 70.
RECEIVED SIGNAL LEVEL (DBM)
PAGE


LM/FM/9D/S
30.
20.
10.
0
-10.
-20.
-30.
-40.
PREDETECTION VOICE SUBCARRIER SNR
-40.
-30.
-20.
-10.
0
10.
20.
30.
IF SNR (DB)
PAGE


LM/FM/90/S
10.
0
-10.
-20.
-30.
-40.
-50.
-60.
-30.
-20.
-10.
0
10.
20.
30.
IF SNR (DB)
PAGE

5. OPERATING PROCEDURES

This program is written in FORTRAN V for use with the SRU 1108 EXEC II system. Presently this program is in production only for the 1108 system. No input tapes are required by this program in addition to the standard input tape required by the 1108 system, however, previously generated CØMSIM data tapes may be used as input to the program. A standard deck of CØMSIM parameter description cards is included on the second file of the program PCF tape and may be called by the user. For this reason the PCF tape must be mounted on unit "X" (FORTRAN ID No. 27) and must be positioned at the beginning of the second file at the time CØMSIM is first executed. Care must be taken when copying the program PCF tape so as not to lose this data.

The CØMSIM program requires the use of at least one output tape. If no tape assignments are made, drum files will be used and the user must indicate this on his run request form. Drum files may be used when the user does not desire any plot output (since drum files are lost between program executions) and when he does not wish to save a CØMSIM data tape. The user must be careful not to exceed the drum file length. The drum file is large enough to store approximately 150 CØMSIM records; these may be split up between problem sets or problems, but ***in toto*** the number of CØMSIM records must not exceed approximately 150.

If tape assignments are made without the use of "=", FASTRAND files will be used for the output tape and the user must indicate this on his run request form. FASTRAND files may be used when the user desires plot output but does not wish to save a CØMSIM data tape. FASTRAND files are of variable length, the length of each file depending on the number of FASTRAND files used; FASTRAND files are large enough so that the user need not, in general, worry about exceeding the file length.

If tape assignments are made with the use of "=", an actual output tape will be generated and may be saved by the user. Tape may be used in lieu of drum files and FASTRAND files and must be used when the user desires to save a CØMSIM data tape.

5.1 DECK SETUP — NO PLOT OUTPUT DESIRED, NO DATA TAPE SAVED

```
c
c
1
$JØB etc.
∇△ASG△X=(PCF tape number)
∇△XQT△CUR†
△TRW△X
△IN△X
∇△XQT△HV008C
[
 CØMSIM data deck
]
∇△EØF
```

5.2 DECK SETUP — PLOT OUTPUT DESIRED, NO DATA TAPE SAVED

```
c
c
1
$JØB etc.
∇△ASG△X=(PCF tape number)
∇△ASG△F
∇△XQT△CUR†
△TRW△X
△IN△X
∇△XQT△HV008C
[
 CØMSIM data deck
]
∇△XQT△TRWPLT
[
 plot data
]
∇△EØF
```

5.3 DECK SETUP — DATA TAPE SAVED

```
c
c
1
$JØB etc.
∇△ASG△X=(PCF tape number)
∇△ASG△F=SAVEF
∇△XQT△CUR†
△TRW△F
△TRW△X
△IN△X
```

† The following CUR operations must be followed precisely.

```
c
c
1
∇ΔXQTΔHV008C
[
 CØMSIM data deck
[
∇ΔEØF
```

5.4 COMPUTER RUN REQUEST

In submitting the card deck for a computer run, the run time may be estimated at approximately thirty seconds per CØMSIM problem and the print output may be estimated at approximately 25 pages per CØMSIM problem. If plots are generated, the microfilm or calcomp output estimate depends upon the number of plots generated in the plotting program.

5.4.1 Sample Run Request Form

TIME IN

LEFT TRW

☐ PRIORITY

INSTRUCTIONS FOR SCIENTIFIC COMPUTER RUNS

RE-RUN ☐

(DO NOT FILL IN SHADED AREAS)

PROGRAMMER	BADGE NO.	BOX NO.	PHONE NO.	DATE (M, D, Y)	RETURN TRW
Argila, C. A.	57659	TRW	2503	8/1/68	

DIVISION CODE	PROG. NO.	PROJ. NO.	EST. TIME (MIN)	MAX. TIME (MIN)	LINES OUTPUT	SEQ. NUMBER	TIME OUT
TRW	A025	1135B	1	2	1		

OPERATING SYSTEM				TYPE OF RUN		COMPUTER	
1108 FORTRAN V	☒	FORTRAN FAP	☐	PROD. ☐	TEST ☒	1108 ☒	360 ☐
1108 FORTRAN IV	☐	IBSYS ☐	SYSB ☐	OTHER (EXPLAIN BELOW)		7094 ☐	
1108 COBOL	☐	OTHER				OTHER	

INPUT TAPES

UNIT	REEL	BIN NO.	DEN
X	5938	A235	8

OUTPUT TAPES

UNIT	REEL NO.	BIN NO.	DEN-SITY	SAVE	PROCESSING REQUIRED

WORKING TAPES

ACTUAL TIME USAGE

START

STOP

CHECK FOR	CALCOMP ☐	REEL NO.	NO. FRAMES	PROCESSING
	4020 ☒		12	

ABNORMAL STOPS

STOP AT LOC.

SR:

LOOPING: LOC.

THRU

EXCESS OUTPUT

EXCESS TIME

PROBLEM NO.	H	3	8	1	0	1
PROGRAM NAME	H	V	0	0	8	C
TOTAL TAPES						1
INPUT (100'S CARD)						2
OUTPUT (100'S LINES)						
OUTPUT (100'S CARDS)						
RUN AT		TRW	MSC	MCD	OTHER	

PROGRAMMER'S COMMENTS:

ONE FASTRAND REQUIRED

OPERATOR'S COMMENTS:

SYSTEM OPERATOR

PERIPHERAL OPERATOR

SYSTEMS 7011-H (9-13-67)

APPENDIX

UTILITY PROGRAMS

The CØMSIM package contains two utility programs which reclaim and alter the standard deck of CØMSIM parameter description cards which are contained on the second file of the program PCF tape.

Each of the utility programs exists simultaneously with CØMSIM in the user PCF area and hence they may be executed with, or independently of, CØMSIM, in any order what-so-ever. The only restrictions are that the proper control cards be inserted into the job deck as indicated below.

1.1 THE UTILITY PROGRAM, UTILT1

The utility program, UTILT1, reclaims the standard deck of CØMSIM parameter description cards which reside on the second file of the program PCF tape. No card input is required by UTILT1. It is assumed that the program PCF tape is mounted on unit "X" (FORTRAN ID No. 27). Once the program PCF tape has been entered into the user PCF area only the following control card is necessary in order to execute UTILT1:

```
c
c
1
▽△XQT△UTILT1
```

Upon termination, UTILT1 will leave the program PCF tape in position for CØMSIM execution; hence UTILT1 may be executed before or after CØMSIM. Approximately 400 cards of punch output will be generated by UTILT1.

1.2 THE UTILITY PROGRAM, UTILT2

The utility program, UTILT2, alters or replaces the standard deck of CØMSIM parameter description cards which reside on the second file of the program PCF tape. The FØRTRAN namelist "$INPUT" is used to input the single parameter, IFLAG. IFLAG=1 indicates that the old parameter description card deck is to be altered. IFLAG=2 indicates that this deck is to be replaced; IFLAG is not initialized. The alter cards or replacement deck must follow this namelist. No end card is necessary to terminate the alter or replacement deck.

Because, under current operating procedures, it is impossible to write on a previously generated tape, a new program PCF tape must be generated whenever the parameter description card deck is being altered or replaced. It is assumed that the old program PCF tape is mounted on unit "Y" and that the new program PCF tape is mounted on unit "X". The following control cards will generate a new program PCF tape with the altered or replaced CØMSIM parameter description card deck.

```
c
c
1
▽△XQT△CUR
△TRW△X,Y
△ERS
△IN△Y
△ØUT△X
△TEF△X
▽△XQT△UTILT2
[
[ input card deck
[
▽△EØF
```

Upon termination, UTILT2 will leave the new program PCF tape in position for CØMSIM execution; hence UTILT2 may be executed before or after CØMSIM.

V O L U M E I I

P R O G R A M M E R ' S M A N U A L

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TABLE OF CONTENTS (CONTINUED)

TABLES

1. INTRODUCTION

The main program, CØMSIM, and the individual subroutines are discussed in separate sections. Each section contains the applicable information for the following:

a) Identification (unless otherwise noted, the main program identification data are applicable to each subroutine)

b) Deck Identification

c) Purpose

d) Description (Includes references)

e) Storage (Figures do not include named CØMMØN storage)

f) Restrictions

g) Library Usage

h) Subroutine Usage (Refer to Table 2-1 for subroutine cross reference table)

i) Named CØMMØN Usage (Refer to Table 2-2 for Named CØMMØN cross reference table)

j) Arguments

k) Local variables

l) Equivalences

m) Namelists

n) Flow Chart

2. THE MAIN PROGRAM, CØMSIM

2.1 IDENTIFICATION

The program identification data are as follows:

Program Number: HV008C

Title: CØMSIM

Task Number: E9

Programming Language: FØRTRAN V

Machine: SRU 1108 (EXEC II)

2.2 DECK IDENTIFICATION

CØMSIM

2.3 PURPOSE

This program will simulate the Apollo LM/CSM/MSFN S-band communication system.

2.4 DESCRIPTION

Each basic communication function associated with the Apollo LM/CSM/MSFN S-band communication system is represented by a computational "block" or module. There are fifty such blocks in CØMSIM and various sequences of these blocks simulate various subsystems of the Apollo LM/CSM/MSFN S-band communication system. (Currently, only thirty-five of these blocks are being used.) A description of the various systems which can be simulated and their corresponding CØMSIM block sequences is given in the CØMSIM User's Manual.

Initially, parameter definition cards are read in either from cards or from tape; these cards provide a description of each of the numerical parameters which represent the various physical quantities necessary to simulate the communication system. Parameters are classed as (1) Input (parameters which can only be entered as program input), (2) Intermediate (parameters which may be either input or computed) and (3) Output (parameters which can only be computed by the program). These parameter definitions are not necessary for the execution of the program since reference is made only to the numerical name of a particular parameter, not its description.

The program is designed to process any number of problem sets where a problem set is a particular simulation; hence, after the parameter definitions are input, "$PRBSET" namelist input is expected which indicates the number of problems in the set, and, optionally, the number of the logical unit for the data tape and a designator for the use of input parameters from the preceding problem. Data for each problem of a problem set is determined by "$PRBSPC" namelist input which indicates the number of communication links desired, the number of reports desired, the number of pages per report and lines per page desired, the location of the file on the data tape and a flag for optional output. This card is followed by link specification cards which indicate, for each link specified in the problem data, the sequence of the computational blocks necessary for the desired simulation and then by data cards defining the values of the input and intermediate parameters of the problem. These cards are then followed by "$REPSPC" namelist input for each report desired. This namelist indicates the type of report desired, start and stop limits for the variables to be reported (if they are the same, all points are reported) and, for report type 5, the parameter numbers of the variables to be reported. Succeeding problem sets are set up in the same manner and simply sequenced one after the other.

The independent variable varied for computation can be either the received signal level (in DBM) or the range (in nautical miles). A block sequence of 1,... or 9,1,... indicates that range is the independent variable; otherwise, received signal level is the independent variable.

The printed output consists of a listing of the input and intermediate parameters followed by one or more communication reports, as indicated on the "$PRBSPC" namelist input, followed by a listing of output and intermediate parameters and their value at the last computational point. A data tape is also generated which may be saved for future reports and for plotting.

A complete description of the printed and data tape output is included in the CØMSIM User's Manual.

2.5 STORAGE

The main program, CØMSIM, uses 2554 octal locations.

2.6 SUBROUTINE USAGE

Table 2-1 is a subroutine usage cross reference table which includes subroutines called by the main program.

2.7 NAMED CØMMØN USAGE

Each named CØMMØN block is listed below. Table 2-2 is a named CØMMØN usage cross reference table which includes named CØMMØN usage by the main program.

2.7.1 AE

Storage: 4 decimal locations.

IE	LOCEM	NEM	NEMAX

2.7.2 ANSCØM

Storage: 300 decimal locations.

BER (2)	MGBE (2)	MGC (2)	MGKE (2)	MGP (2)
MGTE (2)	MGTØ (2)	MGTPR (2)	MGTSB (2)	MGTSFR(2)
MGVE (2)	MGVØ (2)	MGVØF (2)	MGVSF (2)	MLBV (2)
MLCVBS(2)	MLDC (2)	MLDK (2)	MLDPHT(2)	MLDPLT(2)
MLDPRN(2)	MLDPV (2)	MLDVLT(2)	MLEVA(2,8)	MLHLB (2)
MLUC (2)	MLUPT (2)	MLUPV (2)	NOISEF(2)	PCDBM (2)
PHIFDB(2)	SNBD (2,4)	SNBDDB(2,4)	SNBE (2)	SNBEDB(2)
SNC (2)	SNCDB (2)	SNESB (2,8)	SNESBB(2,8)	SNHSB (2)
SNHSBB(2)	SNIF (2)	SNIFDB(2)	SNKE (2)	SNKEDB(2)
SNMM (2,4)	SNMMDB(2,4)	SNMSF (2,4)	SNMSFB(2,4)	SNP (2)
SNPDB (2)	SNPBV (2)	SNPBVB(2)	SNTE (2)	SNTEDB(2)
SNTFR (2)	SNTFRB(2)	SNTØ (2)	SNTØDB(2)	SNTP (2)
SNTPDB(2)	SNTPR (2)	SNTPRB(2)	SNTSB (2)	SNTSBB(2)
SNTSF (2)	SNTSFB(2)	SNVE (2)	SNVEDB(2)	SNVØ (2)
SNVØDB(2)	SNVØF (2)	SNVØFB(2)	SNVSF (2)	SNVSFB(2)
SNXE (2)	SNXEDB(2)	DUMMYA(68)		

2.7.3 BJSCØM

Storage: 71 decimal locations.

BJ (3,2,3)	BJBET (3)	BJGAM (3)	BJXI (3)	BJPE (2,2)
BJPH (2,2)	BJPK (2,2)	BJEVA(2,2,8)		

2.7.4 INTERM

Storage: 200 decimal locations.

ALPHA (2)	BET (2)	BETEVA(2,8)	COMØLE(2)	DMMSF (2,4)
DNMSF (2,4)	DNMSFB(2,4)	DPBV (2)	DPBVDB(2)	DTB (2)
DTBDB (2)	DTP (2)	DTPDB (2)	DTPR (2)	DTPRDB(2)
DTSF (2)	DTSFDB(2)	DTSFR (2)	DTSFRB(2)	DVB (2)
DVBDB (2)	DVF (2)	DVFDB (2)	DVSF (2)	DVSFDB(2)
DXE (2)	DXEDB (2)	ELLELL(2)	ENIF (2)	FREDEV(2,4)
GAMM (2)	LDB (2)	LSDB (2)	MGTBER(2)	PC (2)
PCDB (2)	PHIF (2)	RATIØ (2,8)	RNM (2)	SNVØP (2)
SNVØPB(2)	SR (2)	SRDB (2)	SRDBM (2)	STDB (2)
T (2)	XI (2)	DUMMYI(54)		

2.7.5 LISTC

Storage: 5206 decimal locations.

IVAR	N	DATAPE	NLISTS
NPAGES	NLINES	NFW	INFØS(150,13)
INFØI(100,13)	INFØA(150,13)		

2.7.6 NUMBER

Storage: 32 decimal locations.

ZERØ	FIFTH	QUARTR	HALF	ØNE	TWØ	THREE
FØUR	FIVE	SIX	SEVEN	EIGHT	FNINE	TEN
TWENTY	FIFTY	HUNDRD	THSAND	FMIYUN	I1	I2
I3	I4	I5	I6	I7	I8	I9
I10	I20	I50	I100			

2.7.7 STATIC

Storage: 300 decimal locations.

A	(2)	B	(2)	BB	(2,4)	BBE	(2)	BC	(2)
BD	(2,4)	BEE	(2,8)	BHE	(2)	BIF	(2)	BKE	(2)
BLF	(2)	BLM	(2,4)	BLPBV	(2)	BLTP	(2)	BLX	(2)
BMSF	(2,4)	BPBVE	(2)	BPBVØ	(2)	BPK	(2)	BR	(2)
BTE	(2)	BTEF	(2)	BTØ	(2)	BTPE	(2)	BTPØ	(2)
BVE	(2)	BVEF	(2)	BVØ	(2)	BVØF	(2)	BWTSF	(2)
BWVSF	(2)	BXE	(2)	CMSF	(2,4)	CTSF	(2)	CVSF	(2)
DELFB	(2,4)	DELNM	(2)	DELSR	(2)	DFK	(2)	DFKPBV	(2)
DFKT	(2)	DFKTP	(2)	DFKX	(2)	FMC	(2)	FPBV	(2)
FTF	(2)	FTP	(2)	FTS	(2)	FVF	(2)	FVS	(2)
FVSF	(2)	FXF	(2)	GAMMA	(2)	GR	(2)	GT	(2)
K	(2)	KB	(2)	LC	(2)	MØDLEV	(2,8)	NEMU	(2)
PBE	(2)	PDEV	(2)	PE	(2)	PH	(2)	PHIØ	(2)
PK	(2)	PP	(2)	PT	(2)	PV	(2)	RBE	(2)
RC	(2)	RHØB	(2,4)	RHØPBV	(2)	RHØT	(2)	RHØTP	(2)
RHØV	(2)	RHØX	(2)	RKE	(2)	RPK	(2)	RTE	(2)
RTØ	(2)	RTPR	(2)	RTSB	(2)	RTSFR	(2)	RVE	(2)
RVØ	(2)	RVØF	(2)	RVSF	(2)	SNRCØM	(2)	SNRCST	(2)
SNTRDB	(2)	ST	(2)	TAPERA	(2)	TAPERB	(2)	TRC	(2)
DUMMYS	(40)								

Table 2-3 cross references input, intermediate and output parameter numbers against computer mnemonics in the STATIC, INTERM and ANSCØM CØMMØN blocks, respectively. A complete description of each of these parameters is given in the CØMSIM User's Manual.

2.8 LOCAL VARIABLES

2.8.1 Dimensioned

Mnemonic	Type	Size	Description
TITLES	R	(3,2)	Title on link specification card(s)
LINKID	I	(2)	Link ID type. 1=downlink, 2=uplink.
NØEQS	I	(2)	Number of equations on link specification card(s)
III	I	(13)	Temporary storage for parameter descriptions
UDLINK	R	(2)	Hollerith "DØWN" and "UP"
IDEQSS	I	(20,2)	Sequence of equations on link specification card(s)

Mnemonic	Type	Size	Description
STATIV	R	(300)	Working array for input parameters
FINTEV	R	(200)	Working array for intermediate parameters
ANSCØV	R	(300)	Working array for output parameters
ITABLE	I	(50)	Table of integers indicating which parameters can be operated on by the finite transmitted SNR algorithm variable
SNTR	R	(2)	Miscellaneous variable

2.8.2 Undimensioned

Mnemonic	Type	Description
IFINIS	I	Alphanumeric "b$ENDb"
IBLANK	I	Alphanumeric "bbbbbb"
NFW	I	Number of FØRTRAN words on data tape (For this version NFW = 800)
IDDEF	I	Bad ID number counter
IEND	I	End flag
ID	I	Parameter description ID number
J	I	Index
I	I	"DØ" loop index
NPRØBS	I	Number of problems in problem set
NPØINT	I	Total number of computational points (= NPAGES*NLINES)
L	I	"DØ" loop index
IPRINT	I	Optional print flag (IPRINT ≠ 0 indicates print out of namelist $BJSCØN)
IN	I	I/O list index
IT	I	I/O list index
IDSTAT	I	Bad parameter ID number counter
VALUE	R	Temporary storage
I34	I	Page line storage
ID1	I	Index
ID2	I	Index
J1	I	Index
J2	I	Index
IK	I	"DØ" loop index
M	I	Temporary storage

Mnemonic	Type	Description
DATAPE	I	Data tape ID number
ICNT	I	Maximum number of underflows/overflows allowed
II	I	Temporary storage
IM	I	"DØ" loop index
INTAPE	I	Input tape ID number
JI	I	Index
JJ	I	Index
LIMIT	I	"DØ" loop limit
LINK1	I	First link ID number
LINK2	I	Second link ID number

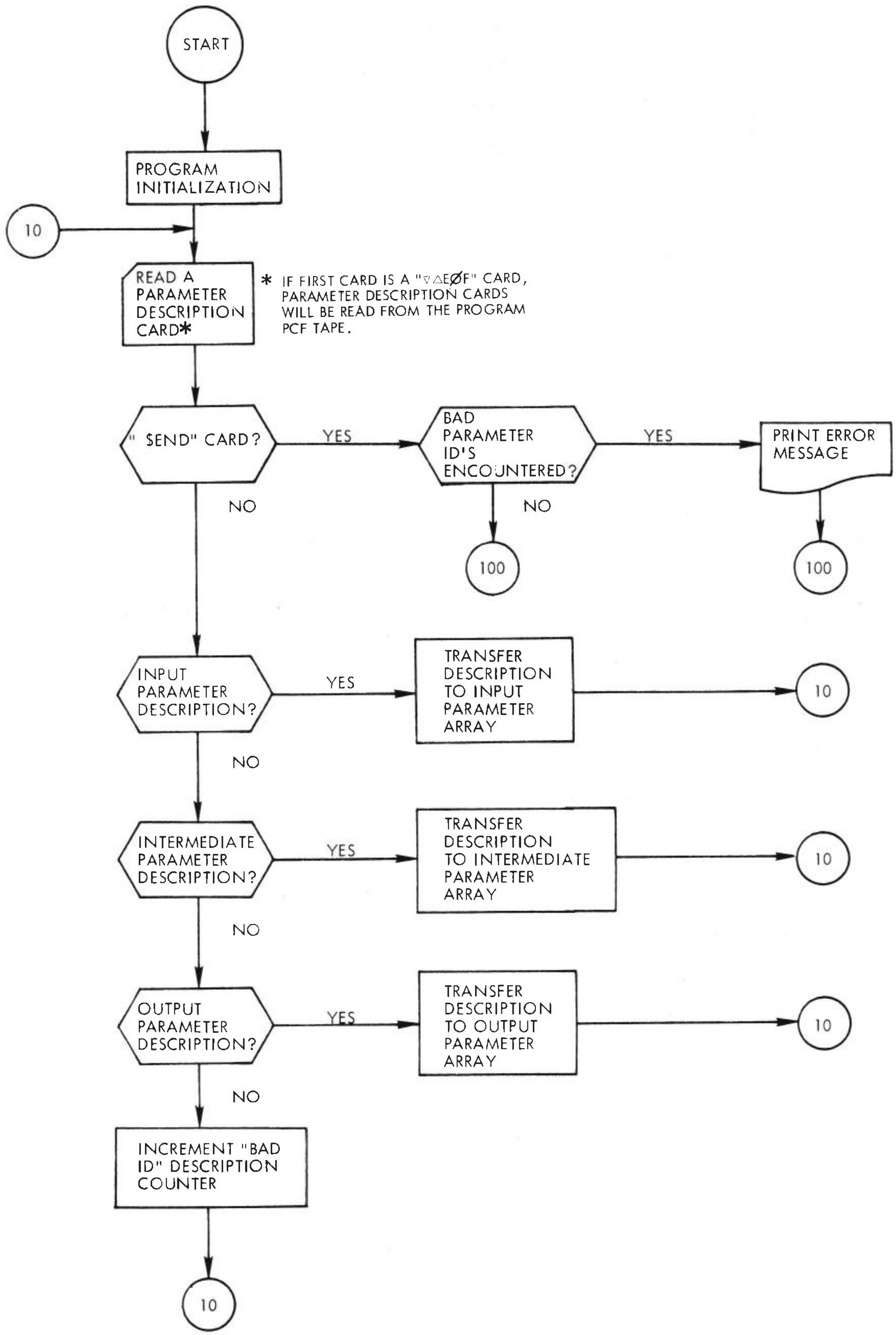
2.9 EQUIVALENCES

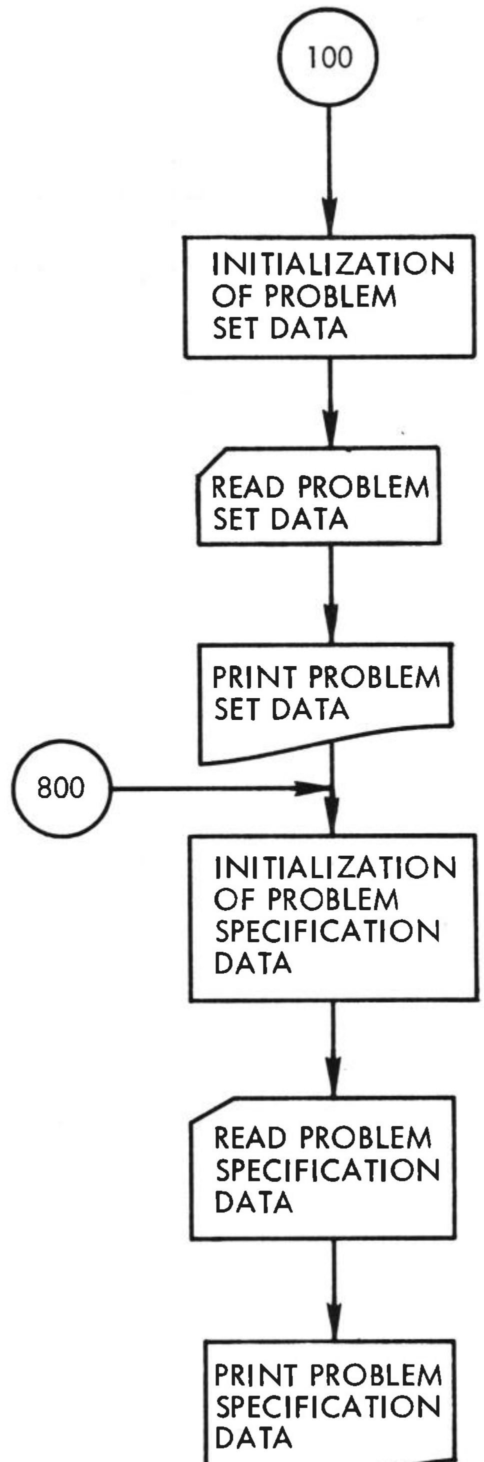
Mnemonic-1	Mnemonic-2	Purpose
STATIV(1)	A(1)	All parameters in CØMMØN STATIC referred to as array STATIV
FINTEV(1)	ALPHA(1)	All parameters in CØMMØN INTERM referred to as array FINTEV
ANSCØV(1)	BER(1)	All parameters in CØMMØN ANSCØM referred to as array ANSCØV

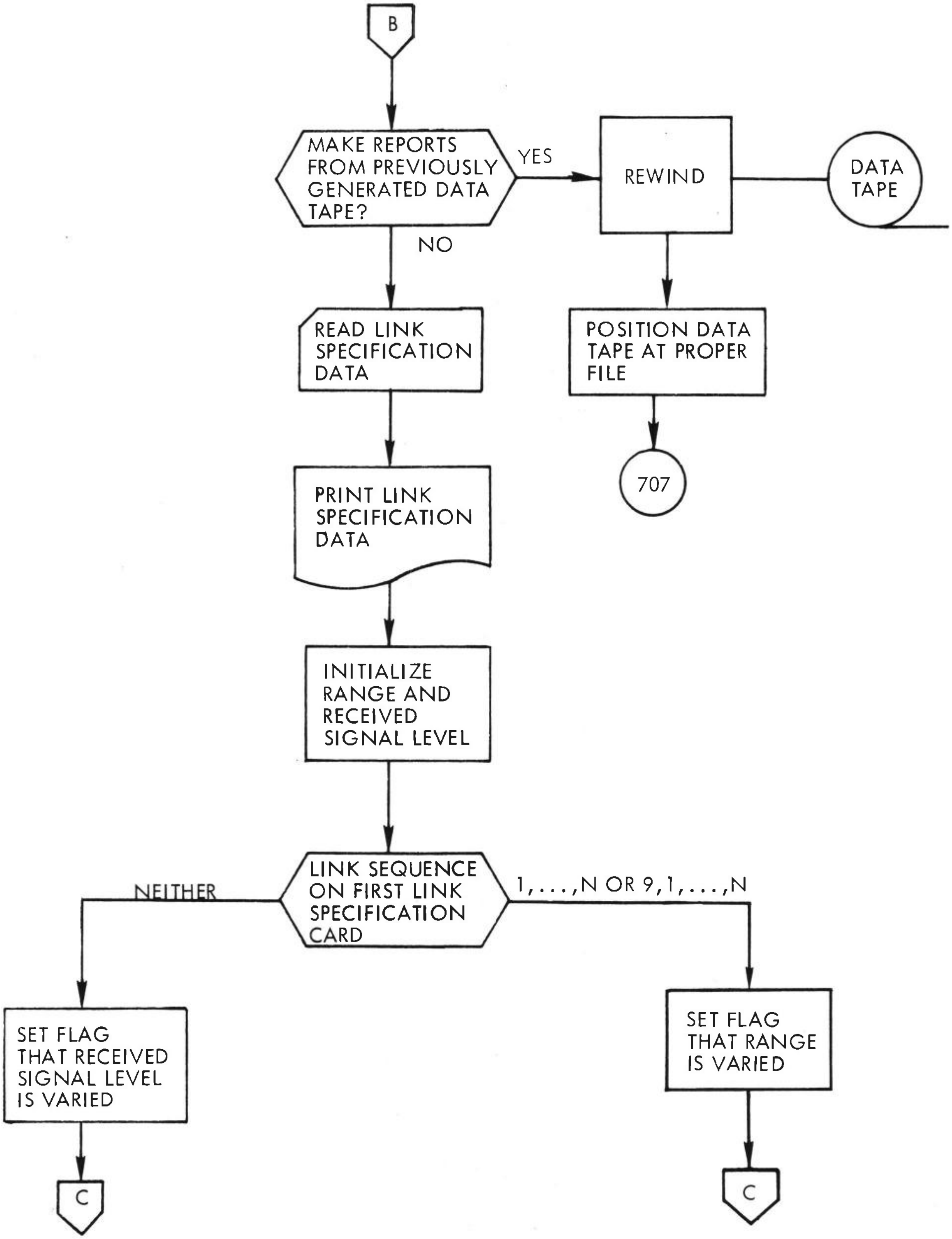
2.10 NAMELISTS

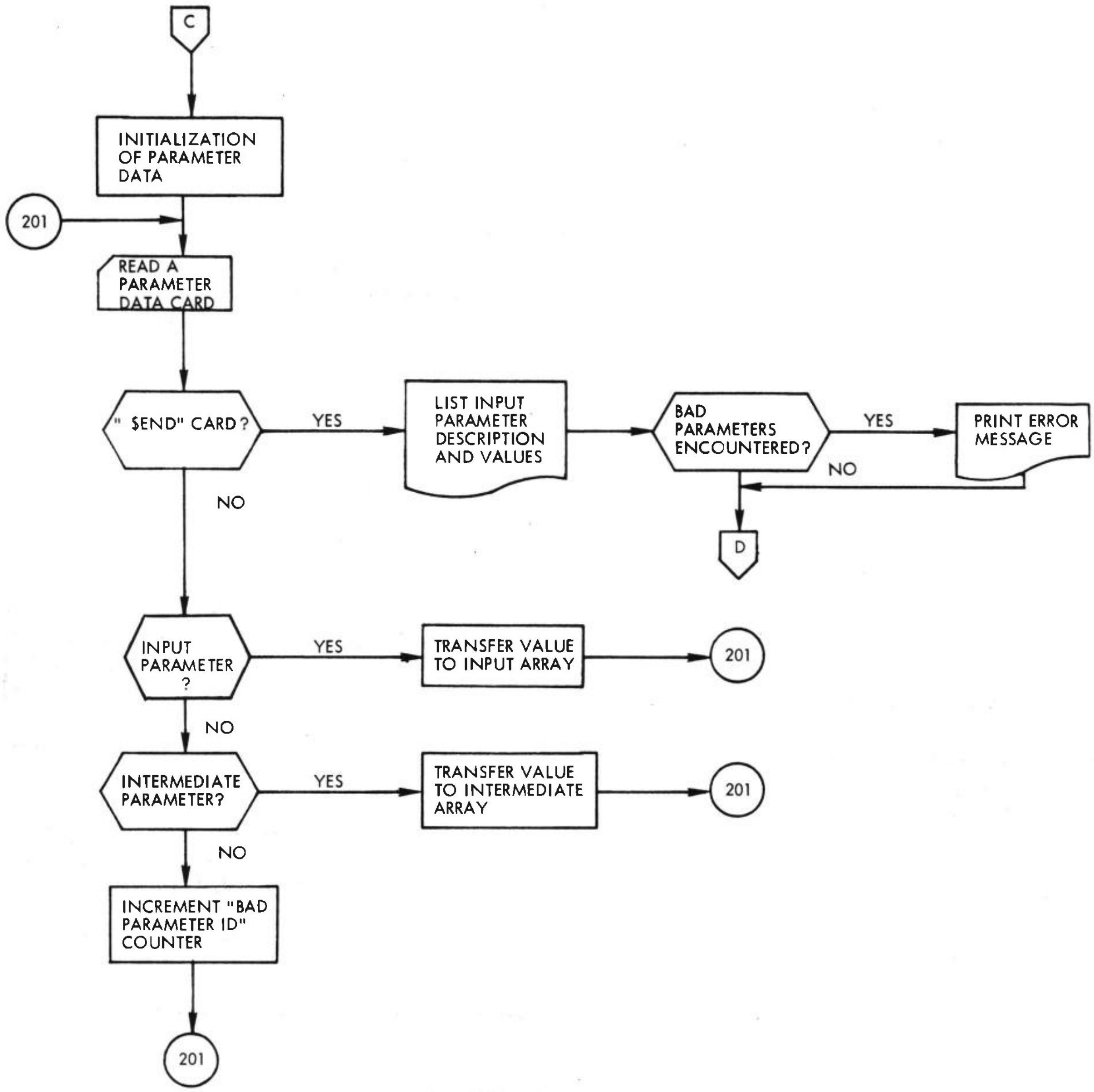
Namelist	Variables			
BJSCØN	BJ	BJBET	BJGAM	BJXI
	BJPE	BJPH	BJPK	BJEVA
PRBSET	NPROBS	DATAPE	SAVE	
PRBSPC	LINKS	NLISTS	NPAGES	NLINES
	NFILE	IPRINT		

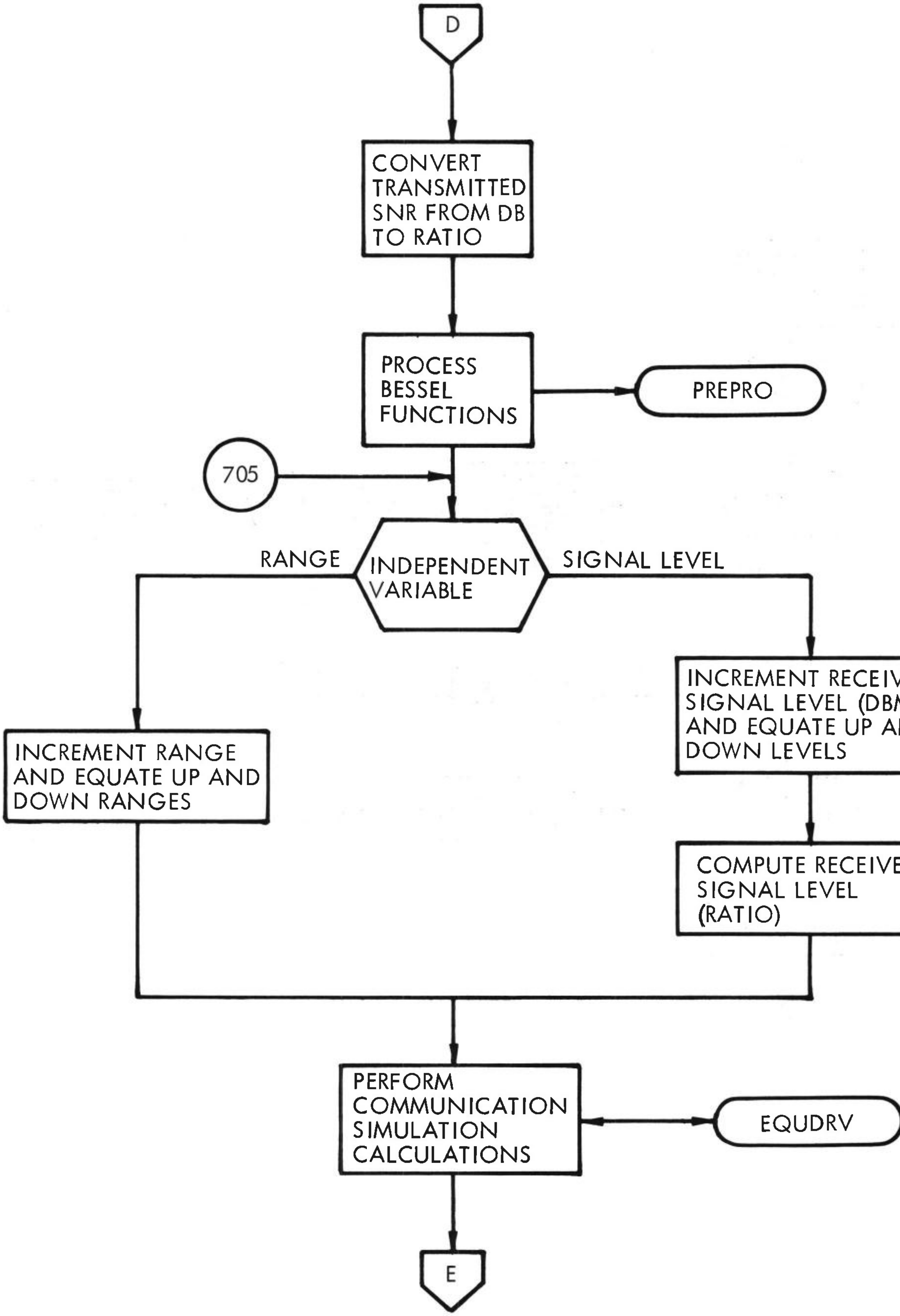
2.11 FLOW CHART

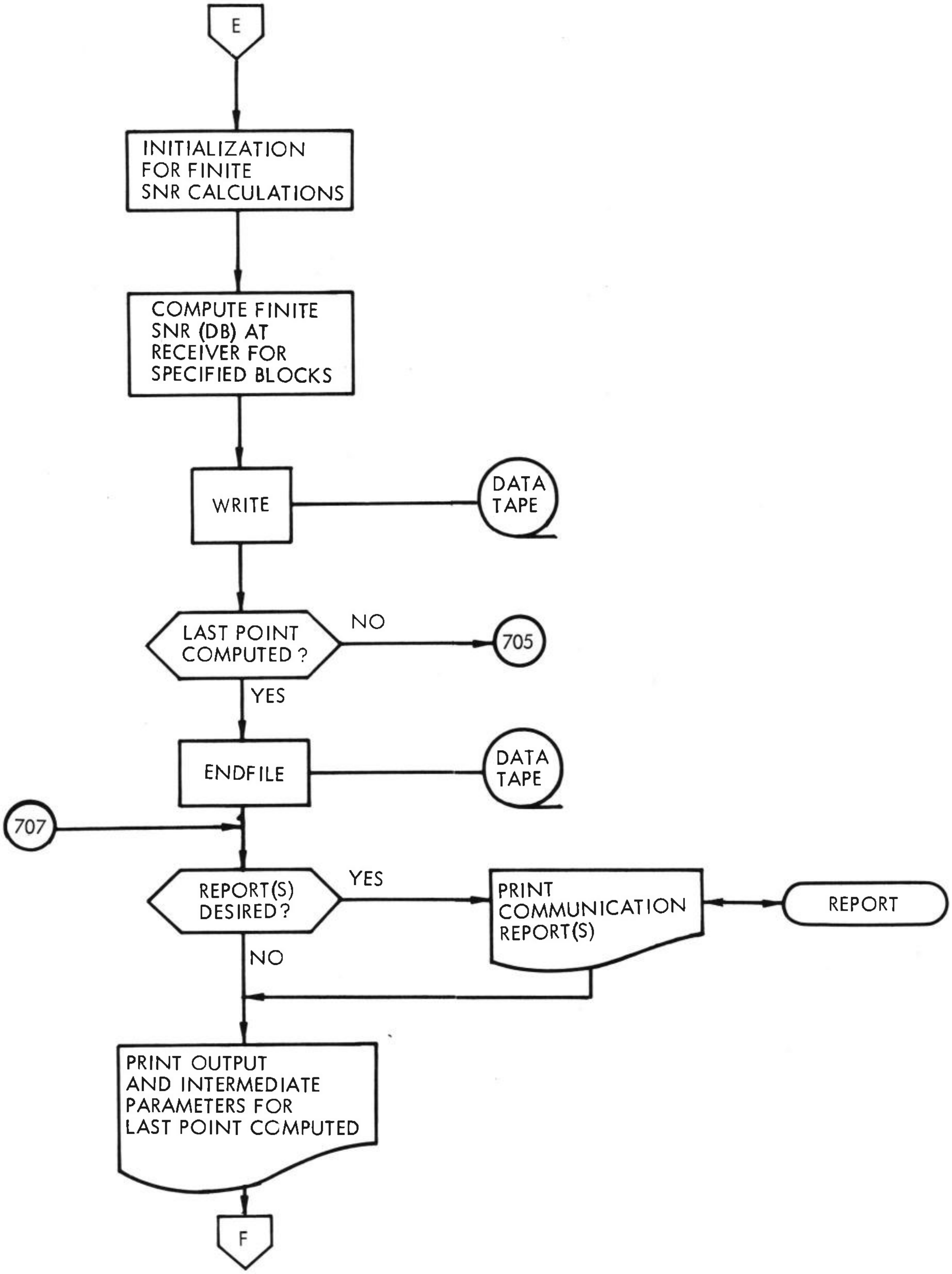



100
INITIALIZATION OF PROBLEM SET DATA
READ PROBLEM SET DATA
PRINT PROBLEM SET DATA
800
INITIALIZATION OF PROBLEM SPECIFICATION DATA
READ PROBLEM SPECIFICATION DATA
PRINT PROBLEM SPECIFICATION DATA
B


B
MAKE REPORTS FROM PREVIOUSLY GENERATED DATA TAPE?
YES
REWIND
DATA TAPE
NO
READ LINK SPECIFICATION DATA
POSITION DATA TAPE AT PROPER FILE
707
PRINT LINK SPECIFICATION DATA
INITIALIZE RANGE AND RECEIVED SIGNAL LEVEL
NEITHER
LINK SEQUENCE ON FIRST LINK SPECIFICATION CARD
1,...,N OR 9,1,...,N
SET FLAG THAT RECEIVED SIGNAL LEVEL IS VARIED
SET FLAG THAT RANGE IS VARIED
C
C


C
INITIALIZATION OF PARAMETER DATA
201
READ A PARAMETER DATA CARD
" $END" CARD?
YES
LIST INPUT PARAMETER DESCRIPTION AND VALUES
BAD PARAMETERS ENCOUNTERED?
YES
PRINT ERROR MESSAGE
NO
D
NO
INPUT PARAMETER ?
YES
TRANSFER VALUE TO INPUT ARRAY
201
NO
INTERMEDIATE PARAMETER?
YES
TRANSFER VALUE TO INTERMEDIATE ARRAY
201
NO
INCREMENT "BAD PARAMETER ID" COUNTER
201


D
CONVERT TRANSMITTED SNR FROM DB TO RATIO
PROCESS BESSEL FUNCTIONS
PREPRO
705
INDEPENDENT VARIABLE
RANGE
SIGNAL LEVEL
INCREMENT RANGE AND EQUATE UP AND DOWN RANGES
INCREMENT RECEIVED SIGNAL LEVEL (DBM) AND EQUATE UP AND DOWN LEVELS
COMPUTE RECEIVED SIGNAL LEVEL (RATIO)
PERFORM COMMUNICATION SIMULATION CALCULATIONS
EQUDRV
E


E
INITIALIZATION FOR FINITE SNR CALCULATIONS
COMPUTE FINITE SNR (DB) AT RECEIVER FOR SPECIFIED BLOCKS
WRITE
DATA TAPE
LAST POINT COMPUTED ?
NO
705
YES
ENDFILE
DATA TAPE
707
REPORT(S) DESIRED?
YES
PRINT COMMUNICATION REPORT(S)
REPORT
NO
PRINT OUTPUT AND INTERMEDIATE PARAMETERS FOR LAST POINT COMPUTED
F

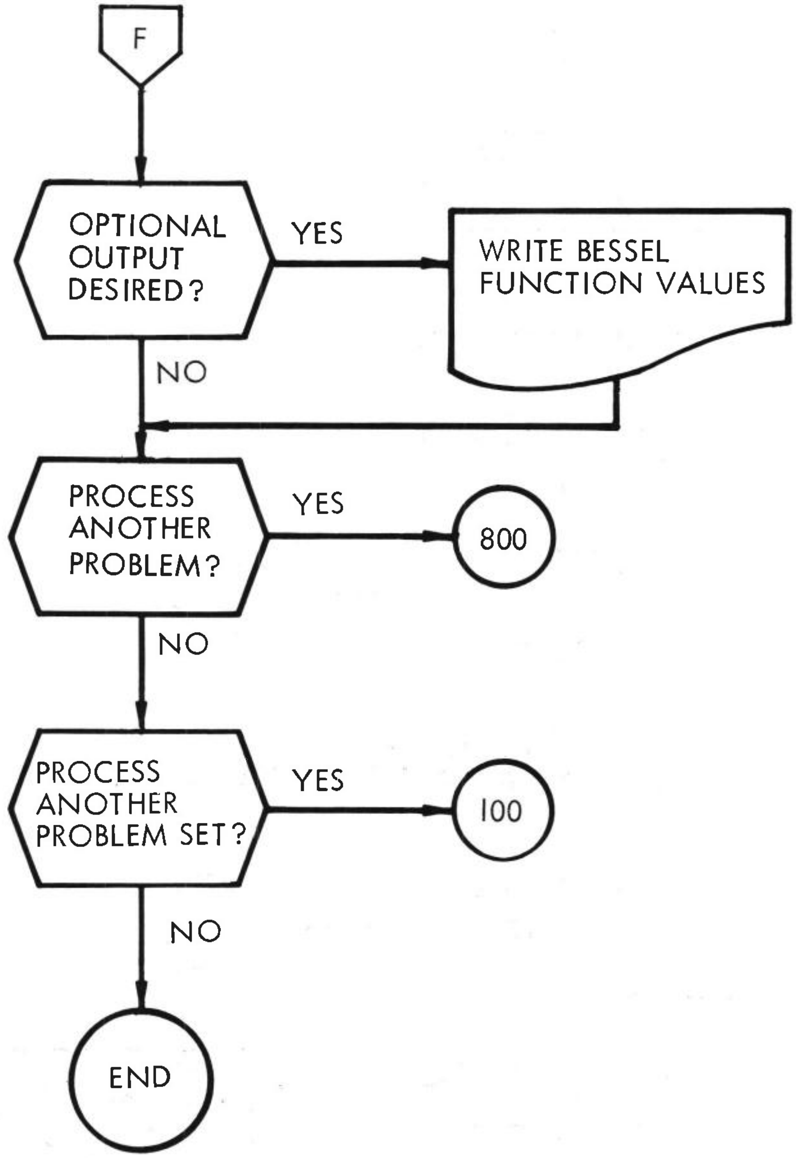

F
OPTIONAL OUTPUT DESIRED?
YES
WRITE BESSEL FUNCTION VALUES
NO
PROCESS ANOTHER PROBLEM?
YES
800
NO
PROCESS ANOTHER PROBLEM SET?
YES
100
NO
END

TABLE 2-1. SUBROUTINE USAGE CROSS REFERENCE

CALLED SUBROUTINE	CALLING SUBROUTINE CØMSIM	BJERR	BJPRCS	PREPRØ
BESJ			*	
BJERR			*	
BJPRCS				*
EQUDRV	*			
ERMES		*		
FACTØR	*			
PREPRØ	*			
REPØRT	*			
ZERØUT	*			

TABLE 2-2. NAMED CØMMØN USAGE CROSS REFERENCE

SUBROUTINE	NAMED CØMMØN						
	AE	ANSCØM	BJSCØM	INTERM	LISTC	NUMBER	STATIC
CØMSIM	*	*	*	*	*	*	*
BESJ							
BJERR	*						
BJPRCS	*					*	
EQUDRV	*	*	*	*		*	*
ERMES	*						
FACTØR							
NUMBER						*	
PREPRØ			*				*
REPØRT					*		
ZERØUT		*		*			

TABLE 2-3. PARAMETER NUMBER--MNEMONIC CROSS REFERENCE

PARAMETER NUMBER	MNEMONIC		PARAMETER NUMBER	MNEMONIC		PARAMETER NUMBER	MNEMONIC	
INPUT PARAMETERS (STATIC)								
1	A	(1)	31	BEE	(1,4)	61	BLX	(1)
2	A	(2)	32	BEE	(2,4)	62	BLX	(2)
3	B	(1)	33	BEE	(1,5)	63	BMSF	(1,1)
4	B	(2)	34	BEE	(2,5)	64	BMSF	(2,1)
5	BB	(1,1)	35	BEE	(1,6)	65	BMSF	(1,2)
6	BB	(2,1)	36	BEE	(2,6)	66	BMSF	(2,2)
7	BB	(1,2)	37	BEE	(1,7)	67	BMSF	(1,3)
8	BB	(2,2)	38	BEE	(2,7)	68	BMSF	(2,3)
9	BB	(1,3)	39	BEE	(1,8)	69	BMSF	(1,4)
10	BB	(2,3)	40	BEE	(2,8)	70	BMSF	(2,4)
11	BB	(1,4)	41	BHE	(1)	71	BPBVE	(1)
12	BB	(2,4)	42	BHE	(2)	72	BPBVE	(2)
13	BBE	(1)	43	BIF	(1)	73	BPBVO	(1)
14	BBE	(2)	44	BIF	(2)	74	BPBVO	(2)
15	BC	(1)	45	BKE	(1)	75	BPK	(1)
16	BC	(2)	46	BKE	(2)	76	BPK	(2)
17	BD	(1,1)	47	BLF	(1)	77	BR	(1)
18	BD	(2,1)	48	BLF	(2)	78	BR	(2)
19	BD	(1,2)	49	BLM	(1,1)	79	BTE	(1)
20	BD	(2,2)	50	BLM	(2,1)	80	BTE	(2)
21	BD	(1,3)	51	BLM	(1,2)	81	BTEF	(1)
22	BD	(2,3)	52	BLM	(2,2)	82	BTEF	(2)
23	BD	(1,4)	53	BLM	(1,3)	83	BTO	(1)
24	BD	(2,4)	54	BLM	(2,3)	84	BTO	(2)
25	BEE	(1,1)	55	BLM	(1,4)	85	BTPE	(1)
26	BEE	(2,1)	56	BLM	(2,4)	86	BTPE	(2)
27	BEE	(1,2)	57	BLPBV	(1)	87	BTPO	(1)
28	BEE	(2,2)	58	BLPBV	(2)	88	BTPO	(2)
29	BEE	(1,3)	59	BLTP	(1)	89	BVE	(1)
30	BEE	(2,3)	60	BLTP	(2)	90	BVE	(2)

TABLE 2-3. PARAMETER NUMBER--MNEMONIC CROSS REFERENCE (CONTINUED)

PARAMETER NUMBER	MNEMONIC	PARAMETER NUMBER	MNEMONIC	PARAMETER NUMBER	MNEMONIC
91	BVEF (1)	121	DELFB (1,4)	151	FVSF (1)
92	BVEF (2)	122	DELFB (2,4)	152	FVSF (2)
93	BVO (1)	123	DELNM (1)	153	FXF (1)
94	BVO (2)	124	DELNM (2)	154	FXF (2)
95	BVOF (1)	125	DELSR (1)	155	GAMMA (1)
96	BVOF (2)	126	DELSR (2)	156	GAMMA (2)
97	BWTSF (1)	127	DFK (1)	157	GR (1)
98	BWTSF (2)	128	DFK (2)	158	GR (2)
99	BWVSF (1)	129	DFKPBV (1)	159	GT (1)
100	BWVSF (2)	130	DFKPBV (2)	160	GT (2)
101	BXE (1)	131	DFKT (1)	161	K (1)
102	BXE (2)	132	DFKT (2)	162	K (2)
103	CMSF (1,1)	133	DFKTP (1)	163	KB (1)
104	CMSF (2,1)	134	DFKTP (2)	164	KB (2)
105	CMSF (1,2)	135	DFKX (1)	165	LC (1)
106	CMSF (2,2)	136	DFKX (2)	166	LC (2)
107	CMSF (1,3)	137	FMC (1)	167	MODLEV (1,1)
108	CMSF (2,3)	138	FMC (2)	168	MODLEV (2,1)
109	CMSF (1,4)	139	FPBV (1)	169	MODLEV (1,2)
110	CMSF (2,4)	140	FPBV (2)	170	MODLEV (2,2)
111	CTSF (1)	141	FTF (1)	171	MODLEV (1,3)
112	CTSF (2)	142	FTF (2)	172	MODLEV (2,3)
113	CVSF (1)	143	FTP (1)	173	MODLEV (1,4)
114	CVSF (2)	144	FTP (2)	174	MODLEV (2,4)
115	DELFB (1,1)	145	FTS (1)	175	MODLEV (1,5)
116	DELFB (2,1)	146	FTS (2)	176	MODLEV (2,5)
117	DELFB (1,2)	147	FVF (1)	177	MODLEV (1,6)
118	DELFB (2,2)	148	FVF (2)	178	MODLEV (2,6)
119	DELFB (1,3)	149	FVS (1)	179	MODLEV (1,7)
120	DELFB (2,3)	150	FVS (2)	180	MODLEV (2,7)

TABLE 2-3. PARAMETER NUMBER--MNEMONIC CROSS REFERENCE (CONTINUED)

PARAMETER NUMBER	MNEMONIC	PARAMETER NUMBER	MNEMONIC	PARAMETER NUMBER	MNEMONIC
181	MODLEV (1,8)	208	RHOB (2,1)	235	RTSB (1)
182	MODLEV (2,8)	209	RHOB (1,2)	236	RTSB (2)
183	NEMU (1)	210	RHOB (2,2)	237	RTSFR (1)
184	NEMU (2)	211	RHOB (1,3)	238	RTSFR (2)
185	PBE (1)	212	RHOB (2,3)	239	RVE (1)
186	PBE (2)	213	RHOB (1,4)	240	RVE (2)
187	PDEV (1)	214	RHOB (2,4)	241	RVO (1)
188	PDEV (2)	215	RHOPBV (1)	242	RVO (2)
189	PE (1)	216	RHOPBV (2)	243	RVOF (1)
190	PE (2)	217	RHOT (1)	244	RVOF (2)
191	PH (1)	218	RHOT (2)	245	RVSF (1)
192	PH (2)	219	RHOTP (1)	246	RVSF (2)
193	PHIO (1)	220	RHOTP (2)	247	SNRCOM (1)
194	PHIO (2)	221	RHOV (1)	248	SNRCOM (2)
195	PK (1)	222	RHOV (2)	249	SNRCST (1)
196	PK (2)	223	RHOX (1)	250	SNRCST (2)
197	PP (1)	224	RHOX (2)	251	SNTRDB (1)
198	PP (2)	225	RKE (1)	252	SNTRDB (2)
199	PT (1)	226	RKE (2)	253	ST (1)
200	PT (2)	227	RPK (1)	254	ST (2)
201	PV (1)	228	RPK (2)	255	TAPERA (1)
202	PV (2)	229	RTE (1)	256	TAPERA (2)
203	RBE (1)	230	RTE (2)	257	TAPERB (1)
204	RBE (2)	231	RTO (1)	258	TAPERB (2)
205	RC (1)	232	RTO (2)	259	TRC (1)
206	RC (2)	233	RTPR (1)	260	TRC (2)
207	RHOB (1,1)	234	RTPR (2)		

TABLE 2-3. PARAMETER NUMBER--MNEMONIC CROSS REFERENCE (CONTINUED)

PARAMETER NUMBER	MNEMONIC	PARAMETER NUMBER	MNEMONIC	PARAMETER NUMBER	MNEMONIC
INTERMEDIATE PARAMETERS (INTERM)					
301	ALPHA (1)	331	DNMSF (1,1)	361	DTPRDB (1)
302	ALPHA (2)	332	DNMSF (2,1)	362	DTPRDB (2)
303	BET (1)	333	DNMSF (1,2)	363	DTSF (1)
304	BET (2)	334	DNMSF (2,2)	364	DTSF (2)
305	BETEVA (1,1)	335	DNMSF (1,3)	365	DTSFDB (1)
306	BETEVA (2,1)	336	DNMSF (2,3)	366	DTSFDB (2)
307	BETEVA (1,2)	337	DNMSF (1,4)	367	DTSFR (1)
308	BETEVA (2,2)	338	DNMSF (2,4)	368	DTSFR (2)
309	BETEVA (1,3)	339	DNMSFB (1,1)	369	DTSFRB (1)
310	BETEVA (2,3)	340	DNMSFB (2,1)	370	DTSFRB (2)
311	BETEVA (1,4)	341	DNMSFB (1,2)	371	DVB (1)
312	BETEVA (2,4)	342	DNMSFB (2,2)	372	DVB (2)
313	BETEVA (1,5)	343	DNMSFB (1,3)	373	DVBDB (1)
314	BETEVA (2,5)	344	DNMSFB (2,3)	374	DVBDB (2)
315	BETEVA (1,6)	345	DNMSFB (1,4)	375	DVF (1)
316	BETEVA (2,6)	346	DNMSFB (2,4)	376	DVF (2)
317	BETEVA (1,7)	347	DPBV (1)	377	DVFDB (1)
318	BETEVA (2,7)	348	DPBV (2)	378	DVFDB (2)
319	BETEVA (1,8)	349	DPBVDB (1)	379	DVSF (1)
320	BETEVA (2,8)	350	DPBVDB (2)	380	DVSF (2)
321	COMOLE (1)	351	DTB (1)	381	DVSFB (1)
322	COMOLE (2)	352	DTB (2)	382	DVSFB (2)
323	DMMSF (1,1)	353	DTBDB (1)	383	DXE (1)
324	DMMSF (2,1)	354	DTBDB (2)	384	DXE (2)
325	DMMSF (1,2)	355	DTP (1)	385	DXEDB (1)
326	DMMSF (2,2)	356	DTP (2)	386	DXEDB (2)
327	DMMSF (1,3)	357	DTPDB (1)	387	ELLELL (1)
328	DMMSF (2,3)	358	DTPDB (2)	388	ELLELL (2)
329	DMMSF (1,4)	359	DTPR (1)	389	ENIF (1)
330	DMMSF (2,4)	360	DTPR (2)	390	ENIF (2)

TABLE 2-3. PARAMETER NUMBER--MNEMONIC CROSS REFERENCE (CONTINUED)

PARAMETER NUMBER	MNEMONIC	PARAMETER NUMBER	MNEMONIC	PARAMETER NUMBER	MNEMONIC
391	FREDEV (1,1)	410	PCDB (2)	429	RNM (1)
392	FREDEV (2,1)	411	PHIF (1)	430	RNM (2)
393	FREDEV (1,2)	412	PHIF (2)	431	SNVOP (1)
394	FREDEV (2,2)	413	RATIO (1,1)	432	SNVOP (2)
395	FREDEV (1,3)	414	RATIO (2,1)	433	SNVOPB (1)
396	FREDEV (2,3)	415	RATIO (1,2)	434	SNVOPB (2)
397	FREDEV (1,4)	416	RATIO (2,2)	435	SR (1)
398	FREDEV (2,4)	417	RATIO (1,3)	436	SR (2)
399	GAMM (1)	418	RATIO (2,3)	437	SRDB (1)
400	GAMM (2)	419	RATIO (1,4)	438	SRDB (2)
401	LDB (1)	420	RATIO (2,4)	439	SRDBM (1)
402	LDB (2)	421	RATIO (1,5)	440	SRDBM (2)
403	LSDB (1)	422	RATIO (2,5)	441	STDB (1)
404	LSDB (2)	423	RATIO (1,6)	442	STDB (2)
405	MGTBER (1)	424	RATIO (2,6)	443	T (1)
406	MGTBER (2)	425	RATIO (1,7)	444	T (2)
407	PC (1)	426	RATIO (2,7)	445	XI (1)
408	PC (2)	427	RATIO (1,8)	446	XI (2)
409	PCDB (1)	428	RATIO (2,8)		
		OUTPUT PARAMETERS (ANSCØM)			
501	BER (1)	511	MGTE (1)	521	MGVE (1)
502	BER (2)	512	MGTE (2)	522	MGVE (2)
503	MGBE (1)	513	MGTO (1)	523	MGVO (1)
504	MGBE (2)	514	MGTO (2)	524	MGVO (2)
505	MGC (1)	515	MGTPR (1)	525	MGVOF (1)
506	MGC (2)	516	MGTPR (2)	526	MGVOF (2)
507	MGKE (1)	517	MGTSB (1)	527	MGVSF (1)
508	MGKE (2)	518	MGTSB (2)	528	MGVSF (2)
509	MGP (1)	519	MGTSFR (1)	529	MLBV (1)
510	MGP (2)	520	MGTSFR (2)	530	MLBV (2)

TABLE 2-3. PARAMETER NUMBER--MNEMONIC CROSS REFERENCE (CONTINUED)

PARAMETER NUMBER	MNEMONIC	PARAMETER NUMBER	MNEMONIC	PARAMETER NUMBER	MNEMONIC
531	MLCVBS (1)	561	MLEVA (1,8)	591	SNBDDB (1,4)
532	MLCVBS (2)	562	MLEVA (2,8)	592	SNBDDB (2,4)
533	MLDC (1)	563	MLHLB (1)	593	SNBE (1)
534	MLDC (2)	564	MLHLB (2)	594	SNBE (2)
535	MLDK (1)	565	MLUC (1)	595	SNBEDB (1)
536	MLDK (2)	566	MLUC (2)	596	SNBEDB (2)
537	MLDPHT (1)	567	MLUPT (1)	597	SNC (1)
538	MLDPHT (2)	568	MLUPT (2)	598	SNC (2)
539	MLDPLT (1)	569	MLUPV (1)	599	SNCDB (1)
540	MLDPLT (2)	570	MLUPV (2)	600	SNCDB (2)
541	MLDPRN (1)	571	NOISEF (1)	601	SNESB (1,1)
542	MLDPRN (2)	572	NOISEF (2)	602	SNESB (2,1)
543	MLDPV (1)	573	PCDBM (1)	603	SNESB (1,2)
544	MLDPV (2)	574	PCDBM (2)	604	SNESB (2,2)
545	MLDVLT (1)	575	PHIFDB (1)	605	SNESB (1,3)
546	MLDVLT (2)	576	PHIFDB (2)	606	SNESB (2,3)
547	MLEVA (1,1)	577	SNDB (1,1)	607	SNESB (1,4)
548	MLEVA (2,1)	578	SNDB (2,1)	608	SNESB (2,4)
549	MLEVA (1,2)	579	SNDB (1,2)	609	SNESB (1,5)
550	MLEVA (2,2)	580	SNDB (2,2)	610	SNESB (2,5)
551	MLEVA (1,3)	581	SNDB (1,3)	611	SNESB (1,6)
552	MLEVA (2,3)	582	SNDB (2,3)	612	SNESB (2,6)
553	MLEVA (1,4)	583	SNDB (1,4)	613	SNESB (1,7)
554	MLEVA (2,4)	584	SNDB (2,4)	614	SNESB (2,7)
555	MLEVA (1,5)	585	SNBDDB (1,1)	615	SNESB (1,8)
556	MLEVA (2,5)	586	SNBDDB (2,1)	616	SNESB (2,8)
557	MLEVA (1,6)	587	SNBDDB (1,2)	617	SNESBB (1,1)
558	MLEVA (2,6)	588	SNBDDB (2,2)	618	SNESBB (2,1)
559	MLEVA (1,7)	589	SNBDDB (1,3)	619	SNESBB (1,2)
560	MLEVA (2,7)	590	SNBDDB (2,3)	620	SNESBB (2,2)

TABLE 2-3. PARAMETER NUMBER--MNEMONIC CROSS REFERENCE (CONTINUED)

PARAMETER NUMBER	MNEMONIC	PARAMETER NUMBER	MNEMONIC	PARAMETER NUMBER	MNEMONIC
621	SNESBB (1,3)	651	SNMM (1,4)	681	SNPBV (1)
622	SNESBB (2,3)	652	SNMM (2,4)	682	SNPBV (2)
623	SNESBB (1,4)	653	SNMMDB (1,1)	683	SNPBVB (1)
624	SNESBB (2,4)	654	SNMMDB (2,1)	684	SNPBVB (2)
625	SNESBB (1,5)	655	SNMMDB (1,2)	685	SNTE (1)
626	SNESBB (2,5)	656	SNMMDB (2,2)	686	SNTE (2)
627	SNESBB (1,6)	657	SNMMDB (1,3)	687	SNTEDB (1)
628	SNESBB (2,6)	658	SNMMDB (2,3)	688	SNTEDB (2)
629	SNESBB (1,7)	659	SNMMDB (1,4)	689	SNTFR (1)
630	SNESBB (2,7)	660	SNMMDB (2,4)	690	SNTFR (2)
631	SNESBB (1,8)	661	SNMSF (1,1)	691	SNTFRB (1)
632	SNESBB (2,8)	662	SNMSF (2,1)	692	SNTFRB (2)
633	SNHSB (1)	663	SNMSF (1,2)	693	SNTO (1)
634	SNHSB (2)	664	SNMSF (2,2)	694	SNTO (2)
635	SNHSBB (1)	665	SNMSF (1,3)	695	SNTODB (1)
636	SNHSBB (2)	666	SNMSF (2,3)	696	SNTODB (2)
637	SNIF (1)	667	SNMSF (1,4)	697	SNTP (1)
638	SNIF (2)	668	SNMSF (2,4)	698	SNTP (2)
639	SNIFDB (1)	669	SNMSFB (1,1)	699	SNTPDB (1)
640	SNIFDB (2)	670	SNMSFB (2,1)	700	SNTPDB (2)
641	SNKE (1)	671	SNMSFB (1,2)	701	SNTPR (1)
642	SNKE (2)	672	SNMSFB (2,2)	702	SNTPR (2)
643	SNKEDB (1)	673	SNMSFB (1,3)	703	SNTPRB (1)
644	SNKEDB (2)	674	SNMSFB (2,3)	704	SNTPRB (2)
645	SNMM (1,1)	675	SNMSFB (1,4)	705	SNTSB (1)
646	SNMM (2,1)	676	SNMSFB (2,4)	706	SNTSB (2)
647	SNMM (1,2)	677	SNP (1)	707	SNTSBB (1)
648	SNMM (2,2)	678	SNP (2)	708	SNTSBB (2)
649	SNMM (1,3)	679	SNPDB (1)	709	SNTSF (1)
650	SNMM (2,3)	680	SNPDB (2)	710	SNTSF (2)

TABLE 2-3. PARAMETER NUMBER--MNEMONIC CROSS REFERENCE (CONTINUED)

PARAMETER NUMBER	MNEMONIC	PARAMETER NUMBER	MNEMONIC	PARAMETER NUMBER	MNEMONIC
711	SNTSFB (1)	719	SNVODB (1)	726	SNVSF (2)
712	SNTSFB (2)	720	SNVODB (2)	727	SNVSFB (1)
713	SNVE (1)	721	SNVOF (1)	728	SNVSFB (2)
714	SNVE (2)	722	SNVOF (2)	729	SNXE (1)
715	SNVEDB (1)	723	SNVOFB (1)	730	SNXE (2)
716	SNVEDB (2)	724	SNVOFB (2)	731	SNXEDB (1)
717	SNVO (1)	725	SNVSF (1)	732	SNXEDB (2)
718	SNVO (2)				

3. SUBROUTINE BESJ

3.1 IDENTIFICATION

IBM Application Program from the System/360 Scientific Subroutine Package, Publication No. 20-0205-2, 1966.

4. SUBROUTINE BJERR

4.1 DECK IDENTIFICATION

BJERR

4.2 PURPOSE

This routine tests an error flag; if the error flag is zero, no error is indicated and control is returned to the calling program. If the error flag is non-zero, an error message is printed out through subroutine ERMES.

4.3 STORAGE

This routine requires 31 octal locations.

4.4 SUBROUTINE USAGE

The subroutine ERMES is called.

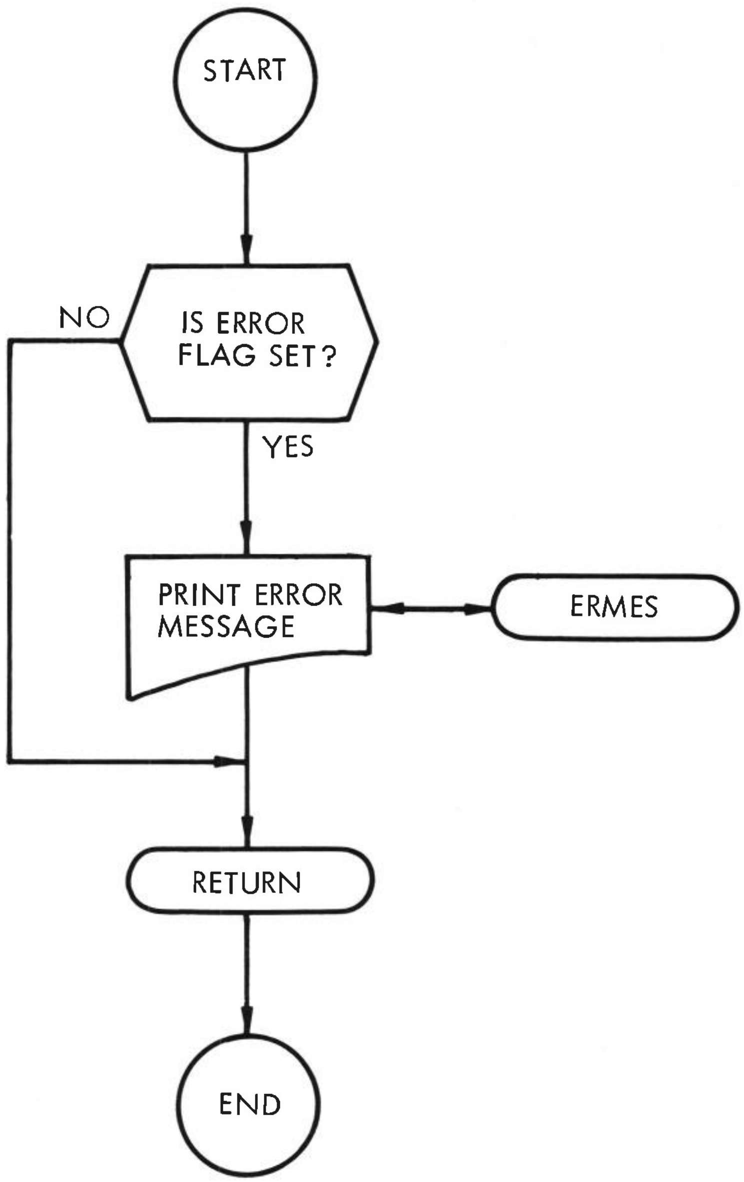
4.5 NAMED CØMMØN USAGE

This routine uses named CØMMØN AE.

4.6 ARGUMENT

Mnemonic	Type	Description
IER	I	Error flag

4.7 FLOW CHART



5. SUBROUTINE BJPRCS

5.1 DECK IDENTIFICATION

BJPRCS

5.2 PURPOSE

This routine is a pre-processor for subroutine BESJ.

5.3 DESCRIPTION

For a specified argument X and integral order NØ $\geq$ 0, subroutine BJPRCS returns the Bessel functions $J_{NØ}(X)$, $J_{NØ-1}(X), \ldots, J_0(X)$. If NØ < 0 it returns the Bessel function $J_{-NØ}(X)$.

5.4 STORAGE

This routine requires 112 octal locations.

5.5 LIBRARY USAGE

This routine uses the library function IABS.

5.6 SUBROUTINE USAGE

The subroutines BESJ and BJERR are called.

5.7 NAMED CØMMØN USAGE

This routine uses the nammed CØMMØN blocks AE and NUMBER.

5.8 ARGUMENTS

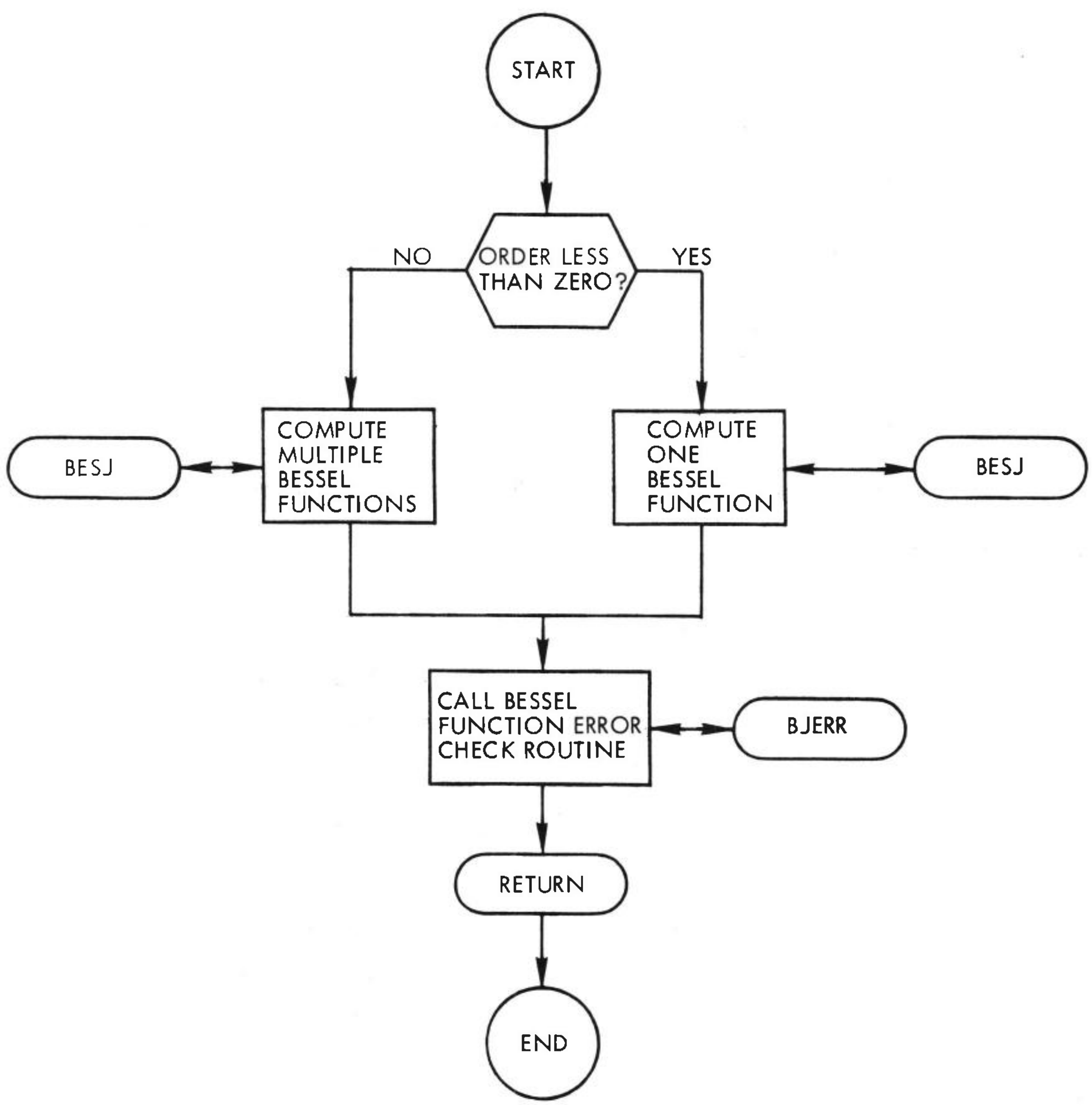
Mnemonic	Type	Description
NØ	I	If NØ $\geq$ 0, order of Bessel function desired. Otherwise, negative of order of Bessel function desired.
X	R	Argument of desired Bessel function
BJX	R	Array of returned Bessel functions. BJX(1) = $J_0(X)$,...,BJX(NØ+1) = $J_{NØ}(X)$, for the case NØ $\geq$ 0 and BJX(1) = $J_{-NØ}(X)$, for the case NØ < 0.

5.9 LOCAL VARIABLES

5.9.1 Undimensioned

Mnemonic	Type	Description
N2	I	Upper limit of "DØ" loop
ACURAC	R	Required accuracy of Bessel functions computed. ACURAC is set to the constant 0.00005.
NØRDER	I	Actual order of Bessel function to be computed
I	I	"DØ" loop index
IER	I	Error flag

5.10 FLOW CHART



6. SUBROUTINE EQUDRV

6.1 DECK IDENTIFICATION

EQUDRV

6.2 PURPOSE

This routine accepts an array of up to twenty of the integers 1,..., 50. It calls any one of fifty computational blocks in a sequence indicated by the order of the integers occuring in the array. Not all of the computational blocks need be called, and any one of the blocks may be called more than once.

6.3 STORAGE

This routine requires 4507 octal locations.

6.4 LIBRARY USAGE

This routine uses the library functions IABS, ALØG10, CØS, SIN, SQRT, ABS and ERF.

6.5 SUBROUTINE USAGE

This routine calls the subroutines ERMES AND BJPRCS.

6.6 NAMED CØMMØN USAGE

This routine uses the named CØMMØN blocks AE, ANSCØM, BJSCØM, INTERM, NUMBER, and STATIC.

6.7 ARGUMENTS

Mnemonic	Type	Description
N	I	Link ID flag. 1=downlink, 2=uplink.
NUMEQS	I	The number of the integers 1,...,50 occuring in the array
IDEQS	I	A twenty point array containing NUMEQS of the integers 1,...,50

6.8 RESTRICTIONS

NUMEQS must satisfy the relation $1 \leq NUMEQS \leq 20$. The first NUMEQS entries of the array IDEQS must be one of the integers 1,...,50.

6.9 LOCAL VARIABLES

6.9.1 Dimensioned

Mnemonic	Type	Size	Description
THETFUL	R	(2)	Working array
RHØ	R	(2)	Working array
SNVSFP	R	(2)	Working array
SNTSFP	R	(2)	Working array
SNVØFP	R	(2)	Working array
SNPBVP	R	(2)	Working array
SNTØP	R	(2)	Working array
SNTPP	R	(2)	Working array

6.9.2 Undimensioned

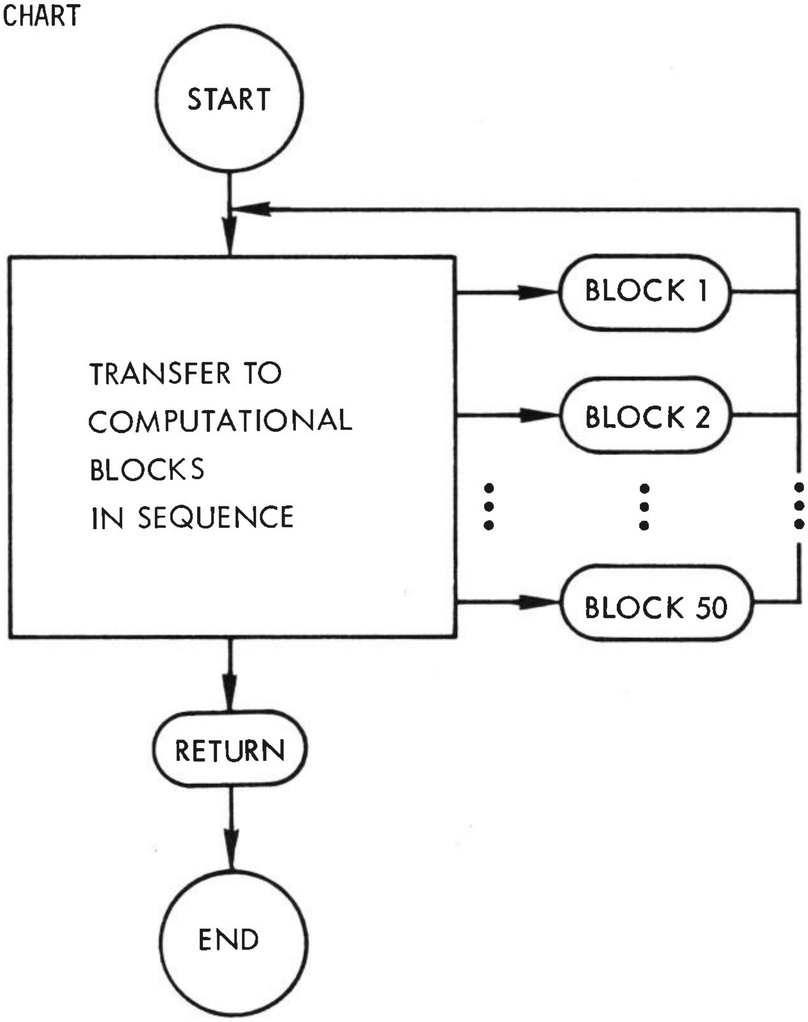
Mnemonic	Type	Description
I	I	"DØ" loop index
KALGØ	I	Variable used to call computational blocks in sequence
LIMIT	I	"DØ" loop limit
ØRDER	I	Order of Bessel function desired
ACURAC	R	Accuracy of Bessel function desired. Set to constant 0.0005.
JBFLAG	I	Order of Bessel function. Set to constant 1.
C	R	Intermediate calculation variable
D	R	Intermediate calculation variable
CØNST1	R	Temporary storage
CØNST2	R	Temporary storage
CØNST3	R	Temporary storage
NØ	I	Order of Bessel function desired

Mnemonic	Type	Description
PI	R	Value of π
PRØDUT	R	Temporary storage
SNIFP	R	Temporary storage
SNR	R	Temporary storage
SNRDB	R	Temporary storage
SUM	R	Temporary storage

6.10 EQUIVALENCES

Mnemonic-1	Mnemonic-2	Purpose
RHØ (1)	RHØV (1)	Computational facility
THETUL(1)	PP (1)	Computational facility

6.11 FLOW CHART



7. SUBROUTINE ERMES

7.1 DECK IDENTIFICATION

ERMES

7.2 PURPOSE

This routine prints out an error message specifying the number of the error message, the location of the error and the type of the error (by numerical code). If more than a specified number of error messages are encountered, program execution will be terminated.

7.3 STORAGE

This subroutine requires 67 octal locations.

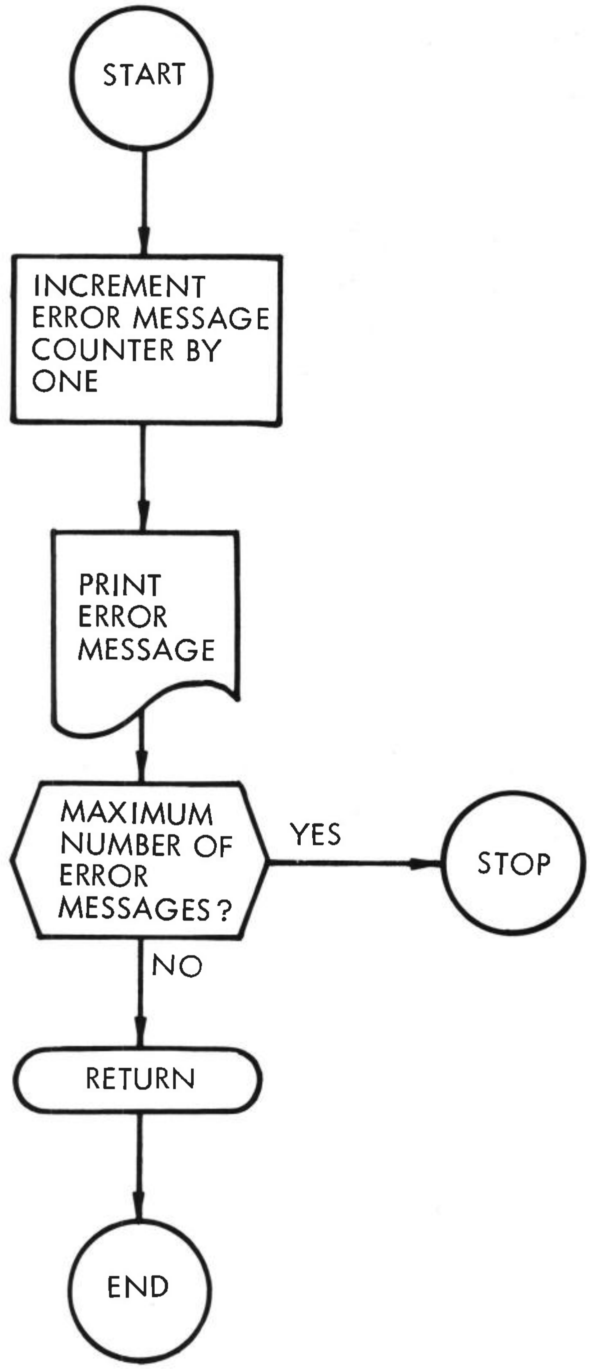
7.4 NAMED CØMMØN USAGE

This routine uses the named CØMMØN AE.

7.5 ARGUMENT

Mnemonic	Type	Description
ICØDE	I	Numerical identification of the error type

7.6 FLOW CHART



8. SUBROUTINE FACTØR

8.1 DECK IDENTIFICATION

FACTØR

8.2 PURPOSE

This routine will multiply by a specified factor any number of consecutive storage cells of core starting at a specified address.

8.3 STORAGE:

This routine requires 50 octal locations.

8.4 ARGUMENTS

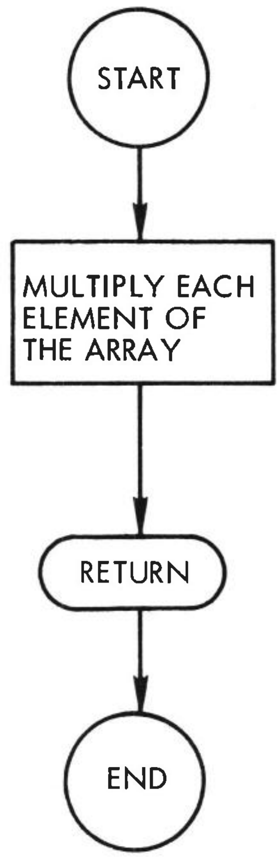
Mnemonic	Type	Description
A	R	Denotes by name the starting address of the block of consecutive storage cells of core to be multiplied. A is dimensioned in the subroutine as NØCCSC.
NØCCSC	I	Denotes the number of consecutive core storage cells. Is used as the dimension of the array A in the subroutine.
FACTER	R	The factor which is used to multiply each of the specified storage cells of core

8.5 LOCAL VARIABLES

8.5.1 Undimensioned

Mnemonic	Type	Description
I	I	"DØ" loop index.

8.6 FLOW CHART



9. SUBROUTINE NUMBER

9.1 DECK IDENTIFICATION

NUMBER

9.2 PURPOSE

Subroutine NUMBER is a FØRTRAN block data subroutine.

9.3 DESCRIPTION

The following block data is entered into the named CØMMØN NUMBER.

Variable	Type	Value
ZERØ	R	0.0
FIFTH	R	0.2
QUARTR	R	0.25
HALF	R	0.5
ØNE	R	1.0
TWØ	R	2.0
THREE	R	3.0
FØUR	R	4.0
FIVE	R	5.0
SIX	R	6.0
SEVEN	R	7.0
EIGHT	R	8.0
FNINE	R	9.0
TEN	R	10.0
TWENTY	R	20.0
FIFTY	R	50.0
HUNDRD	R	100.0
THSAND	R	1000.0
FMIYUN	R	1,000,000.0
I1	I	1
I2	I	2
I3	I	3
I4	I	4
I5	I	5
I6	I	6
I7	I	7
I8	I	8
I9	I	9
I10	I	10
I20	I	20
I50	I	50
I100	I	100

9.4 STORAGE

No storage is required by this routine.

9.5 NAMED CØMMØN USAGE

This routine uses the named CØMMØN NUMBER.

10. SUBROUTINE PREPRØ

10.1 DECK IDENTIFICATION

PREPRØ

10.2 PURPOSE

This routine computes a sequence of eighteen Bessel functions, computing the Bessel function J_2, J_1 and J_0 for six arguments.

10.3 DESCRIPTION

The arrays BJ(3,2,3), PV(2), PT(2) and PK(2) appear in named CØMMØN statements. Subroutine PREPRØ produces the following Bessel functions:

$$J_0(PV(1)) = BJ(1,1,1)$$
$$J_1(PV(1)) = BJ(2,1,1)$$
$$J_2(PV(1)) = BJ(3,1,1)$$
$$J_0(PT(1)) = BJ(1,1,2)$$
$$J_1(PT(1)) = BJ(2,1,2)$$
$$J_2(PT(1)) = BJ(3,1,2)$$
$$J_0(PK(1)) = BJ(1,1,3)$$
$$J_1(PK(1)) = BJ(2,1,3)$$
$$J_2(PK(1)) = BJ(3,1,3)$$
$$J_0(PV(2)) = BJ(1,2,1)$$
$$J_1(PV(2)) = BJ(2,2,1)$$
$$J_2(PV(2)) = BJ(3,2,1)$$
$$J_0(PT(2)) = BJ(1,2,2)$$
$$J_1(PT(2)) = BJ(2,2,2)$$
$$J_2(PT(2)) = BJ(3,2,2)$$
$$J_0(PK(2)) = BJ(1,2,3)$$
$$J_1(PK(2)) = BJ(2,2,3)$$
$$J_2(PK(2)) = BJ(3,2,3)$$

10.4 STORAGE

This routine requires 75 octal locations.

10.5 SUBROUTINE USAGE

This routine uses subroutine BJPRCS.

10.6 NAMED CØMMØN USAGE

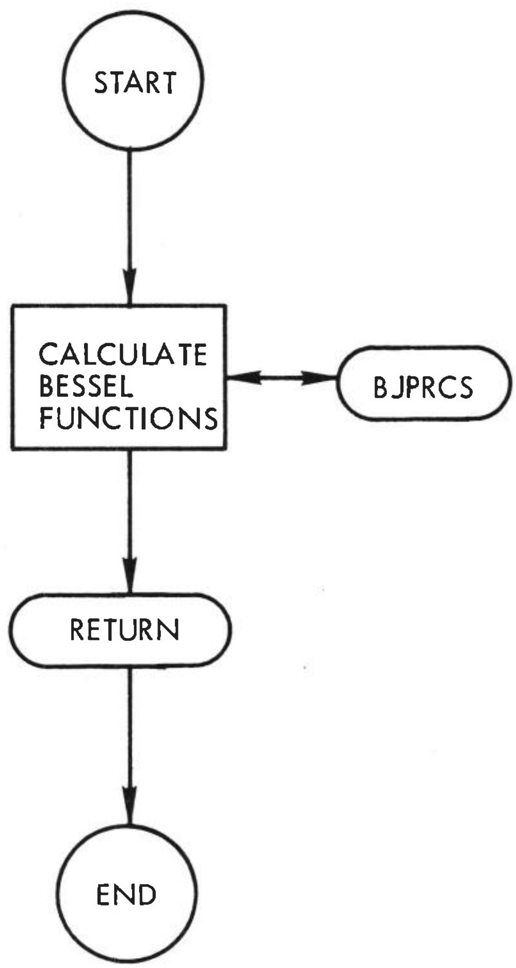
This routine uses the named CØMMØN blocks BJSCØM, and STATIC .

10.7 LOCAL VARIABLES

10.7.1 Undimensioned

Mnemonic	Type	Description
NØ	I	Highest order of Bessel function desired. Set to the constant 2.
ND	I	"DØ" loop index

10.8 FLOW CHART



11. SUBROUTINE REPØRT

11.1 DECK IDENTIFICATION

REPØRT

11.2 PURPOSE

Subroutine REPØRT prints various types of communication reports from a data tape generated by the main program.

11.3 DESCRIPTION

A description of each fixed report type and the variable report type is included in the CØMSIM User's Manual.

11.4 STORAGE

This routine requires 3306 octal locations.

11.5 LIBRARY USAGE

This routine uses the library routines MØD, ABS and FSBSFL.

11.6 NAMED CØMMØN USAGE

This routine uses the named CØMMØN LISTC.

11.7 LOCAL VARIABLES

11.7.1 Dimensioned

Mnemonic	Type	Size	Description
NVAR	I	(8)	Alphanumeric parameter description
TEMP	R	(14)	Temporary storage
IT	I	(37)	Data statement
DT	R	(800)	Working array
VARIA	R	(4,2)	Hollerith of independent variable

11.7.2 Undimensioned

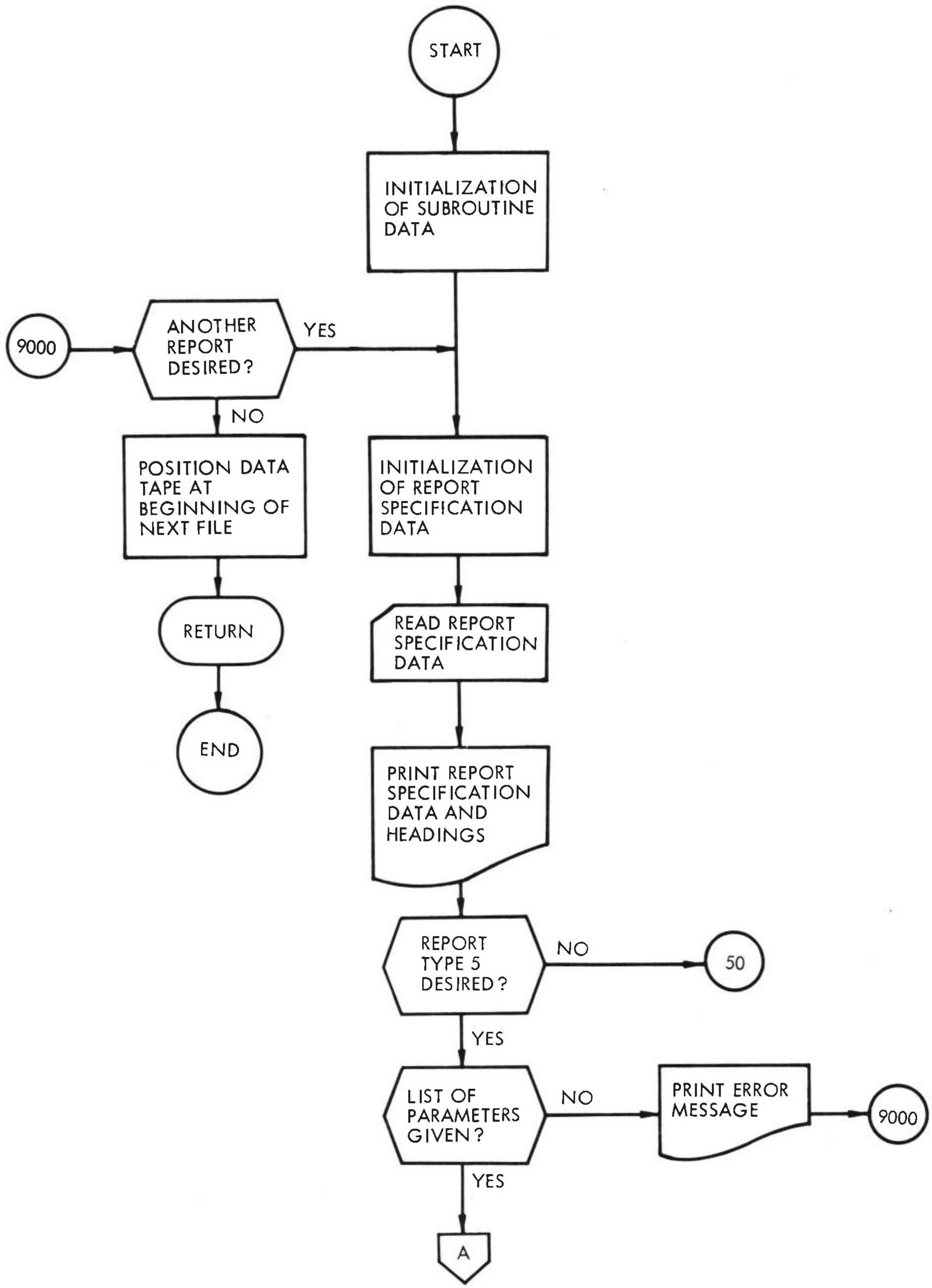
Mnemonic	Type	Description
UP	R	Alphanumeric "UP"
DØWN	R	Alphanumeric "DØWN"
UDLINK	R	Up/down link indicator
II	I	"DØ" loop index

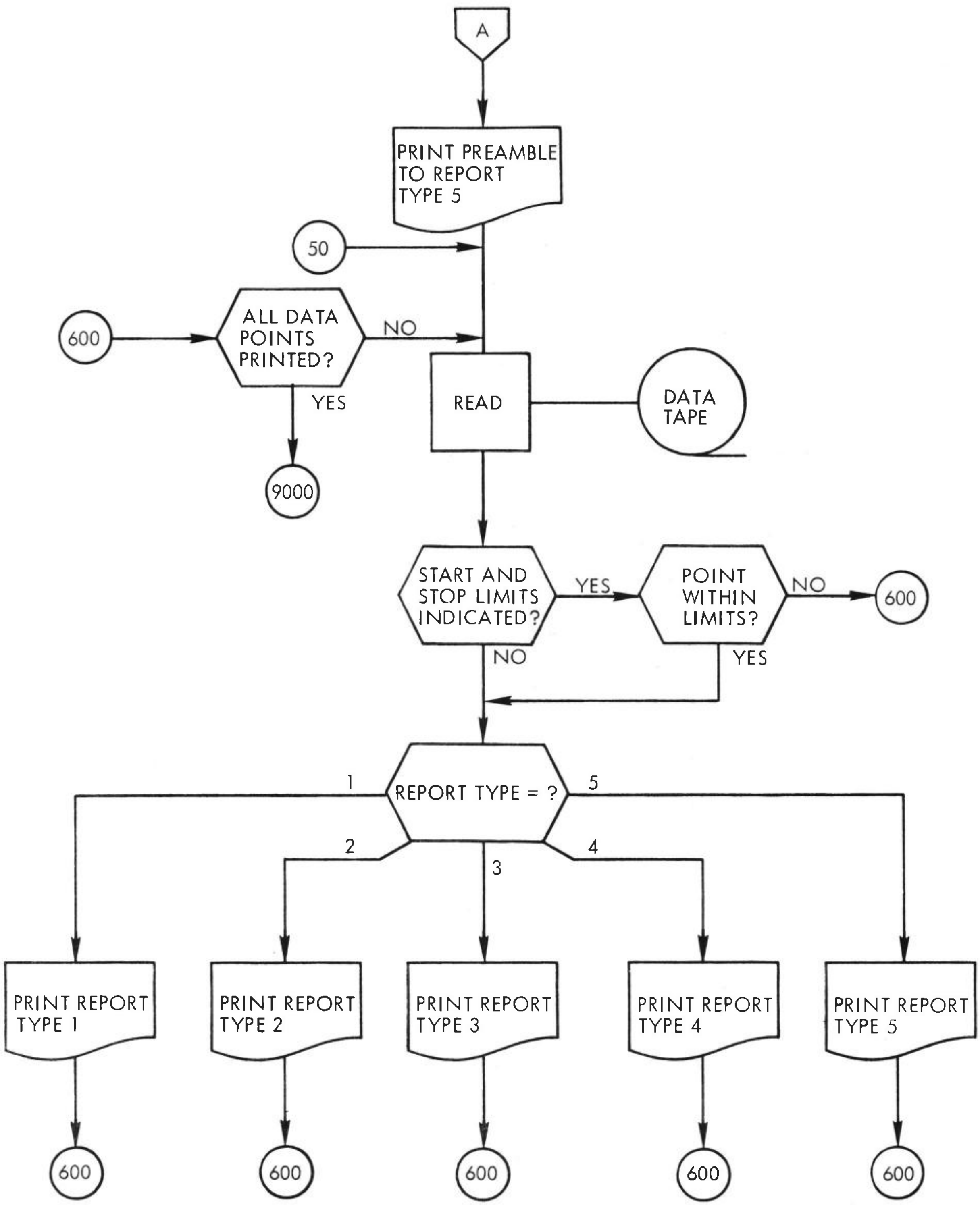
Mnemonic	Type	Description
LISTID	I	Parameter number
START	R	Start value
STØP	R	Stop value
I	I	"DØ" loop index
NN	I	Transfer indicator
ULINK	R	Up/down link indicator
KK	I	Miscellaneous variable
K	I	Miscellaneous variable
J	I	Index
JJ	I	"DØ" loop index
NLNS	I	Miscellaneous variable
ICNT	I	Miscellaneous variable
IER	I	Error flag
NPØINT	I	Number of computational points
CNTPAR	R	Temporary storage

11.8 NAMELIST

Namelist	Variables			
REPSPC	LISTID	START	STØP	NVAR

11.9 FLOW CHART




A
PRINT PREAMBLE TO REPORT TYPE 5
50
600
ALL DATA POINTS PRINTED?
NO
YES
9000
READ
DATA TAPE
START AND STOP LIMITS INDICATED?
YES
NO
POINT WITHIN LIMITS?
NO
600
YES
REPORT TYPE = ?
1
2
3
4
5
PRINT REPORT TYPE 1
PRINT REPORT TYPE 2
PRINT REPORT TYPE 3
PRINT REPORT TYPE 4
PRINT REPORT TYPE 5
600
600
600
600
600

12. SUBROUTINE ZERØUT

12.1 DECK IDENTIFICATION

ZERØUT

12.2 PURPOSE

This routine initializes each element of two given arrays to zero.

12.3 STORAGE

This routine requires 42 octal locations.

12.4 NAMED CØMMØN USAGE

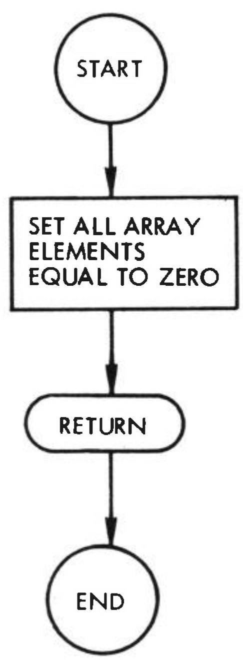
This routine uses the named CØMMØN blocks ANSCØM and INTERM.

12.5 LOCAL VARIABLE

12.5.1 Undimensioned

Mnemonic	Type	Description
I	I	"DØ" loop index

12.6 FLOW CHART



13. PROGRAM COMPILATION

13.1 THE MAIN PROGRAM, CØMSIM

```
             THE MAIN PROGRAM, COMSIM                                    DATE  090868  PAGE     1

& FOR COMSIM,COMSIM                                                          13&58&05
UNIVAC 1108 FORTRAN V LEVEL   2206 0018 F5018F
THIS COMPILATION WAS DONE ON 09 AUG 68 AT 13&58&05

   MAIN PROGRAM

   STORAGE USED (BLOCK, NAME, LENGTH)

         0001   *CODE    001711
         0000   *DATA    000643
         0002   *BLANK   000000
         0003   STATIC   000454
         0004   INTERM   000310
         0005   ANSCOM   000454
         0006   NUMBER   000040
         0007   AE       000004
         0010   BJSCOM   000107
         0011   LISTC    012127


   EXTERNAL REFERENCES (BLOCK, NAME)

         0012   ALOG10
         0013   QQUFOF
         0014   FACTOR
         0015   ZEROUT
         0016   FSBSFL
         0017   PREPRO
         0020   EQUDRV
         0021   REPORT
         0022   NRDU$
         0023   NIO1$
         0024   NIO2$
         0025   NWDU$
         0026   NREW$
         0027   NRNL$
         0030   NEXP6$
         0031   NERR2$
         0032   NWBU$
```

```
0033   NWEF$
0034   NWNL$
0035   NSTOP$
```

STORAGE ASSIGNMENT FOR VARIABLES (BLOCK, TYPE, RELATIVE LOCATION, NAME)

```
0001     000055 10L       0001     000245 100L      0000     000466 1000F     0000     000471 1100F     0001     000021 147G
0000     000356 1500F     0000     000401 1501F     0001     000032 152G      0001     000070 171G      0001     000373 199L
0001     000155 20L       0001     000535 201L      0001     000613 202L      0001     000626 203L      0001     000713 204L
0001     000617 205L      0001     001010 208L      0001     000166 212G      0001     000204 221G      0001     000222 230G
0001     001126 260L      0001     000303 264G      0001     001133 270L      0001     001151 280L      0001     000172 30L
0001     000406 323G      0001     000407 325G      0001     000415 332G      0001     000430 341G      0001     000441 345G
0001     000462 356G      0001     000470 363G      0001     000040 4L        0001     000210 40L       0000     000336 4000F
0000     000506 4005F     0000     000511 4010F     0000     000520 4015F     0000     000553 4020F     0000     000524 4025F
0000     000554 4030F     0000     000344 4035F     0000     000565 4045F     0000     000576 4050F     0001     000662 437G
0001     000722 456G      0001     000752 473G      0001     000226 49L       0001     000231 50L       0001     001310 501L
0001     001406 505L      0001     001017 513G      0001     001116 541G      0001     001154 556G      0001     001177 566G
0001     001337 606G      0001     001415 620G      0001     001422 624G      0001     001427 630G      0001     001475 654G
0001     001542 674G      0001     001452 708L      0001     001572 710G      0001     001533 710L      0001     001450 711L
0001     001630 720L      0001     001637 730G      0001     001677 800L      0001     001702 801L      0001     000452 997L
0003 R 000000 A         0012 R 000000 ALOG10    0004 R 000000 ALPHA     0005 R 000000 ANSCOV    0003 R 000002 B
0003 R 000004 BB        0003 R 000014 BBE       0003 R 000016 BC        0003 R 000020 BD        0003 R 000030 BEE
0005 R 000000 BER       0004 R 000002 BET       0004 R 000004 BETEVA    0003 R 000050 BHE       0003 R 000052 BIF
0010 R 000000 BJ        0010 R 000022 BJBET     0010 R 000047 BJEVA     0010 R 000025 BJGAM     0010 R 000033 BJPE
0010 R 000037 BJPH      0010 R 000043 BJPK      0010 R 000030 BJXI      0003 R 000054 BKE       0003 R 000056 BLF
0003 R 000060 BLM       0003 R 000070 BLPBV     0003 R 000072 BLTP      0003 R 000074 BLX       0003 R 000076 BMSF
0003 R 000106 BPBVE     0003 R 000110 BPBVO     0003 R 000112 BPK       0003 R 000114 BR        0003 R 000116 BTE
0003 R 000120 BTEF      0003 R 000122 BTO       0003 R 000124 BTPE      0003 R 000126 BTPO      0003 R 000130 BVE
0003 R 000132 BVEF      0003 R 000134 BVO       0003 R 000136 BVOF      0003 R 000140 BWTSF     0003 R 000142 BWVSF
0003 R 000144 BXE       0003 R 000146 CMSF      0004 R 000024 COMOLE    0003 R 000156 CTSF      0003 R 000160 CVSF
0011 I 000002 DATAPE    0003 R 000162 DELFB     0003 R 000172 DELNM     0003 R 000174 DELSK     0003 R 000176 DFK
0003 R 000200 DFKPBV    0003 R 000202 DFKT      0003 R 000204 DFKTP     0003 R 000206 DFKX      0004 R 000026 DMMSF
0004 R 000036 DNMSF     0004 R 000046 DNMSFB    0004 R 000056 DPBV      0004 R 000060 DPBVDB    0004 R 000062 DTB
0004 R 000064 DTBDB     0004 R 000066 DTP       0004 R 000070 DTPDB     0004 R 000072 DTPR      0004 R 000074 DTPRDB
0004 R 000076 DTSF      0004 R 000100 DTSFDB    0004 R 000102 DTSFR     0004 R 000104 DTSFRB    0005 R 000350 DUMMYA
0004 R 000222 DUMMYI    0003 R 000404 DUMMYS    0004 R 000106 DVB       0004 R 000110 DVBDB     0004 R 000112 DVF
0004 R 000114 DVFDB     0004 R 000116 DVSF      0004 R 000120 DVSFDB    0004 R 000122 DXE       0004 R 000124 DXEDB
0006 R 000013 EIGHT     0004 R 000126 ELLELL    0004 R 000130 ENIF      0006 R 000001 FIFTH     0006 R 000017 FIFTY
0004 R 000000 FINTEV    0006 R 000010 FIVE      0003 R 000210 FMC       0006 R 000022 FMIYUN    0006 R 000014 FNINE
```

```
0006 R 000007 FOUR     0003 R 000212 FPBV     0004 R 000132 FREDEV   0003 R 000214 FTF      0003 R 000216 FTP
0003 R 000220 FTS      0003 R 000222 FVF      0003 R 000224 FVS      0003 R 000226 FVSF     0003 R 000230 FXF
0004 R 000142 GAMM     0003 R 000232 GAMMA    0003 R 000234 GR       0003 R 000236 GT       0006 R 000003 HALF
0006 R 000020 HUNDRD   0000 I 000177 I        0000 I 000167 IBLANK   0000 I 000170 ICNT     0000 I 000202 ID
0000 I 000176 IDDEF    0000 I 000000 IDEQSS   0000 I 000212 IDSTAT   0000 I 000217 ID1      0000 I 000216 ID2
0007 I 000000 IE       0000 I 000213 IEND     0000 I 000205 IER      0000 I 000166 IFINIS   0000 I 000224 II
0000 I 000050 III      0000 I 000223 IK       0000 I 000230 IM       0000 I 000207 IN       0011 I 006271 INFOA
0011 I 003645 INFOI    0011 I 000007 INFOS    0000 I 000201 INTAPE   0000 I 000175 IPRINT   0000 I 000206 IT
0000 I 000065 ITABLE   0011 I 000000 IVAR     0000 I 000165 I$       0006 I 000023 I1       0006 I 000034 I10
0006 I 000037 I100     0006 I 000024 I2       0006 I 000035 I20      0006 I 000025 I3       0000 I 000215 I34
0006 I 000026 I4       0006 I 000027 I5       0006 I 000036 I50      0006 I 000030 I6       0006 I 000031 I7
0006 I 000032 I8       0006 I 000033 I9       0000 I 000200 J        0000 I 000225 JI       0000 I 000226 JJ
0000 I 000221 J1       0000 I 000222 J2       0003 R 000240 K        0003 R 000242 KB       0000 I 000203 L
0003 R 000244 LC       0004 R 000144 LDB      0000 I 000227 LIMIT    0000 I 000147 LINKID   0000 I 000173 LINKS
0000 I 000210 LINK1    0000 I 000211 LINK2    0007 I 000001 LOCEM    0004 R 000146 LSDB     0000 I 000220 M
0005 R 000002 MGBE     0005 R 000004 MGC      0005 R 000006 MGKE     0005 R 000010 MGP      0004 R 000150 MGTBER
0005 R 000012 MGTE     0005 R 000014 MGTO     0005 R 000016 MGTPR    0005 R 000020 MGTSB    0005 R 000022 MGTSFR
0005 R 000024 MGVE     0005 R 000026 MGVO     0005 R 000030 MGVOF    0005 R 000032 MGVSF    0005 R 000034 MLBV
0005 R 000036 MLCVBS   0005 R 000040 MLDC     0005 R 000042 MLDK     0005 R 000044 MLDPHT   0005 R 000046 MLDPLT
0005 R 000050 MLDPRN   0005 R 000052 MLDPV    0005 R 000054 MLDVLT   0005 R 000056 MLEVA    0005 R 000076 MLHLB
0005 R 000100 MLUC     0005 R 000102 MLUPT    0005 R 000104 MLUPV    0003 R 000246 MODLEV   0011 I 000001 N
0007 I 000002 NEM      0007 I 000003 NEMAX    0003 R 000266 NEMU     0000 I 000174 NFILE    0011 I 000006 NFW
0011 I 000005 NLINES   0011 I 000003 NLISTS   0000 I 000151 NOEQS    0005 R 000106 NOISEF   0011 I 000004 NPAGES
0000 I 000204 NPOINT   0000 I 000171 NPROBS   0006 R 000004 ONE      0003 R 000270 PBE      0004 R 000152 PC
0004 R 000154 PCDB     0005 R 000110 PCDBM    0003 R 000272 PDEV     0003 R 000274 PE       0003 R 000276 PH
0004 R 000156 PHIF     0005 R 000112 PHIFDB   0003 R 000300 PHIO     0003 R 000302 PK       0003 R 000304 PP
0003 R 000306 PT       0003 R 000310 PV       0006 R 000002 QUARTR   0004 R 000160 RATIO    0003 R 000312 RBE
0003 R 000314 RC       0003 R 000316 RHOB     0003 R 000326 RHOPBV   0003 R 000330 RHOT     0003 R 000332 RHOTP
0003 R 000334 RHOV     0003 R 000336 RHOX     0003 R 000340 RKE      0004 R 000200 RNM      0003 R 000342 RPK
0003 R 000344 RTE      0003 R 000346 RTO      0003 R 000350 RTPR     0003 R 000352 RTSB     0003 R 000354 RTSFR
0003 R 000356 RVE      0003 R 000360 RVO      0003 R 000362 RVOF     0003 R 000364 RVSF     0000 R 000172 SAVE
0006 R 000012 SEVEN    0006 R 000011 SIX      0005 R 000114 SNBD     0005 R 000124 SNBDDB   0005 R 000134 SNBE
0005 R 000136 SNBEDB   0005 R 000140 SNC      0005 R 000142 SNCDB    0005 R 000144 SNESB    0005 R 000164 SNESBB
0005 R 000204 SNHSB    0005 R 000206 SNHSBB   0005 R 000210 SNIF     0005 R 000212 SNIFDB   0005 R 000214 SNKE
0005 R 000216 SNKEDB   0005 R 000220 SNMM     0005 R 000230 SNMMDB   0005 R 000240 SNMSF    0005 R 000250 SNMSFB
0005 R 000260 SNP      0005 R 000264 SNPBV    0005 R 000266 SNPBVB   0005 R 000262 SNPDB    0003 R 000366 SNRCOM
0003 R 000370 SNRCST   0005 R 000270 SNTE     0005 R 000272 SNTEDB   0005 R 000274 SNTFR    0005 R 000276 SNTFRB
0005 R 000300 SNTO     0005 R 000302 SNTODB   0005 R 000304 SNTP     0005 R 000306 SNTPDB   0005 R 000310 SNTPR
0005 R 000312 SNTPRB   0000 R 000153 SNTR     0003 R 000372 SNTRDB   0005 R 000314 SNTSB    0005 R 000316 SNTSBB
0005 R 000320 SNTSF    0005 R 000322 SNTSFB   0005 R 000324 SNVE     0005 R 000326 SNVEDB   0005 R 000330 SNVO
0005 R 000332 SNVODB   0005 R 000334 SNVOF    0005 R 000336 SNVOFB   0004 R 000202 SNVOP    0004 R 000204 SNVOPB
```

```
0005 R 000340 SNVSF     0005 R 000342 SNVSFB    0005 R 000344 SNXE      0005 R 000346 SNXEDB    0004 R 000206 SR
0004 R 000210 SRDB      0004 R 000212 SRDBM     0003 R 000374 ST        0003 R 000000 STATIV    0004 R 000214 STDB
0004 R 000216 T         0003 R 000376 TAPERA    0003 R 000400 TAPERB    0006 R 000015 TEN       0006 R 000006 THREE
0006 R 000021 THSAND    0000 R 000155 TITLES    0003 R 000402 TRC       0006 R 000016 TWENTY    0006 R 000005 TWO
0000 R 000163 UDLINK    0000 R 000214 VALUE     0004 R 000220 XI        0006 R 000000 ZERO
```

```
00100   C HV008  COMMUNICATIONS SIMULATION (APOLLO ORIENTED) COMSIM     SKILLMAN
00100   C HV008B - MODIFIED MAR. 6, 1968 BY C. ARGILA.                             03/06/CA
00100   C HV008C - MODIFIED JULY '68 BY C. ARGILA                                   JUL68 CA
00100   C                                                                           APR68 CA
00100   C *** NON-EXECUTABLE STATEMENTS                                             APR68 CA
00101         INTEGER DATAPE                                                        JUL68 CA
00103         REAL                                                                  JUL68 CA
00103        $K     , KB    , LC    , LDB   , LSDB  , MGBE  , MGC   , MGKE  ,      JUL68 CA
00103        $MGP   , MGTE  , MGTBER, MGTO  , MGTSB , MGVE  , MGVO  , MGVOF ,      JUL68 CA
00103        $MGVSF , MGTPR , MGTSFR, MLBV  , MLCVBS, MLDC  , MLDK  , MLDPHT,      JUL68 CA
00103        $MLDPLT, MLDPRN, MLDPV , MLDVLT, MLEVA , MLHLB , MLUC  , MLUPT ,      JUL68 CA
00103        $MLUPV , MODLEV, NEMU  , NOISEF                                        JUL68 CA
00104         COMMON /STATIC/       A     (2), B     (2), BB    (2,4)          , JUL68 JW
00104        $BBE   (2), BC    (2), BD    (2,4)         , BEE   (2,8)          , JUL68 JW
00104        $BHE   (2), BIF   (2), BKE   (2), BLF   (2), BLM (2,4), BLPBV (2), JUL68 JW
00104        $BLTP  (2), BLX   (2), BMSF  (2,4)         , BPBVE (2),            JUL68 JW
00104        $BPBVO (2), BPK   (2), BR    (2), BTE   (2), BTEF  (2), BTO   (2), JUL68 JW
00104        $BTPE  (2), BTPO  (2), BVE   (2), BVEF  (2), BVO   (2), BVOF  (2), JUL68 JW
00104        $BWTSF (2), BWVSF (2), BXE   (2), CMSF  (2,4)         , CTSF  (2), JUL68 JW
00104        $CVSF  (2), DELFB (2,4)         , DELNM (2), DELSR (2), DFK   (2), JUL68 JW
00104        $DFKPBV(2), DFKT  (2), DFKTP (2), DFKX  (2), FMC   (2), FPBV  (2), JUL68 JW
00104        $FTF   (2), FTP   (2), FTS   (2), FVF   (2), FVS   (2), FVSF  (2), JUL68 JW
00104        $FXF   (2), GAMMA (2), GR    (2), GT    (2), K     (2), KB    (2), JUL68 JW
00104        $LC    (2), MODLEV(2,8)         , NEMU  (2), PBE   (2), PDEV  (2), JUL68 JW
00104        $PE    (2), PH    (2), PHIO  (2), PK    (2), PP    (2), PT    (2), JUL68 JW
00104        $PV    (2), RBE   (2), RC    (2), RHOB  (2,4)         , RHOPBV(2), JUL68 JW
00104        $RHOT  (2), RHOTP (2), RHOV  (2), RHOX  (2), RKE   (2), RPK   (2), JUL68 JW
00104        $RTE   (2), RTO   (2), RTPR  (2), RTSB  (2), RTSFR (2), RVE   (2), JUL68 JW
00104        $RVO   (2), RVOF  (2), RVSF  (2), SNRCOM(2), SNRCST(2), SNTRDB(2), JUL68 JW
00104        $ST    (2), TAPERA(2), TAPERB(2), TRC   (2)                        JUL68 JW
00105         COMMON /STATIC/ DUMMYS(40)                                            JUL68 JW
00105         COMMON /INTERM/       ALPHA (2), BET   (2), BETEVA(2,8)          , JUL68 JW
```

```
00106     33*     $COMOLE(2), DMMSF (2,4)          , DNMSF (2,4)          , DNMSFB(2,4)JUL68 JW
00106     34*     $          , DPBV  (2), DPBVDB(2), DTB   (2), DTBDB (2), DTP   (2), JUL68 JW
00106     35*     $DTPDB (2), DTPR  (2), DTPRDB(2), DTSF  (2), DTSFDB(2), DTSFR (2), JUL68 JW
00106     36*     $DTSFRB(2), DVB   (2), DVBDB (2), DVF   (2), DVFDB (2), DVSF  (2), JUL68 JW
00106     37*     $DVSFDB(2), DXE   (2), DXEDB (2), ELLELL(2), ENIF  (2), FREDEV(2,4)JUL68 JW
00106     38*     $          , GAMM  (2), LDB   (2), LSDB  (2), MGTBER(2), PC    (2), JUL68 JW
00106     39*     $PCDB  (2), PHIF  (2), RATIO (2,8)          , RNM   (2), SNVOP (2), JUL68 JW
00106     40*     $SNVOPB(2), SR    (2), SRDB  (2), SRDBM (2), STDB  (2), T     (2), JUL68 JW
00106     41*     $XI    (2)                                                           JUL68 JW
00107     42*      COMMON /INTERM/ DUMMYI(54)                                          JUL68 JW
00110     43*      COMMON /ANSCOM/      BER   (2), MGBE  (2), MGC   (2), MGKE  (2), JUL68 CA
00110     44*     $MGP   (2), MGTE  (2), MGTO  (2), MGTPR (2), MGTSB (2), MGTSFR(2), JUL68 CA
00110     45*     $MGVE  (2), MGVD  (2), MGVOF (2), MGVSF (2), MLBV  (2), MLCVBS(2), JUL68 CA
00110     46*     $MLDC  (2), MLDK  (2), MLDPHT(2), MLDPLT(2), MLDPRN(2), MLDPV (2), JUL68 CA
00110     47*     $MLDVLT(2), MLEVA (2,8)          , MLHLB (2), MLUC  (2), MLUPT (2), JUL68 CA
00110     48*     $MLUPV (2), NOISEF(2), PCDBM (2), PHIFDB(2), SNBD  (2,4)          , JUL68 CA
00110     49*     $SNBDDB(2,4)          , SNBE  (2), SNBEDB(2), SNC   (2), SNCDB (2), JUL68 CA
00110     50*     $SNESB (2,8)          , SNESBB(2,8)          , SNHSB (2), SNHSBB(2), JUL68 CA
00110     51*     $SNIF  (2), SNIFDB(2), SNKE  (2), SNKEDB(2), SNMM  (2,4)          , JUL68 CA
00110     52*     $SNMMDB(2,4)          , SNMSF (2,4)          , SNMSFB(2,4)          , JUL68 CA
00110     53*     $SNP   (2), SNPDB (2), SNPBV (2), SNPBVB(2), SNTE  (2), SNTEDB(2), JUL68 JW
00110     54*     $SNTFR (2), SNTFRB(2), SNTO  (2), SNTODB(2), SNTP  (2), SNTPDB(2), JUL68 JW
00110     55*     $SNTPR (2), SNTPRB(2), SNTSB (2), SNTSBB(2), SNTSF (2), SNTSFB(2), JUL68 JW
00110     56*     $SNVE  (2), SNVEDB(2), SNVO  (2), SNVODB(2), SNVOF (2), SNVOFB(2), JUL68 JW
00110     57*     $SNVSF (2), SNVSFB(2), SNXE  (2), SNXEDB(2)                      JUL68 JW
00111     58*      COMMON /ANSCOM/ DUMMYA(68)                                          JUL68 JW
00112     59*      COMMON     /NUMBER/   ZERO,      FIFTH,     QUARTR,    HALF,
00112     60*     2           ONE,       TWO,       THREE,     FOUR,      FIVE,
00112     61*     3           SIX,       SEVEN,     EIGHT,     FNINE,     TEN,
00112     62*     4           TWENTY,    FIFTY,     HUNDRD,    THSAND,    FMIYUN,
00112     63*     5           I1,        I2,        I3,        I4,        I5,
00112     64*     6           I6,        I7,        I8,        I9,        I10,
00112     65*     7           I20,       I50,       I100
00113     66*      COMMON     /AE/       IE,        LOCEM,     NEM,       NEMAX
00114     67*      COMMON     /BJSCOM/   BJ(3,2,3), BJBET(3),  BJGAM(3),  BJXI(3)  ,
00114     68*     2           BJPE(2,2), BJPH(2,2), BJPK(2,2)
00115     69*      COMMON     /BJSCOM/   BJEVA(2,2,8)                                  03/06/CA
00116     70*      COMMON /LISTC/ IVAR, N, DATAPE, NLISTS, NPAGES, NLINES,             JUL68 CA
00116     71*     $NFW, INFOS(150,13), INFOI(100,13), INFOA(150,13)                    JUL68 CA
00117     72*      DIMENSION ANSCOV(300), FINTEV(200), IDEQSS(20,2),                   JUL68 CA
00117     73*     $          III     (13), ITABLE  (50), LINKID  (2), NOEQS    (2),    JUL68 CA
```

```
00117        $            SNTR     (2), STATIV (300), TITLES(3,2)                 JUL68 CA
00120         DIMENSION UDLINK(2)                                                 JUL68 CA
00121         EQUIVALENCE (STATIV(1),A(1)), (FINTEV(1),ALPHA(1)), (ANSCOV(1),BERAPR68 CA
00121        $(1))                                                                APR68 CA
00122         DATA ITABLE /0,   0,   0,   0,  97,   0,   0,   0,   0, 177, 185, JUL68 CA
00122        $ 193, 185, 185, 209, 189, 205, 197, 201,   0, 213, 217, 213, 225, JUL68 CA
00122        $ 221, 193, 181, 141, 229,   0, 161, 145, 101,  77, 133, 15*0/     JUL68 CA
00124         DATA IFINIS, IBLANK /6H $END , 1H /                                 APR68 CA
00127         DATA ICNT /100/                                                     JUL68 CA
00131         DATA UDLINK /6H  DOWN,6H    UP/                                     JUL68 CA
00133         NAMELIST /BJSCON/ BJ    , BJBET , BJGAM , BJXI  , BJPE  , BJPH  , APR68 CA
00133        $ BJPK   , BJEVA ,                                                   APR68 CA
00134         NAME LIST /PRBSET/ NPROBS, DATAPE, SAVE                             JUL68 CA
00135         NAME LIST/PRBSPC/ LINKS, NLISTS, NPAGES, NLINES, NFILE, IPRINT      JUL68 CA
00136         SNREDB(A,ADB,B,BDB) = AMIN1(ADB,BDB) - TEN * ALOG10((AMIN1(A,B) + JUL68 CA
00136        $SNRCST) / AMAX1(A,B) + ONE)                                         JUL68 CA
00136  C                                                                          JUL68 CA
00136  C *** ESTABLISH OVERFLOW/UNDERFLOW MONITOR                                  JUL68 CA
00137         CALL QQUFOF(ICNT,ICNT,1)                                            JUL68 CA
00137  C                                                                          JUL68 CA
00137  C *** INITIALIZATION                                                       JUL68 CA
00140         IDDEF = 0                                                           JUL68 CA
00141         IE = 6                                                              JUL68 CA
00142         NEM = 0                                                             JUL68 CA
00143         NEMAX = 0                                                           JUL68 CA
00144         NFILE = 0                                                           AUG68 JW
00145         NFW = 800                                                           JUL68 CA
00146         DO 4 I = 1, 150                                                     JUL68 CA
00151         DO 4 J = 1, 13                                                      JUL68 CA
00154         INFOS(I,J) = IBLANK                                                 01/08/GG
00155         INFOA(I,J) = IBLANK                                                 01/08/GG
00156         IF(I .GT. 100) GO TO 4                                              JUL68 CA
00160         INFOI(I,J) = IBLANK                                                 01/08/GG
00161       4 CONTINUE                                                            01/08/GG
00161  C                                                                          JUL68 CA
00161  C *** READ IN PARAMETER DESCRIPTION CARDS                                   JUL68 CA
00161  C *** IF '& EOF' APPEARS READ CARDS FROM PCF TAPE                          APR68 CA
00164         INTAPE = 5                                                          JUL68 CA
00165      10 READ(INTAPE,4000,END=49) III(1), ID, (III(I),I=2,13)                JUL68 CA
00175    4000 FORMAT(1A6,1X,1I3,1X,10A6,1A1,1X,1A6)                               APR68 CA
00176         IF(III(1) .EQ. IFINIS) GO TO 50                                     APR68 CA
```

```
00175    C                                                      11/20/GG
00176    C *** IS DESCRIPTION FOR $STATIN PARAMETER             11/20/GG
00176    C                                                      11/20/GG
00200          IF((ID .GT. 0) .AND. (ID .LT. 301)) GO TO 20     JUL68 CA
00200    C                                                      11/20/GG
00200    C *** IS DEFINITION FOR $INTERN PARAMETER              11/20/GG
00200    C                                                      11/20/GG
00202          IF((ID .GT. 300) .AND. (ID .LT. 501)) GO TO 30   JUL68 CA
00202    C                                                      11/20/GG
00202    C *** IS DEFINITION FOR $ANSCON PARAMETER              11/20/GG
00202    C                                                      11/20/GG
00204          IF((ID .GT. 500) .AND. (ID .LT. 801)) GO TO 40   JUL68 CA
00204    C                                                      11/20/GG
00204    C *** BAD ID NUMBER                                    11/20/GG
00204    C                                                      11/20/GG
00206          IDDEF = IDDEF + 1                                11/20/GG
00207          GO TO 10                                         11/20/GG
00207    C                                                      11/20/GG
00207    C *** $STATIN PARAMETER                                11/20/GG
00207    C                                                      11/20/GG
00210       20 J = (ID + 1)/2                                   11/20/GG
00211          DO 25 I = 1, 13                                  APR68 CA
00214       25 INFOS(J,I) = III(I)                              11/20/GG
00216          GO TO 10                                         11/20/GG
00216    C                                                      11/20/GG
00216    C *** $INTERN PARAMETER                                11/20/GG
00216    C                                                      11/20/GG
00217       30 J = (ID - 299)/2                                 11/20/GG
00220          DO 35 I = 1, 13                                  APR68 CA
00223       35 INFOI(J,I) = III(I)                              11/20/GG
00225          GO TO 10                                         11/20/GG
00225    C                                                      11/20/GG
00225    C *** $ANSCON PARAMETER                                11/20/GG
00225    C                                                      11/20/GG
00226       40 J = (ID - 499)/2                                 11/20/GG
00227          DO 45 I = 1, 13                                  APR68 CA
00232       45 INFOA(J,I) = III(I)                              11/20/GG
00234          GO TO 10                                         11/20/GG
00235       49 INTAPE = 27                                      AUG68 JW
00236          GO TO 10                                         APR68 CA
00236    C                                                      11/20/GG
```

```
00235   C *** WERE ANY DEFINITION CARDS IGNORED                                      11/20/GG
00236   C                                                                            11/20/GG
00237      50 IF (IDDEF .NE. 0)  WRITE (6,4035)  IDDEF                               11/20/GG
00243    4035 FORMAT (1H1, 10X ,5H*****,I5, 36H PARAMETER DESCRIPTION CARDS IGNO11/20/GG
00243        2RED    )                                                               11/20/GG
00244         REWIND 27
00245     100 CONTINUE
00245   C                                                                            JUL68 CA
00245   C *** INITIALIZATION                                                         JUL68 CA
00246         DATAPE = 8                                                             JUL68 CA
00247         NPROBS = 1                                                             JUL68 CA
00250         SAVE = 0.0                                                             JUL68 CA
00250   C *** READ INPUT FOR THIS SET OF PROBLEMS - NUMBER OF PROBLEMS
00251         READ(5,PRBSET,END=801)                                                 JUL68 CA
00254         CALL FACTOR (A, 300, SAVE)                                             JUL68 CA
00255         WRITE(6,1500) NPROBS, DATAPE, SAVE                                     JUL68 CA
00262    1500 FORMAT(18H1PROBLEM SET DATA-/1H04X20HNUMBER OF PROBLEMS =,I3/5X,23APR68 CA
00262        $HDATA TAPE I.D. NUMBER =,I3/5X,13HSAVE FACTOR =,F6.3)                  JUL68 CA
00262   C *** PROCESS EACH PROBLEM
00263          DO 800 L= 1,NPROBS
00263   C                                                                            JUL68 CA
00263   C *** INITIALIZATION                                                         JUL68 CA
00266          CALL ZEROUT
00267         IPRINT = 0                                                             JUL68 CA
00270         LINKS = 1                                                              JUL68 CA
00271         NFILE = NFILE + 1                                                      AUG68 JW
00272         NLINES = 1                                                             JUL68 CA
00273         NLISTS = 1                                                             JUL68 CA
00274         NPAGES = 1                                                             JUL68 CA
00274   C *** READ INPUT PARAMETERS FOR EACH PROBLEM  - NUMBER OF SETS ( 1 OR 2 )
00275         READ(5,PRBSPC)                                                         APR68 CA
00300         NPOINT = NPAGES * NLINES                                               APR68 CA
00301         WRITE(6,1501) LINKS, NLISTS, NPAGES, NLINES, NPOINT, NFILE, IPRINTJUL68 CA
00312    1501 FORMAT(1H1,4X,27HPROBLEM SPECIFICATION DATA-,/1H0,9X,             17APR68 CA
00312        $HNUMBER OF LINKS =,I2/10X,27HNUMBER OF REPORTS DESIRED =,I3/10X,28APR68 CA
00312        $HNUMBER OF PAGES PER REPORT =,I3/10X,26HNUMBER OF LINES PER PAGE =APR68 CA
00312        $,I3/10X,28HNUMBER OF LINES PER REPORT =,I3/10X,                   25APR68 CA
00312        $HDATA LOCATED IN FILE NO. ,I2/                                         JUL68 CA
00312        $10X,12HPRINT FLAG =,I2/1H0,4X,24HLINK SPECIFICATION DATA-)             APR68 CA
00313         IF(NLISTS .GE. 0) GO TO 199
00315         REWIND DATAPE                                                          JUL68 CA
```

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              THE MAIN PROGRAM, COMSIM                                  DATE  090868  PAGE     9
00316           CALL FSBSFL(DATAPE,NFILE-1,IER)                                          JUL68 CA
00317           NLISTS = -NLISTS                                                         JUL68 CA
00320           GO TO 711                                                                JUL68 CA
00320     C *** READ INPUT PARAMETERS FOR EACH SET - TITLE (15 ALPHANUMERICS + ( ) CC16-18
00321       199 READ(5,1000) ((TITLES(IT,IN),IT=1,3),LINKID(IN),(IDEQSS(ID,IN),ID=JUL68 CA
00321          $1,20),IN=1,LINKS)                                                        JUL68 CA
00337      1000 FORMAT(3A6,1X,I1,20I3)                                                   JUL68 CA
00340           DO 999 IN = 1, LINKS                                                     JUL68 CA
00343           NOEQS(IN) = 0                                                            JUL68 CA
00344           DO 998 ID = 1, 20                                                        JUL68 CA
00347           IF (IDEQSS(ID,IN) .EQ. 0)GO TO 997                                       JUL68 JW
00351       998 NOEQS(IN) = NOEQS(IN) + 1                                                JUL68 CA
00353       997 I = LINKID(IN)                                                           JUL68 JW
00354       999 WRITE(6,1100)  (TITLES(IT,IN),IT=1,3), UDLINK(I), (IDEQSS(ID,IN), JUL68 CA
00354          $ID=1,20)                                                                 JUL68 CA
00370      1100 FORMAT(1H0,9X,4A6,24HLINK.  BLOCK SEQUENCE = I3,9(2H, I3),1H,/      JUL68 JW
00370          $58X,I3,9(2H, I3),1H.)                                                    JUL68 JW
00371       200 CONTINUE
00371     C                                                                            11/14/GG
00371     C *** INITIALIZE RANGE AND SRDBM                                             11/14/GG
00371     C                                                                            11/14/GG
00372           LINK1 = LINKID(1)                                                        APR68 CA
00373           LINK2 = MOD(LINK1,2) + 1                                                 APR68 CA
00373     C                                                                            11/14/GG
00373     C *** SET UP FLAG TO INDICATE RANGE OR SR TO BE VARIED (1=RANGE, 2=SR)      11/14/GG
00373     C                                                                            11/14/GG
00374           IVAR = 2                                                                 11/14/GG
00375           IF((IDEQSS(1,1) .EQ. 1) .OR. (IDEQSS(1,1) .EQ. 9 .AND. IDEQSS(2,1)JUL68 CA
00375        2    .EQ. 1))         IVAR = 1                                              11/14/GG
00375     C *** READ THE INPUT DATA FOR THIS PROBLEM SOLUTION
00375     C                                                                            11/20/GG
00375     C *** IGNORE CARDS WITH BAD PARAMETER ID NUMBER AND COUNT CARDS IGNORED 11/20/GG
00375     C                                                                            11/20/GG
00377           IDSTAT = 0                                                               11/20/GG
00400       201 CONTINUE                                                                 11/20/GG
00401           READ (5,4005) IEND, ID , VALUE                                           11/20/GG
00406      4005 FORMAT(A6,I4,E18.8)
00406     C                                                                            11/20/GG
00406     C *** CHECK IF ALL $STATIN AND $INTERN VALUES READ IN                        01/04/GG
00406     C                                                                            11/20/GG
00407           IF (IEND .EQ. IFINIS)    GO TO 203                                       11/20/GG
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00407   C                                                                    11/20/GG
00407   C *** CHECK IF ID NUMBER VALID                                       11/20/GG
00407   C                                                                    11/20/GG
00411         IF((ID .GT. 0) .AND. (ID .LT. 301)) GO TO 202                  JUL68 CA
00413         IF((ID .GT. 300) .AND. (ID .LT. 501)) GO TO 206                JUL68 CA
00415         IDSTAT = IDSTAT + 1                                            11/20/GG
00416         GO TO 201                                                      11/20/GG
00417     202 STATIV(ID) = VALUE                                             11/20/GG
00420         GO TO 201                                                      11/20/GG
00421     206 J = ID - 300                                                   01/04/GG
00422         FINTEV(J) = VALUE                                              01/04/GG
00423         GO TO 201                                                      01/04/GG
00423   C                                                                    11/20/GG
00423   C *** WRITE OUT INPUT HEADING AND COLUMN HEADING                     11/20/GG
00423   C                                                                    11/20/GG
00424     203 WRITE (6,4010)                                                 11/20/GG
00426    4010 FORMAT (1H1,42X,24HINPUT PARAMETERS LISTING      / )           11/20/GG
00427         WRITE (6,4015)                                                 11/20/GG
00431    4015 FORMAT(1X,108(1H*),1X,12(1H*))                                 APR68 CA
00432         WRITE (6,4025)                                                 11/20/GG
00434    4025 FORMAT(19X,20HPARAMETER DEFINITION,23X,3HNO.,4X,8HDOWNLINK,4X,3HNOAPR68 CA
00434        $.,4X,6HUPLINK,8X,5HUNITS,5X,8HCOMPUTER/70X,5HVALUE,14X,5HVALUE,18XAPR68 CA
00434        $,8HMNEMONIC)                                                   APR68 CA
00435         I34 = 0                                                        11/20/GG
00436         DO 204 I = 1, 150                                              JUL68 CA
00436   C                                                                    11/20/GG
00436   C *** WRITE INPUT  DESCRIPTIONS, ID, VALUE, UNITS                    01/04/GG
00436   C                                                                    11/20/GG
00441         ID2 = I*2                                                      11/20/GG
00442         ID1 = ID2 - 1                                                  11/20/GG
00443         I34 = I34 + 1                                                  11/20/GG
00444         IF (I34 .LT. 34)  GO TO 204                                    11/20/GG
00446         I34 = 1                                                        11/20/GG
00447         WRITE (6,4020)                                                 11/20/GG
00451    4020 FORMAT (1H1)                                                   11/20/GG
00452         WRITE (6,4025)                                                 11/20/GG
00454     204 WRITE(6,4030) (INFOS(I,M),M=2,12), ID1, STATIV(ID1), ID2, STATIV APR68 CA
00454        $(ID2), INFOS(I,13), INFOS(I,1)                                 APR68 CA
00471    4030 FORMAT(1X,10A6,1A1,I3,2X,1PE10.4,4X,I3,2X,E10.4,6X,A6,4X,A6)   APR68 CA
00472         DO 208 I = 1, 100                                              JUL68 CA
00475         ID2 = I*2                                                      01/04/GG
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00476         ID1 = ID2 - 1                                                01/04/GG
00477         J1 = ID1 + 300                                               01/04/GG
00500         J2 = ID2 + 300                                               01/04/GG
00501         I34 = I34 + 1                                                01/04/GG
00502         IF (I34.LT.34)  GO TO 208                                    01/04/GG
00504         I34 = 1                                                      01/04/GG
00505         WRITE (6,4020)                                               01/04/GG
00507         WRITE (6,4025)                                               01/04/GG
00511     208 WRITE(6,4030) (INFOI(I,M),M=2,12), J1, FINTEV(ID1), J2, FINTEV   APR68 CA
00511        $(ID2), INFOI(I,13), INFOI(I,1)                               APR68 CA
00526         IF (IDSTAT .NE. 0)    WRITE (6,4045)  IDSTAT                 01/04/GG
00532    4045 FORMAT(1H1,10X,5H*****,I5,30H PARAMETER VALUE CARDS IGNORED )   01/04/GG
00532   C                                                                  11/17/GG
00532   C *** CONVERT TRANSMITTED SNR TO POWER RATIO                        11/17/GG
00532   C                                                                  11/17/GG
00533         IF (SNTRDB(1) .GT. 0.0)   SNTR(1) = TEN**(SNTRDB(1) / TEN)   11/17/GG
00535         IF (SNTRDB(2) .GT. 0.0)   SNTR(2) = TEN**(SNTRDB(2) / TEN)   11/17/GG
00535   C                                                                  11/20/GG
00535   C *** PROCESS BESSEL FUNCTIONS
00537          CALL PREPRO
00537   C *** PROCESS EACH LINE OF ANSWERS
00540         DO 705 IK = 1, NPOINT                                        APR68 CA
00543         GO TO (260,270), IVAR                                        11/14/GG
00544     260 CONTINUE                                                     11/14/GG
00544   C *** INCREMENT THE RANGE
00545         RNM(LINK1) = RNM(LINK1) + DELNM(LINK1)                       APR68 CA
00545   C *** EQUATE UP AND DOWN RANGES
00546         RNM(LINK2) = RNM(LINK1)                                      APR68 CA
00547         GO TO 280                                                    11/14/GG
00547   C                                                                  11/14/GG
00547   C *** VARY THE RECIEVED SIGNAL LEVEL (SRDBM) AND COMPUTE SR        11/14/GG
00547   C                                                                  11/14/GG
00550     270 SRDBM(LINK1) = SRDBM(LINK1) + DELSR(LINK1)                   APR68 CA
00551         SRDBM(LINK2) = SRDBM(LINK1)                                  APR68 CA
00552         SR(1) = TEN** ((SRDBM(1) - 30.)/TEN)                         11/14/GG
00553         SR(2) = SR(1)                                                11/14/GG
00554     280 CONTINUE                                                     11/14/GG
00554   C *** PROCESS EACH SET
00555         DO 500 I=1,LINKS                                             01/04/GG
00555   C *** CALL THE EQUATION DRIVER
00560          CALL EQUDRV (LINKID(I), NOEQS (I), IDEQSS(1,I))
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00561    500  CONTINUE
00561  C *** REINITIALIZATION OF 'N' PRIOR TO OUTPUT
00563        N = LINKID(LINKS)                                             01/04/GG
00563  C                                                                   11/17/GG
00563  C *** COMPUTE RESULTANT SNR AT RECEIVER IN DB                       11/17/GG
00563  C                                                                   11/17/GG
00564        M = NOEQS(LINKS)
00565        DO 505 I=1,M                                                  11/17/GG
00570        II = IABS(IDEQSS(I,N))                                        11/17/GG
00571        IF((IDEQSS(I,N) .GE. 0) .OR. (ITABLE(II) .EQ. 0)) GO TO 505   APR68 CA
00573        IF((II .GE. 31) .AND. (II .LE. 34)) GO TO 501                 JUL68 CA
00575        JI = ITABLE(II) + N - 1                                       11/29/GG
00576        JJ = JI + 2                                                   11/29/GG
00577        ANSCOV(JJ) = SNREDB(SNTR(N), SNTRDB(N), ANSCOV(JI), ANSCOV(JJ))  11/29/GG
00600        GO TO 505                                                     11/17/GG
00601    501 LIMIT = NEMU(N)                                               03/06/CA
00602        J = 8                                                         JUL68 CA
00603        IF(II .EQ. 33) J = 16                                         JUL68 CA
00605        DO 503 IM = 1, LIMIT                                          03/06/CA
00610        JI = ITABLE(II) - 3 + N + 2*IM                                11/29/GG
00611        JJ = J + JI                                                   JUL68 CA
00612    503 ANSCOV(JJ) = SNREDB(SNTR(N), SNTRDB(N), ANSCOV(JI), ANSCOV(JJ))  03/06/CA
00614    505 CONTINUE                                                      11/17/GG
00614  C                                                                   11/17/GG
00614  C *** SET UP VARPAR TO PRINT, VARPAR IS PARAMETER THAT IS VARIED.    11/17/GG
00614  C                                                                   11/17/GG
00616    705 WRITE(DATAPE) STATIV, FINTEV, ANSCOV, NPOINT                  JUL68 CA
00636        END FILE DATAPE                                               APR68 CA
00637        CALL FSBSFL(DATAPE,-1,IER)                                    JUL68 JW
00640    707 IF(NLISTS .EQ. 0) GO TO 708                                   JUL68 CA
00642    711 CALL REPORT                                                   JUL68 CA
00643    708 WRITE(6,4050)                                                 APR68 CA
00645   4050 FORMAT (1H1,42X, 25HOUTPUT PARAMETERS LISTING      /    )     11/20/GG
00646        WRITE (6,4015)                                                11/20/GG
00650        WRITE (6,4025)                                                11/20/GG
00652        I34 = 0                                                       11/20/GG
00652  C                                                                   11/20/GG
00652  C *** WRITE $ANSCON AND $INTERN                                     11/20/GG
00652  C                                                                   11/20/GG
00653        DO 710 I = 1, 100                                             JUL68 CA
00656        ID2 = I*2                                                     11/20/GG
```

```
00657        ID1 = ID2 - 1                                             11/20/GG
00660        J1 = ID1 + 300                                            JUL68 CA
00651        J2 = ID2 + 300                                            JUL68 CA
00662        I34 = I34 + 1                                             11/20/GG
00663        IF (I34 .LT. 34)  GO TO 710                               11/20/GG
00665        I34 = 1                                                   11/20/GG
00666        WRITE (6,4020)                                            11/20/GG
00670        WRITE (6,4025)                                            11/20/GG
00672    710 WRITE (6,4030) (INFOI(I,M),M=2,12), J1, FINTEV(ID1), J2, FINTEV  JUL68 CA
00672       $(ID2), INFOI(I,13), INFOI(I,1)                            JUL68 CA
00707        DO 720 I = 1, 150                                         JUL68 CA
00712        ID2 = I*2                                                 11/20/GG
00713        ID1 = ID2 - 1                                             11/20/GG
00714        J1 = ID1 + 500                                            JUL68 CA
00715        J2 = ID2 + 500                                            JUL68 CA
00716        I34 = I34 + 1                                             11/20/GG
00717        IF (I34 .LT. 34) GO TO 720                                11/20/GG
00721        I34 = 1                                                   11/20/GG
00722        WRITE (6,4020)                                            11/20/GG
00724        WRITE (6,4025)                                            11/20/GG
00726    720 WRITE(6,4030) (INFOA(I,M),M=2,12), J1, ANSCOV(ID1), J2, ANSCOV   JUL68 CA
00726       $(ID2), INFOA(I,13), INFOA(I,1)                            JUL68 CA
00743        IF(IPRINT .EQ. 0) GO TO 800                               JUL68 CA
00745        WRITE (6,4020)
00747         WRITE (6,BJSCON)
00752    800  CONTINUE
00754        GO TO 100
00755    801 REWIND DATAPE                                             JUL68 CA
00756        STOP                                                      JUL68 CA
00757        END                                                       JUL68 CA
```

END OF UNIVAC 1108 FORTRAN V COMPILATION.   0 *DIAGNOSTIC* MESSAGE(S)

13.2 SUBROUTINE BESJ

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                 SUBROUTINE BESJ                                        DATE  310768  PAGE     1

& FOR BESJ,BESJ                                                             17656636
UNIVAC 1108 FORTRAN V LEVEL   22C6 0018 F5018F
THIS COMPILATION WAS DONE ON 31 JUL 68 AT 17656636

   SUBROUTINE BESJ       ENTRY POINT 000320

   STORAGE USED (BLOCK, NAME, LENGTH)

       0001    *CODE    000375
       0000    *DATA    000051
       0002    *BLANK   000000


   EXTERNAL REFERENCES (BLOCK, NAME)

       0003    NERR3$


   STORAGE ASSIGNMENT FOR VARIABLES (BLOCK, TYPE, RELATIVE LOCATION, NAME)

    0001    000202 120L       0001    000204 130L       0001    000235 150L       0001    000165 152G       0001    000212 167G
    0001    000261 180L       0001    000011 20L        0001    000306 200L       0001    000030 30L        0001    000035 31L
    0001    000057 34L        0001    000070 36L        0001    000101 40L        0001    000124 60L        0001    000137 70L
    0000 R 000012 ALPHA       0000 R 000017 BMK         0000 R 000002 BPREV       0000 R 000011 FM          0000 R 000010 FM1
    0000 I 000013 JT          0000 I 000015 K           0000 I 000007 M           0000 I 000003 MA          0000 I 000004 MB
    0000 I 000016 MK          0000 I 000006 MMAX        0000 I 000005 MZERO       0000 I 000014 M2          0000 I 000000 NTEST
    0000 I 000001 N1          0000 R 000020 S


00100      1*   C                                                                   BESJ0001
00100      2*   C     ..............................................................BESJ0002
00100      3*   C                                                                   BESJ0003
00100      4*   C        SUBROUTINE BESJ                                            BESJ0004
00100      5*   C                                                                   BESJ0005
00100      6*   C        PURPOSE                                                    BESJ0006
00100      7*   C           COMPUTE THE J BESSEL FUNCTION FOR A GIVEN ARGUMENT AND ORDERBESJ0007
```

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00100     8*  C                                                         BESJ0008
00100     9*  C        USAGE                                            BESJ0009
00100    10*  C           CALL BESJ(X,N,BJ,D,IER)                       BESJ0010
00100    11*  C                                                         BESJ0011
00100    12*  C        DESCRIPTION OF PARAMETERS                        BESJ0012
00100    13*  C           X  -THE ARGUMENT OF THE J BESSEL FUNCTION DESIRED   BESJ0013
00100    14*  C           N  -THE ORDER OF THE J BESSEL FUNCTION DESIRED      BESJ0014
00100    15*  C           BJ -THE RESULTANT J BESSEL FUNCTION           BESJ0015
00100    16*  C           D  -REQUIRED ACCURACY                         BESJ0016
00100    17*  C           IER-RESULTANT ERROR CODE WHERE                BESJ0017
00100    18*  C              IER=0  NO ERROR                            BESJ0018
00100    19*  C              IER=1  N IS NEGATIVE                       BESJ0019
00100    20*  C              IER=2  X IS NEGATIVE                       BESJ0020
00100    21*  C              IER=3  REQUIRED ACCURACY NOT OBTAINED      BESJ0021
00100    22*  C              IER=4  RANGE OF N COMPARED TO X NOT CORRECT (SEE REMARKS)BESJ0022
00100    23*  C                                                         BESJ0023
00100    24*  C        REMARKS                                          BESJ0024
00100    25*  C           N MUST BE GREATER THAN OR EQUAL TO ZERO, BUT IT MUST BE     BESJ0025
00100    26*  C           LESS THAN                                     BESJ0026
00100    27*  C              20+10*X-X** 2/3    FOR X LESS THAN OR EQUAL TO 15     BESJ0027
00100    28*  C              90+X/2             FOR X GREATER THAN 15   BESJ0028
00100    29*  C                                                         BESJ0029
00100    30*  C        SUBROUTINES AND FUNCTION SUBPROGRAMS REQUIRED    BESJ0030
00100    31*  C           NONE                                          BESJ0031
00100    32*  C                                                         BESJ0032
00100    33*  C        METHOD                                           BESJ0033
00100    34*  C           RECURRENCE RELATION TECHNIQUE DESCRIBED BY H. GOLDSTEIN AND BESJ0034
00100    35*  C           R.M. THALER,'RECURRENCE TECHNIQUES FOR THE CALCULATION OF   BESJ0035
00100    36*  C           BESSEL FUNCTIONS',M.T.A.C.,V.13,PP.102-108 AND I.A. STEGUN  BESJ0036
00100    37*  C           AND M. ABRAMOWITZ,'GENERATION OF BESSEL FUNCTIONS ON HIGH   BESJ0037
00100    38*  C           SPEED COMPUTERS',M.T.A.C.,V.11,1957,PP.255-257     BESJ0038
00100    39*  C                                                         BESJ0039
00100    40*  C     ..................................................................BESJ0040
00100    41*  C                                                         BESJ0041
00101    42*        SUBROUTINE BESJ(X,N,BJ,D,IER)                       BESJ0042
00101    43*  C                                                         BESJ0043
00103    44*        BJ=.0                                               BESJ0044
00104    45*        IF(N)10,20,20                                       BESJ0045
00107    46*     10 IER=1                                               BESJ0046
00110    47*        RETURN                                              BESJ0047
00111    48*     20 IF(X.LT.0.) GO TO 30                                BESJ0048
```

```
00113            IF(X.GT.0.) GO TO 31                           RESJ0049
00115            IF(N.EQ.0) RJ = 1.                             RESJ0050
00117            RETURN                                         RESJ0051
00120         30 IER=2                                          RESJ0052
00121            RETURN                                         RESJ0053
00122         31 IF(X-15.)32,32,34                              RESJ0054
00125         32 NTEST=20.+10.*X-X** 2/3.                       RESJ0055
00126            GO TO 36                                       RESJ0056
00127         34 NTEST=90.+X/2.                                 RESJ0057
00130         36 IF(N-NTEST)40,38,38                            RESJ0058
00133         38 IER=4                                          RESJ0059
00134            RETURN                                         RESJ0060
00135         40 IER=0                                          RESJ0061
00136            N1=N+1                                         RESJ0062
00137            BPREV=.0                                       RESJ0063
00137      C                                                    RESJ0064
00137      C     COMPUTE STARTING VALUE OF M                    RESJ0065
00137      C                                                    RESJ0066
00140            IF(X-5.)50,60,60                               RESJ0067
00143         50 MA=X+6.                                        RESJ0068
00144            GO TO 70                                       RESJ0069
00145         60 MA=1.4*X+60./X                                 RESJ0070
00146         70 MB=N+IFIX(X)/4+2                               RESJ0071
00147            MZERO=MAX0(MA,MB)                              RESJ0072
00147      C                                                    RESJ0073
00147      C     SET UPPER LIMIT OF M                           RESJ0074
00147      C                                                    RESJ0075
00150            MMAX=NTEST                                     RESJ0076
00151        100 DO 190 M=MZERO,MMAX,3                          RESJ0077
00151      C                                                    RESJ0078
00151      C     SET F(M),F(M-1)                                RESJ0079
00151      C                                                    RESJ0080
00154            FM1=1.0E-28                                    RESJ0081
00155            FM=.0                                          RESJ0082
00156            ALPHA=.0                                       RESJ0083
00157            IF(M-(M/2)*2)120,110,120                       RESJ0084
00162        110 JT=-1                                          RESJ0085
00163            GO TO 130                                      RESJ0086
00164        120 JT=1                                           RESJ0087
00165        130 M2=M-2                                         RESJ0088
00166            DO 160 K=1,M2                                  RESJ0089
```

```
00171    90*           MK=M-K                                       BESJ0090
00172    91*           BMK=2.*FLOAT(MK)*FM1/X-FM                    BESJ0091
00173    92*           FM=FM1                                       BESJ0092
00174    93*           FM1=BMK                                      BESJ0093
00175    94*           IF(MK-N-1)150,140,150                        BESJ0094
00200    95*       140 BJ=BMK                                       BESJ0095
00201    96*       150 JT=-JT                                       BESJ0096
00202    97*           S=1+JT                                       BESJ0097
00203    98*       160 ALPHA=ALPHA+BMK*S                            BESJ0098
00205    99*           BMK=2.*FM1/X-FM                              BESJ0099
00206   100*           IF(N)180,170,180                             BESJ0100
00211   101*       170 BJ=BMK                                       BESJ0101
00212   102*       180 ALPHA=ALPHA+BMK                              BESJ0102
00213   103*           BJ=BJ/ALPHA                                  BESJ0103
00214   104*           IF(ABS(BJ-BPREV)-ABS(D*BJ))200,200,190       BESJ0104
00217   105*       190 BPREV=BJ                                     BESJ0105
00221   106*           IER=3                                        BESJ0106
00222   107*       200 RETURN                                       BESJ0107
00223   108*           END                                          BESJ0108

     END OF UNIVAC 1108 FORTRAN V COMPILATION.     0 *DIAGNOSTIC* MESSAGE(S)
```

13.3 SUBROUTINE BJERR

```
                  SUBROUTINE BJERR                                                          DATE  310768  PAGE     1

& FOR BJERR,BJERR                                                                                 17&56&38
UNIVAC 1108 FORTRAN V LEVEL   22C6 0018 F5018F
THIS COMPILATION WAS DONE ON 31 JUL 68 AT 17&56&38

   SUBROUTINE BJERR      ENTRY POINT 000014

   STORAGE USED (BLOCK, NAME, LENGTH)

         0001     *CODE     000021
         0000     *DATA     000006
         0002     *BLANK    000000
         0003     AE        000004


   EXTERNAL REFERENCES (BLOCK, NAME)

         0004     ERMES
         0005     NERR3$


   STORAGE ASSIGNMENT FOR VARIABLES (BLOCK, TYPE, RELATIVE LOCATION, NAME)

    0003 I 000000 IE          0003 I 000001 LOCEM       00C3 I 000002 NEM         0003 I 000003 NEMAX


00101      1*          SUBROUTINE BJERR      (IER)
00103      2*          COMMON      /AE/       IE,          LOCEM,     NEM,       NEMAX
00104      3*          IF(IER .NE. 0) CALL ERMES(IER)                                         03/06/CA
00106      4*          RETURN                                                                 03/06/CA
00107      5*          END

      END OF UNIVAC 1108 FORTRAN V COMPILATION.      0 *DIAGNOSTIC* MESSAGE(S)
```

13.4 SUBROUTINE BJPRCS

```
              SUBROUTINE BJPRCS                                    DATE  310768  PAGE     1

& FOR BJPRCS,BJPRCS                                                  17&56&39
UNIVAC 1108 FORTRAN V LEVEL   22C6 0018 F5018F
THIS COMPILATION WAS DONE ON 31 JUL 68 AT 17&56&39

   SUBROUTINE BJPRCS     ENTRY POINT 000057

   STORAGE USED (BLOCK, NAME, LENGTH)

         0001    *CODE    000073
         0000    *DATA    000017
         0002    *BLANK   000000
         0003    AE       000004
         0004    NUMBER   000040


   EXTERNAL REFERENCES (BLOCK, NAME)

         0005    RESJ
         0005    BJERR
         0007    NERR3$


   STORAGE ASSIGNMENT FOR VARIABLES (BLOCK, TYPE, RELATIVE LOCATION, NAME)

    0001    000017 100L     0001    000024 117G     00CC R 000001 ACURAC   0004 R 000013 EIGHT    0004 R 000001 FIFTH
    0004 R 000017 FIFTY     0004 R 000010 FIVE      00C4 R 000022 FMIYUN   0004 R 000014 FNINE    0004 R 000007 FOUR
    0004 R 000003 HALF      0004 R 000020 HUNDRD    00C0 I 000003 I        0003 I 000000 IE       0000 I 000004 IER
    0004 I 000023 I1        0004 I 000034 I10       00C4 I 000037 I100     0004 I 000024 I2       0004 I 000035 I20
    0004 I 000025 I3        0004 I 000026 I4        00C4 I 000027 I5       0004 I 000036 I50      0004 I 000030 I6
    0004 I 000031 I7        0004 I 000032 I8        0004 I 000033 I9       0003 I 000001 LOCEM    0003 I 000002 NEM
    0003 I 000003 NEMAX     0000 I 000002 NORDER    00CC I 000000 N2       0004 R 000004 ONE      0004 R 000002 QUARTR
    0004 R 000012 SEVEN     0004 R 000011 SIX       00C4 R 000015 TEN      0004 R 000006 THREE    0004 R 000021 THSAND
    0004 R 000016 TWENTY    0004 R 000005 TWO       00C4 R 000000 ZERO


00101      1*          SUBROUTINE BJPRCS      (NO,        X,          BJX)
```

```
00101   C      ARGUMENTS
00101   C      NO = ORDER,-IF NEGATIVE, ONLY ABSOLUTE VALUE,-IF POSITIVE, ZERO TO VALUE
00101   C      X  = VALUE OF VARIABLE
00101   C      BJX= ANSWER OF J-BESSEL FUNCTION CALCULATION
00103          DIMENSION BJX (1)
00104          COMMON      /AE/        IE,         LOCEM,      NEM,        NEMAX
00105          COMMON      /NUMBER/    ZERO,       FIFTH,      QUARTR,     HALF,
00105         2            ONE,        TWO,        THREE,      FOUR,       FIVE,
00105         3            SIX,        SEVEN,      EIGHT,      FNINE,      TEN,
00105         4            TWENTY,     FIFTY,      HUNCRD,     THSAND,     FMIYUN,
00105         5            I1,         I2,         I3,         I4,         I5,
00105         6            I6,         I7,         I8,         I9,         I10,
00105         7            I20,        I50,        I1C0
00105   C
00105   C CALCULATE UPPER LIMIT OF DO LOOP
00105   C
00106          N2        = IABS(NO) + I1
00106   C
00106   C SET ACCURACY LIMIT (EVALUE) DESIRED
00106   C
00107          ACURAC    = .00005
00107   C
00107   C SET ORDER NUMBER OF J BESSEL FUNCTION DESIRED
00107   C
00110          NORDER    = 0
00110   C
00110   C Q. NO. 1-IS ARGUMENT 'NO' NEGATIVE (YES-COMPUTE ONLY ONE VALUE)
00110   C
00111          IF(NO.GT.-1) GO TO 100
00113          N2        = 1
00114          NORDER    = IABS(NO)
00114   C
00114   C SET ERROR MESSAGE LOCATION INDEX
00114   C
00115     100 LOCEM      = I100
00116          DO 110  I = 1,N2
00116   C
00116   C CALCULATE J-BESSEL FUNCTION VALUES
00116   C
00121          CALL BESJ  (X,NORDER, BJX (NORDER+1)    ,   ACURAC,    IER)
00121   C
```

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              SUBROUTINE BJPRCS                                              DATE  310768  PAGE     3

00122     43*           CALL BJERR (IER)
00122     44*     C
00122     45*     C INCREMENT THE ORDER FOR THE NEXT CALCULATION (IF ANY)
00122     46*     C
00123     47*           NORDER     = NORDER + 1
00124     48*       110 CONTINUE
00126     49*           RETURN
00127     50*           END

      END OF UNIVAC 1108 FORTRAN V COMPILATION.     0 *DIAGNOSTIC* MESSAGE(S)
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13.5 SUBROUTINE EQUDRV

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                    SUBROUTINE EQUDRV                                        DATE  310768  PAGE     1

& FOR EQUDRV,EQUDRV                                                              17&56&40
UNIVAC 1108 FORTRAN V LEVEL   2206 0018 F5018F
THIS COMPILATION WAS DONE ON 31 JUL 68 AT 17&56&40

   SUBROUTINE EQUDRV     ENTRY POINT 004275

   STORAGE USED (BLOCK, NAME, LENGTH)

         0001    *CODE    004321
         0000    *DATA    000166
         0002    *BLANK   000000
         0003    STATIC   000454
         0004    INTERM   000310
         0005    ANSCOM   000454
         0006    NUMBER   000040
         0007    RJSCOM   000107
         0010    AE       000004


   EXTERNAL REFERENCES (BLOCK, NAME)

         0011    ALOG10
         0012    RJPRCS
         0013    ERF
         0014    COS
         0015    SIN
         0016    NERR2$
         0017    NEXP6$
         0020    SQRT
         0021    NERR3$


   STORAGE ASSIGNMENT FOR VARIABLES (BLOCK, TYPE, RELATIVE LOCATION, NAME)

    0001   004244 1L        0001   000215 10L       0001   000716 100L      0001   000770 110L      0001   001047 120L
    0001   000123 123G      0001   001156 130L      0001   001325 140L      0001   001426 150L      0001   001520 160L
    0001   001630 170L      0001   001736 180L      0001   002044 190L      0001   000260 20L       0001   002160 200L
    0001   002242 210L      0001   002327 220L      0001   002444 230L      0001   002552 240L      0001   002656 250L
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           SUBROUTINE EQUDRV                                                   DATE  310768  PAGE     2

0001     002772 260L        0001     003073 270L        00C1     002226 271L        0001     003204 280L        0001     003260 290L
0001     000312 30L         0001     003365 300L        00C1     003476 310L        0001     003610 320L        0001     003713 330L
0001     003632 3302L       0001     003652 3303L       00C1     004033 340L        0001     004124 350L        0001     004225 360L
0001     004226 370L        0001     004227 380L        00C1     004230 390L        0001     000406 40L         0001     004231 400L
0001     004232 410L        0001     004233 420L        00C1     004234 430L        0001     004235 440L        0001     004236 450L
0001     004237 460L        0001     004240 470L        00C1     004241 480L        0001     004242 490L        0001     000507 50L
0001     004243 500L        0001     003402 520G        00C1     003452 527G        0001     003544 544G        0001     003657 566G
0001     000530 60L         0001     003732 602G        00C1     004010 612G        0001     004053 626G        0001     000552 70L
0001     000570 80L         0001     000631 90L         00C3 R 000000 A           0000 R 000022 ACURAC      0011 R 000000 ALOG10
0004 R 000000 ALPHA       0003 R 000002 B           00C3 R 000004 BB          0003 R 000014 BBE         0003 R 000016 BC
0003 R 000020 BD          0003 R 000030 BEE         00C5 R 000000 BER         0004 R 000002 BET         0004 R 000004 BETEVA
0003 R 000050 BHE         0003 R 000052 BIF         00C7 R 000000 BJ          0007 R 000022 BJBET       0007 R 000047 BJEVA
0007 R 000025 BJGAM       0007 R 000033 BJPE        00C7 R 000037 BJPH        0007 R 000043 BJPK        0007 R 000030 BJXI
0003 R 000054 BKE         0003 R 000056 BLF         00C3 R 000060 BLM         0003 R 000070 BLPBV       0003 R 000072 BLTP
0003 R 000074 BLX         0003 R 000076 BMSF        00C3 R 000106 BPBVE       0003 R 000110 BPBVO       0003 R 000112 BPK
0003 R 000114 BR          0003 R 000116 BTE         00C3 R 000120 BTEF        0003 R 000122 BTO         0003 R 000124 BTPE
0003 R 000126 BTPO        0003 R 000130 BVE         00C3 R 000132 BVEF        0003 R 000134 BVO         0003 R 000136 BVOF
0003 R 000140 BWTSF       0003 R 000142 BWVSF       00C3 R 000144 BXE         0000 R 000025 C           0003 R 000146 CMSF
0004 R 000024 COMOLE      0000 R 000033 CONST1      00C0 R 000035 CONST2      0000 R 000034 CONST3      0003 R 000156 CTSF
0003 R 000160 CVSF        0000 R 000024 D           0003 R 000162 DELFB       0003 R 000172 DELNM       0003 R 000174 DELSR
0003 R 000176 DFK         0003 R 000200 DFKPBV      00C3 R 000202 DFKT        0003 R 000204 DFKTP       0003 R 000206 DFKX
0004 R 000026 DMMSF       0004 R 000036 DNMSF       00C4 R 000046 DNMSFB      0004 R 000056 DPBV        0004 R 000060 DPBVDB
0004 R 000062 DTB         0004 R 000064 DTBDB       00C4 R 000066 DTP         0004 R 000070 DTPDB       0004 R 000072 DTPR
0004 R 000074 DTPRDB      0004 R 000076 DTSF        00C4 R 000100 DTSFDB      0004 R 000102 DTSFR       0004 R 000104 DTSFRB
0005 R 000350 DUMMYA      0004 R 000222 DUMMYI      0003 R 000404 DUMMYS      0004 R 000106 DVB         0004 R 000110 DVBDB
0004 R 000112 DVF         0004 R 000114 DVFDB       0004 R 000116 DVSF        0004 R 000120 DVSFDB      0004 R 000122 DXE
0004 R 000124 DXEDB       0006 R 000013 EIGHT       00C4 R 000126 ELLELL      0004 R 000130 ENIF        0013 R 000000 ERF
0006 R 000001 FIFTH       0006 R 000017 FIFTY       0006 R 000010 FIVE        0003 R 000210 FMC         0006 R 000022 FMIYUN
0006 R 000014 FNINE       0006 R 000007 FOUR        00C3 R 000212 FPBV        0004 R 000132 FREDEV      0003 R 000214 FTF
0003 R 000216 FTP         0003 R 000220 FTS         00C3 R 000222 FVF         0003 R 000224 FVS         0003 R 000226 FVSF
0003 R 000230 FXF         0004 R 000142 GAMM        00C3 R 000232 GAMMA       0003 R 000234 GR          0003 R 000236 GT
0006 R 000003 HALF        0006 R 000020 HUNDRD      00CC I 000032 I           0010 I 000000 IE          0006 I 000023 I1
0006 I 000034 I10         0006 I 000037 I100        0006 I 000024 I2          0006 I 000035 I20         0006 I 000025 I3
0006 I 000026 I4          0006 I 000027 I5          00C6 I 000036 I50         0006 I 000030 I6          0006 I 000031 I7
0006 I 000032 I8          0006 I 000033 I9          00C0 I 000015 J           0000 I 000017 JBFLAG      0003 R 000240 K
0000 I 000016 KALGO       0003 R 000242 KB          00C3 R 000244 LC          0004 R 000144 LDB         0000 I 000030 LIMIT
0010 I 000001 LOCEM       0004 R 000146 LSDB        00C5 R 000002 MGBE        0005 R 000004 MGC         0005 R 000006 MGKE
0005 R 000010 MGP         0004 R 000150 MGTBER      00C5 R 000012 MGTE        0005 R 000014 MGTO        0005 R 000016 MGTPR
0005 R 000020 MGTSB       0005 R 000022 MGTSFR      00C5 R 000024 MGVE        0005 R 000026 MGVO        0005 R 000030 MGVOF
0005 R 000032 MGVSF       0005 R 000034 MLBV        0005 R 000036 MLCVBS      0005 R 000040 MLDC        0005 R 000042 MLDK
0005 R 000044 MLDPHT      0005 R 000046 MLDPLT      00C5 R 000050 MLDPRN      0005 R 000052 MLDPV       0005 R 000054 MLDVLT
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SUBROUTINE EQUDRV                                                                      DATE   310768   PAGE     3

0005 R 000056 MLEVA      0005 R 000076 MLHLB      0005 R 000100 MLUC       0005 R 000102 MLUPT      0005 R 000104 MLUPV
0003 R 000246 MODLEV     0010 I 000002 NEM        0010 I 000003 NEMAX      0003 R 000266 NEMU       0000 I 000023 NO
0005 R 000106 NOISEF     0006 R 000004 ONE        0000 I 000000 ORDER      0003 R 000270 PRE        0004 R 000152 PC
0004 R 000154 PCDB       0005 R 000110 PCDBM      0003 R 000272 PDEV       0003 R 000274 PE         0003 R 000276 PH
0004 R 000156 PHIF       0005 R 000112 PHIFDB     0003 R 000300 PHIO       0000 R 000020 PI         0003 R 000302 PK
0003 R 000304 PP         0000 R 000036 PRODUT     0003 R 000306 PT         0003 R 000310 PV         0006 R 000002 QUARTR
0004 R 000160 RATIO      0003 R 000312 RBE        0003 R 000314 RC         0003 R 000334 RHO        0003 R 000316 RHOB
0003 R 000326 RHOPBV     0003 R 000330 RHOT       0003 R 000332 RHOTP      0003 R 000334 RHOV       0003 R 000336 RHOX
0003 R 000340 RKE        0004 R 000200 RNM        0003 R 000342 RPK        0003 R 000344 RTE        0003 R 000346 RTO
0003 R 000350 RTPR       0003 R 000352 RTSB       0003 R 000354 RTSFR      0003 R 000356 RVE        0003 R 000360 RVO
0003 R 000362 RVOF       0003 R 000364 RVSF       0006 R 000012 SEVEN      0006 R 000011 SIX        0005 R 000114 SNBD
0005 R 000124 SNBDDB     0005 R 000134 SNBE       0005 R 000136 SNBEDB     0005 R 000140 SNC        0005 R 000142 SNCDB
0005 R 000144 SNESB      0005 R 000164 SNESBB     0005 R 000204 SNHSB      0005 R 000206 SNHSBB     0005 R 000210 SNIF
0005 R 000212 SNIFDB     0000 R 000021 SNIFP      0005 R 000214 SNKE       0005 R 000216 SNKEDB     0005 R 000220 SNMM
0005 R 000230 SNMMDB     0005 R 000240 SNMSF      0005 R 000250 SNMSFB     0005 R 000260 SNP        0005 R 000264 SNPBV
0005 R 000266 SNPBVB     0000 R 000001 SNPBVP     0005 R 000262 SNPDB      0000 R 000027 SNR        0003 R 000366 SNRCOM
0003 R 000370 SNRCST     0000 R 000026 SNRDB      0005 R 000270 SNTE       0005 R 000272 SNTEDB     0005 R 000274 SNTFR
0005 R 000276 SNTFRB     0005 R 000300 SNTO       0005 R 000302 SNTODB     0000 R 000003 SNTOP      0005 R 000304 SNTP
0005 R 000306 SNTPDB     0000 R 000005 SNTPP      0005 R 000310 SNTPR      0005 R 000312 SNTPRB     0003 R 000372 SNTRDB
0005 R 000314 SNTSB      0005 R 000316 SNTSBB     0005 R 000320 SNTSF      0005 R 000322 SNTSFB     0000 R 000007 SNTSFP
0005 R 000324 SNVE       0005 R 000326 SNVEDB     0005 R 000330 SNVO       0005 R 000332 SNVODB     0005 R 000334 SNVOF
0005 R 000336 SNVOFB     0000 R 000011 SNVOFP     0004 R 000202 SNVOP      0004 R 000204 SNVOPB     0005 R 000340 SNVSF
0005 R 000342 SNVSFB     0000 R 000013 SNVSFP     0005 R 000344 SNXE       0005 R 000346 SNXEDB     0004 R 000206 SR
0004 R 000210 SRDB       0004 R 000212 SRDBM      0003 R 000374 ST         0004 R 000214 STDB       0000 R 000031 SUM
0004 R 000216 T          0003 R 000376 TAPERA     0003 R 000400 TAPERB     0006 R 000015 TEN        0003 R 000304 THETUL
0006 R 000006 THREE      0006 R 000021 THSAND     0003 R 000402 TRC        0006 R 000016 TWENTY     0006 R 000005 TWO
0004 R 000220 XI         0006 R 000000 ZERO


00101      1*        SUBROUTINE EQUDRV(N,NUMEQS,IDEQS)
00103      2*        DIMENSION IDEQS(1)
00104      3*        INTEGER  ORDER
00105      4*        REAL                                                                JUL68 CA
00105      5*       $K     , KB    , LC    , LDB   , LSDB  , MGBE  , MGC   , MGKE  ,     JUL68 CA
00105      6*       $MGP   , MGTE  , MGTBER, MGTO  , MGTSP , MGVE  , MGVO  , MGVOF ,     JUL68 CA
00105      7*       $MGVSF , MGTPR , MGTSFR, MLBV  , MLCVPS, MLDC  , MLDK  , MLDPHT,     JUL68 CA
00105      8*       $MLDPLT, MLDPRN, MLDPV , MLDVLT, MLEVA , MLHLB , MLUC  , MLUPT ,     JUL68 CA
00105      9*       $MLUPV , MODLEV, NEMU  , NOISEF                                      JUL68 CA
00106     10*        COMMON /STATIC/       A     (2), B     (2), BB    (2,4)        ,   JUL68 JW
```

```
00106     $BBE   (2), BC    (2), BD    (2,4)          , BEE   (2,8)          , JUL68 JW
00106     $BHE   (2), BIF   (2), BKE   (2), BLF   (2), BLM (2,4), BLPBV (2), JUL68 JW
00106     $BLTP  (2), BLX   (2), BMSF  (2,4)          , BPBVE (2),              JUL68 JW
00106     $BPBVO (2), BPK   (2), BR    (2), BTE   (2), BTEF  (2), BTO   (2), JUL68 JW
00106     $BTPE  (2), BTPO  (2), BVE   (2), BVEF  (2), BVO   (2), BVOF  (2), JUL68 JW
00106     $BWTSF (2), BWVSF (2), BXE   (2), CMSF  (2,4)          , CTSF  (2), JUL68 JW
00106     $CVSF  (2), DELFB (2,4)          , DELNM (2), DELSR (2), DFK   (2), JUL68 JW
00106     $DFKPBV(2), DFKT  (2), DFKTP (2), DFKX  (2), FMC   (2), FPBV  (2), JUL68 JW
00106     $FTF   (2), FTP   (2), FTS   (2), FVF   (2), FVS   (2), FVSF  (2), JUL68 JW
00106     $FXF   (2), GAMMA (2), GR    (2), GT    (2), K     (2), KB    (2), JUL68 JW
00106     $LC    (2), MODLEV(2,8)          , NEMU  (2), PBE   (2), PDEV  (2), JUL68 JW
00106     $PE    (2), PH    (2), PHIO  (2), PK    (2), PP    (2), PT    (2), JUL68 JW
00106     $PV    (2), RBE   (2), RC    (2), RHCB  (2,4)          , RHOPBV(2), JUL68 JW
00106     $RHOT  (2), RHOTP (2), RHOV  (2), RHCX  (2), RKE   (2), RPK   (2), JUL68 JW
00106     $RTE   (2), RTO   (2), RTPR  (2), RTSB  (2), RTSFR (2), RVE   (2), JUL68 JW
00106     $RVO   (2), RVOF  (2), RVSF  (2), SNRCOM(2), SNRCST(2), SNTRDB(2), JUL68 JW
00106     $ST    (2), TAPERA(2), TAPERB(2), TRC   (2)                        JUL68 JW
00107      COMMON /STATIC/ DUMMYS(40)                                        JUL68 JW
00110      COMMON /INTERM/       ALPHA (2), BET   (2), BETEVA(2,8)          , JUL68 JW
00110     $COMOLE(2), DMMSF (2,4)          , DNMSF (2,4)          , DNMSFB(2,4)JUL68 JW
00110     $          , DPBV  (2), DPBVDB(2), DTB   (2), DTBDB (2), DTP   (2), JUL68 JW
00110     $DTPDB (2), DTPR  (2), DTPRDB(2), DTSF  (2), DTSFDB(2), DTSFR (2), JUL68 JW
00110     $DTSFRB(2), DVB   (2), DVBDB (2), DVF   (2), DVFDB (2), DVSF  (2), JUL68 JW
00110     $DVSFDB(2), DXE   (2), DXEDB (2), ELLELL(2), ENIF  (2), FREDEV(2,4)JUL68 JW
00110     $          , GAMM  (2), LDB   (2), LSDB  (2), MGTBER(2), PC    (2), JUL68 JW
00110     $PCDB  (2), PHIF  (2), RATIO (2,8)          , RNM   (2), SNVOP (2), JUL68 JW
00110     $SNVOPB(2), SR    (2), SRDB  (2), SRCBM (2), STDB  (2), T     (2), JUL68 JW
00110     $XI    (2)                                                         JUL68 JW
00111      COMMON /INTERM/ DUMMYI(54)                                        JUL68 JW
00112      COMMON /ANSCOM/       BER   (2), MGBE  (2), MGC   (2), MGKE  (2), JUL68 CA
00112     $MGP   (2), MGTE  (2), MGTO  (2), MGTPR (2), MGTSB (2), MGTSFR(2), JUL68 CA
00112     $MGVE  (2), MGVO  (2), MGVOF (2), MGVSF (2), MLBV  (2), MLCVBS(2), JUL68 CA
00112     $MLDC  (2), MLDK  (2), MLDPHT(2), MLDPLT(2), MLDPRN(2), MLDPV (2), JUL68 CA
00112     $MLDVLT(2), MLEVA (2,8)          , MLPLB (2), MLUC  (2), MLUPT (2), JUL68 CA
00112     $MLUPV (2), NOISEF(2), PCDBM (2), PHIFDB(2), SNBD  (2,4)          , JUL68 CA
00112     $SNBDDB(2,4)          , SNBE  (2), SNBEDB(2), SNC   (2), SNCDB (2), JUL68 CA
00112     $SNESB (2,8)          , SNESBB(2,8)          , SNHSB (2), SNHSBB(2), JUL68 CA
00112     $SNIF  (2), SNIFDB(2), SNKE  (2), SNKEDB(2), SNMM  (2,4)          , JUL68 CA
00112     $SNMMDB(2,4)          , SNMSF (2,4)          , SNMSFB(2,4)          , JUL68 CA
00112     $SNP   (2), SNPDB (2), SNPBV (2), SNPBVB(2), SNTE  (2), SNTEDB(2), JUL68 JW
00112     $SNTFR (2), SNTFRB(2), SNTO  (2), SNTODB(2), SNTP  (2), SNTPDB(2), JUL68 JW
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00112        $SNTPR (2), SNTPRB(2), SNTSB  (2), SNTSBB(2), SNTSF (2), SNTSFB(2), JUL68 JW
00112        $SNVE  (2), SNVEDB(2), SNVO   (2), SNVODB(2), SNVOF (2), SNVOFB(2), JUL68 JW
00112        $SNVSF (2), SNVSFB(2), SNXE   (2), SNXEDB(2)                         JUL68 JW
00113         COMMON /ANSCOM/ DUMMYA(68)                                          JUL68 JW
00114         COMMON      /NUMBER/   ZERO,      FIFTH,     QUARTR,    HALF,
00114        2            ONE,       TWO,       THREE,     FOUR,      FIVE,
00114        3            SIX,       SEVEN,     EIGHT,     FNINE,     TEN,
00114        4            TWENTY,    FIFTY,     HUNDRD,    THSAND,    FMIYUN,
00114        5            I1,        I2,        I3,        I4,        I5,
00114        6            I6,        I7,        I8,        I9,        I10,
00114        7            I20,       I50,       I100
00115         COMMON      /BJSCOM/   BJ(3,2,3), BJEET(3),  BJGAM(3),  BJXI(3)   ,
00115        2            BJPE(2,2), BJPH(2,2), BJPK(2,2)
00116         COMMON      /BJSCOM/   BJEVA(2,2,8)                                 03/06/CA
00117         COMMON /AE/ IE, LCCEM, NEM, NEMAX                                   03/06/CA
00120         DIMENSION RHO(2), SNPBVP(2), SNTOP(2), SNTPP(2), SNTSFP(2),         APR68 CA
00120        $ SNVOFP(2), SNVSFP(2), THETUL(2)                                    APR68 CA
00121         EQUIVALENCE (RHO(1), RHOV(1)), (THETUL(1), PP(1))                   APR68 CA
00122         DO 1 J = 1, NUMEQS
00125         KALGO = IABS(IDEQS(J))
00126         GO TO ( 10,  20,  30,  40,  50,  60,  7C,  80,  90, 100,
00126        $       110, 120, 130, 140, 150, 160, 17C, 180, 190, 200,
00126        $       210, 220, 230, 240, 25C, 260, 270, 280, 290, 300,
00126        $       310, 320, 330, 340, 350, 360, 370, 380, 390, 400,
00126        $       410, 420, 430, 440, 45C, 460, 470, 480, 490, 500), KALGO
00126   C****************************************
00127      10 CONTINUE
00127   C
00130         LSDB(N)    = 37.8 + TWENTY*ALOG10(FMC(N)*RNM(N))
00131         LDB(N)     = -GR(N) - GT(N) +LSCB(N)+ LC(N) + GAMMA(N)
00132         STDB(N)    = TEN * ALOG10(ST(N))
00133         SRDB(N)    =STDB(N)- LDB(N)
00134         SRDBM(N)=SRDB(N)+ 30.
00135         SR(N) = 10.0**(SRDB(N)/10.0)
00135   C
00135   C****************************************
00136         GO TO 1
00137      20 CONTINUE
00137   C
00140         MLUC(N) = (BJ(1,N,1) * BJ(1,N,2) * CCS(THETUL(N)))**2               JUL68 CA
00141         PC(N) = SP(N) * MLUC(N) * COS(PHIC(N))**2                            JUL68 CA
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00142     93*         PCDB(N) = TEN * ALOG10(PC(N))
00143     94*         PCDBM(N) = PCDB(N) + 30.
00143     95*    C
00143     96*    C****************************************
00144     97*          GO TO 1
00145     98*       30 CONTINUE
00145     99*    C
00146    100*          ORDER   = I2
00147    101*          CALL BJPRCS (ORDER, GAMM(N), BJGAM)
00150    102*          CALL BJPRCS (ORDER, BET (N), BJBET)
00151    103*          CALL BJPRCS (ORDER, XI  (N), BJXI )
00152    104*          MLDC(N) = (BJ(1,N,1) * BJ(1,N,2) * BJ(1,N,3) * BJGAM(1) * BJBET(1)JUL68 CA
00152    105*         $ * BJXI(1) * COS(ALPHA(N)))**2                                     JUL68 CA
00153    106*          PC(N) = SR(N) * MLDC(N) * COS(PHIO(N))**2                           JUL68 CA
00154    107*          PCDB(N) = TEN * ALOG10(PC(N))
00155    108*          PCDBM(N)= PCDB(N) + 30.
00155    109*    C
00155    110*    C****************************************
00156    111*          GO TO 1
00157    112*       40 CONTINUE
00157    113*    C
00160    114*          JBFLAG   = 1
00161    115*          CALL BJPRCS (JBFLAG, PE(N), BJPE(1,N))
00162    116*          CALL BJPRCS (JBFLAG, PH(N), BJPH(1,N))
00163    117*          MLCVBS(N) = (BJ(1,N,2) * BJPH(1,N) * BJPE(1,N)**NEMU(N) * COS(PRE JUL68 CA
00163    118*         $(N)/RHO(N)))**2
00164    119*          PC(N) = SR(N) * MLCVBS(N) * COS(PHIC(N))**2
00165    120*          PCDB(N)  = TEN * ALOG10(PC(N))
00166    121*          PCDBM(N) = PCDB(N) + THREE * TEN
00166    122*    C
00166    123*    C****************************************
00167    124*          GO TO 1
00170    125*       50 CONTINUE
00171    126*          SNC(N)    = PC(N)     /(PHIF(N)  * PC(N))
00172    127*          SNCDB(N)  = TEN * ALOG10(SNC(N))
00173    128*          MGC(N)    = SNCDB(N)  - RC(N)
00173    129*    C
00173    130*    C****************************************
00174    131*          GO TO 1
00175    132*       60 CONTINUE
00175    133*    C
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00176          NOISEF(N) = A(N) / 290.0                                           JUL68 CA
00177          T(N)      = A(N) + B(N)*PC(N)
00200          PHIF(N)   = K(N)*T(N)
00201          PHIFDB(N) = TEN*ALOG10(PHIF(N))
00201    C
00201    C****************************************
00202          GO TO 1
00203       70 CONTINUE
00203    C
00204          SNIF(N)   = SR(N) / (PHIF(N)*BIF(N))
00205          SNIFDB(N) = TEN*ALOG10(SNIF(N))
00205    C
00205    C****************************************
00206          GO TO 1
00207       80 CONTINUE
00207    C
00210          ELLELL(N) = ONE
00211          PI        = 3.1415927
00212          IF (SNIF(N).LE..035)ELLELL(N) = PI/FOUR
00214          IF (SNIF(N).LT..35.AND.SNIF(N).GT..C35) ELLELL(N) = 0.679*SNIF(N) -
00214         2 + 0.76
00214    C
00214    C****************************************
00216          GO TO 1
00217       90 CONTINUE
00217    C
00220          SNIFP     = SNIF(2) * ELLELL(2)
00221          ENIF(1)=TRC(1) *(SNIFP/(ONE+SNIFP))**HALF
00222          BET(1)    = TWO*ENIF(1)* BJ(1,2,1)*BJ(2,2,2) * COS(THETUL(2))
00223          GAMM(1)   = TWO*ENIF(1)* BJ(2,2,1) * BJ(1,2,2) * COS(THETUL(2))
00224          ALPHA(1)  =ENIF(1)*BJ(1,2,1) * BJ(1,2,2) * SIN(THETUL(2))
00225          XI(1)     =ENIF(1)*SQRT(TWO * BR/(SNIFP * BIF(2)))
00225    C
00225    C****************************************
00226          GO TO 1
00227      100 CONTINUE
00227    C
00230          ACURAC     = .0005
00231          MLDPRN(N) = (BJ(1,N,1) * BJ(1,N,2) * BJGAM(1) * BJBET(1) * BJXI(1)JUL68 CA
00231         $ * SIN(ALPHA(N)))**2                                               JUL68 CA
00232          SNP(N) = SR(N) * MLDPRN(N) * ELLELL(N) * COS(PHIO(N))**2           JUL68 CA
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00232          3              /(PHIF(N) * BPK(N))
00233           SNPDB(N)   = TEN * ALOG10(SNP(N))
00234           MGP(N)     = SNPDB(N) - RPK(N)
00234     C
00234     C****************************************
00235           GO TO 1
00236       110 CONTINUE
00236     C
00237           MLUPT(N) = 2.0 * (BJ(2,N,2) * BJ(1,N,1) * COS(THETUL(N)))**2      JUL68 CA
00240           SNTE(N) = SR(N) * MLUPT(N) * ELLELL(N) * COS(PHIO(N))**2 /(BTE(N) JUL68 CA
00240          $* (PHIF(N) + 5.0E-07 * SR(N) *                                    JUL68 CA
00240          3 ELLELL(N) * (BJ(1,N,1) * BJ(1,N,2) * SIN(THETUL(N)))**TWO))
00241           SNTEDB(N) = TEN*ALOG10(SNTE(N))
00242           MGTE  (N) = SNTEDB(N) - RTE(N)
00243            MGTBER(N) = MGTE  (N)
00243     C
00243     C****************************************
00244           GO TO 1
00245       120 CONTINUE
00245     C
00246           SNTOP(N) = THREE *RHOT(N)**TWC*DFKT(N)*      (FTS(N) / BTO(N))**TWO
00246          2          * BTE(N) /    BTO(N) *    SNTE(N)
00247           DTB(N)    = SQRT(THREE)*DFKT(N)*  (BTE(N) /  BTO(N))**TWO * SNTE(N)
00247          2          * (ONE - ERF(SQRT(SNTE(N)))) + ONE
00250           DTBDB(N) = TEN * ALOG10(DTB(N))
00251           SNTO(N)   = SNTOP(N) / DTB(N)
00252           SNTODB(N)= TEN * ALOG10(SNTO(N))
00253           MGTO(N)   = SNTODB(N) - RTO(N)
00254            MGTBER(N) = MGTO  (N)
00254     C                                                                   11/13/GG
00254     C****************************************                           11/13/GG
00255           GO TO 1
00256       130 CONTINUE
00256     C
00257           NO      = I2
00260           CALL BJPRCS(NO,GAMM(N),BJGAM)
00261           CALL BJPRCS(NO,BET (N),BJBET)
00262           CALL BJPRCS(NO,XI   (N),BJXI )
00263           MLDPHT(N) = 2.0 * (BJ(2,N,2) * BJ(1,N,1) * BJGAM(1) * BJBET(1) *  JUL68 CA
00263          $BJXI(1) * COS(ALPHA(N)))**2                                       JUL68 CA
00264           SNTE(N) = SR(N) * MLDPHT(N) * ELLELL(N) * COS(PHIO(N))**2         JUL68 CA
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```
00264          3           /(BTE(N) * PHIF(N) +  SR(N) *(BJ(2,N,2) * BJ(1,N,1) *
00264         $BJXI(1) * COS(ALPHA(N)))**2* ((BJGAM(2) * BJBET(2))**          JUL68 CA
00264          5            TWO + BJBET(3)**TWC * BJGAM(3)**TWO))
00265          SNTEDB(N) = TEN*ALOG10(SNTE(N))
00266          MGTE(N)   = SNTEDB(N) - RTE(N)
00267           MGTBER(N) = MGTE  (N)
00267      C
00267      C****************************************
00270          GO TO 1
00271    140 CONTINUE
00271      C
00272          JBFLAG = 1
00273          CALL BJPRCS (JBFLAG, GAMM  (N), BJGAM (1))
00274          CALL BJPRCS (JBFLAG, XI    (N), BJXI  (1))
00275          CALL BJPRCS (JBFLAG, BET(N),     BJBET (1))
00276          MLDPLT(N) = 2.0 * (BJ(2,N,2) * BJ(1,N,1) * BJBET(1) * BJXI(1) *   JUL68 CA
00276         $BJGAM(1) * COS(ALPHA(N)))**2                                      JUL68 CA
00277          SNTE(N) = SR(N) * MLDPLT(N) * ELLELL(N) * COS(PHIO(N))**2         JUL68 CA
00277         3           /(BTE(N) * PHIF(N))
00300          SNTEDB(N)= TEN * ALOG10(SNTE(N))
00301          MGTE(N)  = SNTEDB(N) - RTE(N)
00302           MGTBER(N) = MGTE  (N)
00302      C
00302      C****************************************
00303          GO TO 1
00304    150 CONTINUE
00304      C
00305          SNTSFP(N) = HALF * (FTF(N)/CTSF(N))**TWC *BIF(N)/ BTEF(N) *SNIF(N)
00305         2           * ELLELL(N) * DFKT(N)                                11/13/GG
00306          DTSF(N) = BWTSF(N)*BIF(N)/(1.732050E * CTSF(N)**2) * SNIF(N)     JUL68 CA
00306         2           * DFKT(N) * ELLELL(N) * (ONE - ERF(SQRT(SNIF(N)*      11/13/GG
00306         3           ELLELL(N)))) + ONE                                  11/13/GG
00307          DTSFDB(N) = TEN * ALOG10(DTSF(N))
00310          SNTSF(N)  = SNTSFP(N)/DTSF(N)
00311          SNTSFB(N) = TEN * ALOG10(SNTSF(N))
00311      C
00311      C****************************************
00312          GO TO 1
00313    160 CONTINUE
00313      C
00314          SNTSFP(N) = HALF * ELLELL(N) * DFKT(N) * (FTF(N)/CTSF(N))**TWO *  11/13/GG
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00314    257*        2             BIF(N)/BTEF(N) * SNIF(N)                         11/13/GG
00315    258*         D = 0.0                                                       12/04/GG
00316    259*         C = -(0.434 * SNIF(N) * ELLELL(N)  +  0.788)                  12/04/GG
00317    260*         IF (ABS(C) .LT. 38.0)   D = TEN**C                            12/04/GG
00321    261*         DTSFR(N) = 4.0*DFKT(N)*ELLELL(N)*BWTSF(N)*BIF(N)*SNIF(N)/CTSF(N)**JUL68 CA
00321    262*        2             TWO * D   +  ONE                                 12/04/GG
00322    263*         DTSFRB(N) = TEN * ALOG10(DTSFR(N))                            11/13/GG
00323    264*         SNTFR(N)  = SNTSFP(N)/DTSFR(N)                                11/13/GG
00324    265*         SNTFRB(N) = TEN * ALOG10(SNTFR(N))                            11/13/GG
00325    266*         MGTSFR(N) = SNTFRB(N) - RTSFR(N)                              11/13/GG
00326    267*         MGTBER(N) = MGTSFR(N)                                         11/13/GG
00326    268*    C
00326    269*    C****************************************
00327    270*         GO TO 1
00330    271*      170 CONTINUE
00330    272*    C
00331    273*         JBFLAG    = 1
00332    274*         CALL BJPRCS (JBFLAG,  PE (N),    BJPE(1,N))
00333    275*         CALL BJPRCS (JBFLAG,  PH (N),    BJPH(1,N))
00334    276*         MLDVLT(N) = 2.0 * (BJ(2,N,2) * BJPE(1,N)**NEMU(N) * BJPH(1,N) *   JUL68 CA
00334    277*        $COS(PBE(N)/RHO(N)))**2                                        JUL68 CA
00335    278*         SNTSB(N) = SR(N) * MLDVLT(N) * ELLELL(N) * COS(PHIO(N))**2    JUL68 CA
00335    279*        3            /(BTE(N) * PHIF(N))
00336    280*         SNTSBB(N) = TEN * ALOG10(SNTSB(N))
00337    281*         MGTSB(N) = SNTSBB(N) - RTSB(N)
00340    282*          MGTBER(N) = MGTSB (N)
00340    283*    C
00340    284*    C****************************************
00341    285*         GO TO 1
00342    286*      180 CONTINUE
00342    287*    C
00343    288*         SNTPP(N)   = THREE*RHOTP(N)**TWC*DFKTP(N)*(FTP(N)/BTPO(N))**TWO *  11/13/GG
00343    289*        2             BTPE(N)/BTPO(N)*SNIF(N)                           11/13/GG
00344    290*         DTP(N)=SQRT(THREE)*BLTP(N)*BTPE(N)*DFKTP(N)*SNIF(N)/BTPO(N)**TWO  11/16/GG
00344    291*        2             * (ONE - ERF(SQRT(SNIF(N)))) + ONE               11/13/GG
00345    292*         DTPDB(N)  = TEN * ALOG10(DTP(N))                              11/13/GG
00346    293*         SNTP(N)   = SNTPP(N)/DTP(N)                                   11/13/GG
00347    294*         SNTPDB(N) = TEN * ALOG10(SNTP(N))                             11/13/GG
00347    295*    C                                                                  11/13/GG
00347    296*    C****************************************                          11/13/GG
00350    297*         GO TO 1
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00351      190 CONTINUE
00351    C
00352          SNTPP(N)   = THREE*RHOTP(N)**TWO*DEKTP(N)*(FTP(N)/BTPO(N))**TWO *  11/13/GG
00352        2              BTPE(N)/BTPO(N) * SNIF(N)                              11/13/GG
00353          D = 0.0                                                             12/04/GG
00354          C = -(0.434 * SNIF(N)  + 0.798)                                     12/04/GG
00355          IF (ABS(C) .LT. 38.0)  D = TEN**C                                   12/04/GG
00357          DTPR(N)    = 12. *DEKTP(N)*BLTP(N)*BTPE(N)*SNIF(N)/BTPO(N)**TWO *  11/13/GG
00357        2              D  +  ONE                                              12/04/GG
00360          DTPRDB(N) = TEN * ALOG10(DTPR(N))                                   11/13/GG
00361          SNTPR(N)  = SNTPP(N) / DTPR(N)                                      11/13/GG
00362          SNTPRB(N) = TEN * ALOG10(SNTPR(N))                                  11/13/GG
00363          MGTPR(N)  = SNTPRB(N) - RTPR(N)                                     11/27/GG
00364          MGTBER(N) = MGTPR(N)                                                11/13/GG
00364    C                                                                         03/06/CA
00364    C****************************************                                 03/06/CA
00365          GO TO 1
00366      200 CONTINUE
00366    C
00367           IF (MGTBER(N).LT.-5..OR.MGTBER(N).GT.ONE) GO TO 271
00371          SNRDB     =MGTBER(N) + 10.779018                                    11/13/GG
00372          SNR       = TEN ** (SNRDB   /TEN)
00373           BER(N)   = HALF * (ONE - ERF(SQRT(SNR)))
00374          GO TO 1
00375      271 CONTINUE
00376          BER (N) = .00995
00377          IF (MGTBER(N) .GT. 1.)       BER(N) = 1.E-8                         01/11/GG
00377    C
00377    C****************************************
00401          GO TO 1
00402      210 CONTINUE
00402    C
00403          MLUPV(N) = 2.0 * (BJ(2,N,1) * BJ(1,N,2) * COS(THETUL(N)))**2       JUL68 CA
00404          SNVE(N) = SR(N) * MLUPV(N) * ELLELL(N) * COS(PHIO(N))**2 * 0.5     JUL68 CA
00404        3              /(BVE(N) * (PHIF(N)/TWO +  SR(N)/TEN**SIX * ELLELL(N) *
00404        4              (BJ(1,N,1) * BJ(1,N,2) * SIN(THETUL(N)))**TWO))
00405          SNVEDB(N)= TEN*ALOG10(SNVE(N))
00406          MGVE(N)  = SNVEDB(N) - RVE(N)
00406    C
00406    C****************************************
00407          GO TO 1
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00410      220 CONTINUE
00410     C
00411           SNVOP(N) = THREE * RHO(N)**TWC*DFK(N) *      (FVS(N) / BVO(N))**TWO
00411          2           * BVE(N) /   BVO(N) *    SNVE(N)
00412           SNVOPB(N)=10 * ALOG10(SNVOP(N))                                    JUL68 JW
00413           DVB(N)    = SQRT(THREE)*DFK(N) *  (BVE(N) /  BVO(N))**TWO * SNVE(N)
00413          2           * (ONE - ERF(SQRT(SNVE(N)))) + ONE
00414           DVBDB(N) = TEN * ALOG10(DVB(N))
00415           SNVO(N)   = SNVOP(N) / DVB(N)
00416           SNVODB(N)= TEN * ALOG10(SNVO(N))
00417           MGVO(N)   = SNVODB(N) - RVO(N)
00417     C
00417     C****************************************
00420           GO TO 1
00421      230 CONTINUE
00421     C
00422           ORDER  = I2
00423           CALL BJPRCS (ORDER, GAMM(N), BJGAM)
00424           CALL BJPRCS (ORDER, BET (N), BJBET)
00425           CALL BJPRCS (ORDER, XI  (N), BJXI )
00426           MLDPV(N) = 2.0 * (BJ(2,N,1) * BJ(1,N,2) * BJGAM(1) * BJBET(1) *    JUL68 CA
00426          $BJXI(1) * COS(ALPHA(N)))**2                                         JUL68 CA
00427           SNVE(N)  = SR(N) * MLDPV(N) * ELLELL(N) * (                        JUL68 CA
00427          3           COS(PHIO(N)))**TWO
00427          4           /(BVE(N) * PHIF(N))
00430            SNVSF(N)= SNVE(N)
00431           SNVEDB(N)= TEN * ALOG10(SNVE(N))
00432           MGVE(N)   = SNVEDB(N) - RVE(N)
00432     C
00432     C****************************************
00433           GO TO 1
00434      240 CONTINUE
00434     C
00435           SNVSFP(N) = HALF * (FVF(N)/CVSF(N))**TWC* BIF(N)/ BVEF(N)*SNIF(N)
00435          2            * ELLELL(N) * DFK(N)                                  11/13/GG
00436           DVSF(N) = BWVSF(N)*BIF(N)*DFK(N)*SNIF(N)*ELLELL(N)*(1.0 - ERF      JUL68 CA
00436          2            (SQRT(SNIF(N) * ELLELL(N)))) / (SQRT(THREE) * CVSF(N) 11/13/GG
00436          3            **TWO) + ONE                                           11/13/GG
00437           DVSFDB(N) = TEN * ALOG10(DVSF(N))
00440           SNVSF(N) = SNVSFP(N)/ DVSF(N)
00441           SNVSFB(N) = TEN * ALOG10(SNVSF(N))
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```
00442         MGVSF(N)   = SNVSFP(N) - RVSF(N)
00442   C
00442   C****************************************
00443         GO TO 1
00444     250 CONTINUE
00444   C
00445         SNVOFP(N) = THREE * RHO(N)**TWO *(FVSF(N)/BVOF(N))**TWO * BVEF(N)
00445        2             /BVOF(N) * SNVSF(N) * DFK(N)                            11/13/GG
00446         DVF(N)     = SQRT(THREE) * BLF(N) * EVEF(N) /BVOF(N)**TWO *SNVSF(N)
00446        2             * DFK(N) * (ONE - ERF(SQRT(SNVSF(N))))  + ONE           11/13/GG
00447         DVFDB(N)   = TEN * ALOG10(DVF(N))
00450         SNVOF(N)   = SNVOFP(N)/DVF(N)
00451         SNVOFB(N)  = TEN * ALOG10(SNVOF(N))
00452         MGVOF(N)   = SNVOFB(N) - RVOF(N)
00453         MGVO (N)   = SNVOFB(N) - RVO (N)
00453   C
00453   C****************************************
00454         GO TO 1
00455     260 CONTINUE
00455   C
00456         JBFLAG     = 1
00457         CALL BJPRCS (JBFLAG,  PE (N),     BJPE(1,N))
00460         CALL BJPRCS (JBFLAG,  PH (N),     BJPH(1,N))
00461         MLBV(N) = (BJ(1,N,2) * BJPE(1,N)**NEMU(N) * BJPH(1,N) * SIN(PBE(N)JUL68 CA
00461        $/RHOV(N)))**2                                                        JUL68 CA
00462         SNBE(N) = SR(N) * MLBV(N) * CCS(PHIC(N))**2                          JUL68 CA
00462        3            /(BBE(N) * PHIF(N))
00463         SNBEDB(N) = TEN * ALOG10(SNBE(N))
00464         MGBE(N)   = SNBEDB(N) - RBE(N)
00464   C
00464   C****************************************
00465         GO TO 1
00466     270 CONTINUE
00466   C
00467         SNPBVP(N) = THREE * DFKPBV(N) * RHOFPV(N)**TWO * (FPBV(N)/BPBVO(N))11/13/GG
00467        2             )**TWO * (BPBVE(N)/BPBVC(N)) * SNIF(N)                 11/13/GG
00470         DPBV(N)    = SQRT(THREE)*BLPBV(N)*PPBVE(N)*SNIF(N) / BPBVO(N)**TWO 11/13/GG
00470        2             * DFKPBV(N) * (ONE - ERF(SQRT(SNIF(N)))) + ONE         11/16/GG
00471         DPBVDB(N) = TEN * ALOG10(DPBV(N))                                    11/13/GG
00472         SNPBV(N)   = SNPBVP(N) / DPBV(N)                                     11/13/GG
00473         SNPBVB(N) = TEN * ALOG10(SNPBV(N))                                   11/13,GG
```

```
00473   C
00473   C*****************************************
00474         GO TO 1
00475     280 CONTINUE
00475   C
00476         JBFLAG    = 1
00477         CALL BJPRCS (JBFLAG,  PK (N),    BJPK(1,N))
00500         MLDK(N) = 2.0 * BJPK(2,N)**2                                 JUL68 CA
00501         SNKE(N) = SR(N) * MLDK(N) * ELLELL(N) * (                    JUL68 CA
00501        2            COS(PHIO(N)))**TWO
00501        3            /(PHIF(N) * BKE(N))
00502         SNKEDB(N) = TEN * ALOG10(SNKE(N))
00503         MGKE(N)  = SNKEDB(N) - BKE(N)
00503   C
00503   C*****************************************
00504         GO TO 1
00505     290 CONTINUE
00505   C
00506         SNTPP(N)  = THREE*RHOX(N)**TWO * (FXF(N)/BXE(N))**TWO*BIF(N)/      11/13/GG
00506        2            BXE(N) * SNIF(N) * DFKX(N)                          11/13/GG
00507         DXE(N)    = SQRT(THREE)*BLX(N)*BIF(N)*DFKX(N)*SNIF(N)/BXE(N)**TWO*11/29/GG
00507        2            (ONE - ERF(SQRT(SNIF(N)))) + ONE                    11/13/GG
00510         DXEDB(N)  = TEN * ALOG10(DXE(N))                                11/13/GG
00511         SNXE(N)   = SNTPP(N) / DXE(N)                                   11/16/GG
00512         SNXEDB(N) = TEN*ALOG10(SNXE(N))
00512   C
00512   C*****************************************
00513         GO TO 1
00514     300 CONTINUE
00514   C                                                                     03/06/CA
00515         LIMIT = NEMU(N)                                                 03/06/CA
00516         SUM = ZERO                                                      03/06/CA
00517         DO 3401 I = 1, LIMIT                                            03/06/CA
00522         RATIO(N,I) = MODLEV(N,I)/MODLEV(N,1)                            03/06/CA
00523    3401 SUM = SUM + RATIO(N,I)**TWO                                     03/06/CA
00525         COMOLE(N) = SQRT(SEVEN) /(SQRT(SUM) * (ONE + ONE/SQRT(TEN**(SNRCOM03/06/CA
00525        $(N)/TEN))))                                                     03/06/CA
00526         DO 3402 I = 1, LIMIT                                            JUL68 CA
00531         CONST1 = RATIO(N,I) * COMOLE(N)                                 JUL68 CA
00532         BETEVA(N,I) = CONST1 * PDEV(N)                                  JUL68 CA
00533    3402 IF(I .LE. 4) FREDEV(N,I) = CONST1 * (TAPERA(N) + TAPERB(N) * CMSF JUL68 CA
```

```
00533         $(N,I))                                                    JUL68 CA
00533   C                                                                03/06/CA
00533   C****************************************                        JUL68 CA
00536         GO TO 1
00537     310 CONTINUE
00537   C                                                                03/06/CA
00540         LIMIT = NEMU(N)                                            03/06/CA
00541         CONST1 = HALF * RVEF(N) * SNVSF(N) * DEK(N)                03/06/CA
00542         CONST3 =          (RVEF(N) * DEK(N) * SNVSF(N) * (ONE - ERF(SQRT( 03/06/CA
00542        $SNVSF(N))))) / SQRT(THREE)                                 03/06/CA
00543         DO 2501 I = 1, LIMIT                                       03/06/CA
00546         SNTPP(N) = (CONST1 * (FREDEV(N,I)/CMSF(N,I))**TWO)/BMSF(N,I)  03/06/CA
00547         DNMSF(N,I) = CONST3 * BLM(N,I) / CMSF(N,I)**2 + 1.0       JUL68 CA
00550         DNMSFB(N,I) = 10 * ALOG10(DNMSF(N,I))                     JUL68 JW
00551         SNMSF(N,I) = SNTPP(N) / DNMSF(N,I)                         03/06/CA
00552    2501 SNMSFB(N,I) = TEN * ALOG10(SNMSF(N,I))                     03/06/CA
00552   C
00552   C****************************************
00554         GO TO 1
00555     320 CONTINUE
00555   C                                                                03/06/CA
00556         LIMIT = NEMU(N)                                            03/06/CA
00557         CONST1 = HALF * RVEF(N) * SNVSF(N) * DEK(N)                03/06/CA
00560         IF(SNVSF(N) .LE. 85) GO TO 3302                            03/06/CA
00562         CONST2 = 0.0                                               03/06/CA
00563         GO TO 3303                                                 03/06/CA
00564    3302 CONST2 = FOUR * DEK(N)          * RVEF(N) * SNVSF(N) / TEN**(0.434JUL68 CA
00564        $ * SNVSF(N) + 0.788)                                       03/06/CA
00565    3303 DO 3301 I=1,LIMIT                                          03/06/CA
00570         SNTPP(N) = (CONST1 * (FREDEV(N,I)/CMSF(N,I))**TWO)/BMSF(N,I)  03/06/CA
00571         DMMSF(N,I) = CONST2 * BLM(N,I) / CMSF(N,I)**2 + 1.0       JUL68 CA
00572         SNMM(N,I) = SNTPP(N) / DMMSF(N,I)                          03/06/CA
00573    3301 SNMMDB(N,I) = TEN*ALOG10(SNMM(N,I))                        03/06/CA
00573   C                                                                03/06/CA
00573   C****************************************                        03/06/CA
00575         GO TO 1
00576     330 CONTINUE
00576   C                                                                03/06/CA
00577         LIMIT = NEMU(N)                                            03/06/CA
00600         PRODUT = ONE                                               03/06/CA
00601         DO 1901 I = 1, LIMIT                                       03/06/CA
```

```
      CALL BJPRCS(1, BETEVA(N,I), BJEVA(1,N,I))                          03/06/CA
 1901 PRODUT = PRODUT * BJEVA(1,N,I)**TWO                                03/06/CA
      CONST1 = 2.0 * PRODUT * (BJ(1,N,2) * COS(PRE(N)/RHO(N)))**2        JUL68 CA
      CONST2 = SR(N) * ELLELL(N) * COS(PHIC(N))**2 / PHIF(N)             JUL68 CA
      DO 1902 I = 1, LIMIT                                               03/06/CA
      MLEVA(N,I) = CONST1 * BJEVA(2,N,I)**2                              JUL68 CA
      SNESB(N,I) = CONST2 * MLEVA(N,I) / (BJEVA(1,N,I)**2 * BEE(N,I))    JUL68 CA
 1902 SNESBB(N,I) = TEN * ALOG10(SNESB(N,I))                             03/06/CA
C
C****************************************
      GO TO 1
  340 CONTINUE
C                                                                        JUL68 CA
      LIMIT = NEMU(N)                                                    JUL68 CA
      CONST1 = 3.0 * KB(N)                                               JUL68 CA
      CONST2 = 1.7320508 * KB(N)                                         JUL68 CA
      DO 3501 I = 1, LIMIT                                               JUL68 CA
      SNBD(N,I) = CONST1 * (RHOB(N,I) * DELFB (N,I))**2 * BMSF(N,I) *    JUL68 CA
     $           SNMSF(N,I) /(CONST2 * BD(N,I) * BMSF(N,I) * BB(N,I) *   JUL68 CA
     $           SNMSF(N,I) * (1.0 - ERF(SQRT(SNMSF(N,I)))) + BB(N,I)**3JUL68 CA
     $           )                                                       JUL68 CA
 3501 SNBDDB(N,I) = 10.0 * ALOG10(SNBD(N,I))                             JUL68 CA
C                                                                        JUL68 CA
      GO TO 1
  350 CONTINUE
C
      JBFLAG    = 1
      CALL BJPRCS (JBFLAG,  PE (N),     BJPE(1,N))
      CALL BJPRCS (JBFLAG,  PH (N),     BJPH(1,N))
      MLHLB(N) = 2.0 * (BJ(1,N,2) * BJPH(2,N) * BJPE(1,N)**NEMU(N) *     JUL68 CA
     $COS(PRE(N)/RHO(N)))**2                                             JUL68 CA
      SNHSB(N) = SR(N) * MLHLB(N) * ELLELL(N) * COS(PHIO(N))**2          JUL68 CA
     4          /(BHE(N) * PHIF(N))
      SNHSBB(N) = TEN * ALOG10(SNHSB(N))
C
C****************************************
      GO TO 1
  360 CONTINUE
      GO TO 1
  370 CONTINUE
      GO TO 1
```

```
  380 CONTINUE
      GO TO 1
  390 CONTINUE
      GO TO 1
  400 CONTINUE
      GO TO 1
  410 CONTINUE
      GO TO 1
  420 CONTINUE
      GO TO 1
  430 CONTINUE
      GO TO 1
  440 CONTINUE
      GO TO 1
  450 CONTINUE
      GO TO 1
  460 CONTINUE
      GO TO 1
  470 CONTINUE
      GO TO 1
  480 CONTINUE
      GO TO 1
  490 CONTINUE
      GO TO 1
  500 CONTINUE
      GO TO 1
1     CONTINUE
      RETURN
      END
```

END OF UNIVAC 1108 FORTRAN V COMPILATION.   0 *DIAGNOSTIC* MESSAGE(S)

13.6 SUBROUTINE ERMES

```
                SUBROUTINE ERMES                                     DATE  310768  PAGE     1

&  FOR ERMES,ERMES                                                      17&56&49
UNIVAC 1108 FORTRAN V LEVEL   22C6 0018 F5018F
THIS COMPILATION WAS DONE ON 31 JUL 68 AT 17&56&49

   SUBROUTINE ERMES      ENTRY POINT 000033

   STORAGE USED (BLOCK, NAME, LENGTH)

       0001    *CODE     000037
       0000    *DATA     000030
       0002    *BLANK    000000
       0003    AE        000004


   EXTERNAL REFERENCES (BLOCK, NAME)

       0004    NWDU$
       0005    NI01$
       0006    NI02$
       0007    NSTOP$
       0010    NERR3$


   STORAGE ASSIGNMENT FOR VARIABLES (BLOCK, TYPE, RELATIVE LOCATION, NAME)

    0000   00000C 9000F      0003 I 000000 IE        0003 I 000001 LOCEM      0003 I 000002 NEM        0003 I 000003 NEMAX


00101      1*          SUBROUTINE ERMES(ICODE)
00103      2*          COMMON    /AE/       IE,        LOCEM,     NEM,       NEMAX
00104      3*     9000 FORMAT (22H ERROR MESSAGE NUMBER ,I4,31H.  SOURCE OF ERROR AT LOCA
00104      4*         1TION ,I3,17H.  TYPE OF ERROR ,I2,1H.)
00105      5*          NEM        = NEM + 1
00106      6*          WRITE (IE,9000)       NEM,       LOCEM,     ICODE
00113      7*          IF (NEM.EQ.NEMAX) STOP
00115      8*          RETURN
```

```
00116      9*          END
      END OF UNIVAC 1108 FORTRAN V COMPILATION.      0 *DIAGNOSTIC* MESSAGE(S)
```

13.7 SUBROUTINE FACTØR

```
                SUBROUTINE FACTOR                                                 DATE  310768  PAGE     1

& FOR FACTOR,FACTOR                                                                  17&56&50
UNIVAC 1108 FORTRAN V LEVEL   22C6 0018 F5018F
THIS COMPILATION WAS DONE ON 31 JUL 68 AT 17&56&50

   SUBROUTINE FACTOR     ENTRY POINT 000023

   STORAGE USED (BLOCK, NAME, LENGTH)

         0001    *CODE     000033
         0000    *DATA     000015
         0002    *BLANK    000000


   EXTERNAL REFERENCES (BLOCK, NAME)

         0003    NERR3$


   STORAGE ASSIGNMENT FOR VARIABLES (BLOCK, TYPE, RELATIVE LOCATION, NAME)

    0001    000006 105G        000C I 000000 I


00101      1*         SUBROUTINE FACTOR (A      , NOCCSC, FACTER)
00101      2*    C *** THIS SUBROUTINE WILL FACTOR BY THE VALUE OF 'FACTER' ANY NUMBER OF
00101      3*    C     CONSECUTIVE CORE STORAGE CELLS (NOCCSC) STARTING AT ADDRESS A.    03/06/CA
00103      4*         DIMENSION A       (NOCCSC)
00104      5*         DO 100 I=1,NOCCSC
00107      6*          A      (I) = A      (I) * FACTER
00110      7*     100 CONTINUE
00112      8*         RETURN
00113      9*         END

      END OF UNIVAC 1108 FORTRAN V COMPILATION.      0 *DIAGNOSTIC* MESSAGE(S)
```

13.8 SUBROUTINE NUMBER

```
                 SUBROUTINE NUMBER                                                    DATE  310768  PAGE      1

& FOR NUMBER,NUMBER                                                                      17&56&51
UNIVAC 1108 FORTRAN V LEVEL   22C6 0018 F5018F
THIS COMPILATION WAS DONE ON 31 JUL 68 AT 17&56&51

   BLOCK DATA

   STORAGE USED (BLOCK, NAME, LENGTH)

         0003    NUMBER  000040


   STORAGE ASSIGNMENT FOR VARIABLES (BLOCK, TYPE, RELATIVE LOCATION, NAME)

    0003 R 000013 EIGHT       0003 R C00001 FIFTH       00C3 R 000017 FIFTY       0003 R 000010 FIVE        0003 R 000022 FMIYUN
    0003 R 000014 FNINE       0003 R 000007 FOUR        0003 P 000003 HALF        0003 R 000020 HUNDRD      0003 I 000023 I1
    0003 I 000034 I10         0003 I 000037 I100        00C3 I 000024 I2          0003 I 000035 I20         0003 I 000025 I3
    0003 I 000026 I4          0003 I 000027 I5          00C3 I 0C0036 I50         0003 I 000030 I6          0003 I 000031 I7
    0003 I 000032 I8          0003 I 000033 I9          00C3 R 000004 ONE         0003 R 000002 QUARTR      0003 R 000012 SEVEN
    0003 R 000011 SIX         0003 R 000015 TEN         00C3 R 000006 THREE       0003 R 000021 THSAND      0003 R 000016 TWENTY
    0003 R 000005 TWO         0003 R 0C0000 ZERO


00101      1*          BLOCK DATA
00102      2*          COMMON      /NUMBER/   ZERO,      FIFTH,     QUARTR,    HALF,
00102      3*         2            ONE,       TWO,       THREE,     FOUR,      FIVE,
00102      4*         3            SIX,       SEVEN,     EIGHT,     FNINE,     TEN,
00102      5*         4            TWENTY,    FIFTY,     HUNDRD,    THSAND,    FMIYUN,
00102      6*         5            I1,        I2,        I3,        I4,        I5,
00102      7*         6            I6,        I7,        I8,        I9,        I10,
00102      8*         7            I20,       I50,       I1CC
00103      9*          DATA                   ZERO,      FIFTH,     QUARTR,    HALF,
00103     10*         2            ONE,       TWO,       THREE,     FOUR,      FIVE,
00103     11*         3            SIX,       SEVEN,     EIGHT,     FNINE,     TEN,
00103     12*         4            TWENTY,    FIFTY,     HUNDRD,    THSAND,    FMIYUN
00103     13*         5/0., .2, .25, .5, 1., 2., 3., 4.,5., 6., 7., 8., 9., 10., 20., 50.
00103     14*         6, 100., 1000., 1.E6/
00127     15*          DATA        I1,        I2,        I3,        I4,        I5,
```

```
00127    16*        2          I6,        I7,        I8,        I9,        I10,
00127    17*        3          I20,       I50,       I1CC/
00127    18*        41, 2, 3, 4, 5, 6, 7, 8, 9, 10, 20, 50, 100/
00145    19*         END

      END OF UNIVAC 1108 FORTRAN V COMPILATION.      0 *DIAGNOSTIC* MESSAGE(S)
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13.9 SUBROUTINE PREPRØ

```
                 SUBROUTINE PREPRO                                               DATE  310768  PAGE     1

& FOR PREPRO,PREPRO                                                                   17656652
UNIVAC 1108 FORTRAN V LEVEL   22C6 0018 F5018F
THIS COMPILATION WAS DONE ON 31 JUL 68 AT 17656652

   SUBROUTINE PREPRO     ENTRY POINT 000053

   STORAGE USED (BLOCK, NAME, LENGTH)

         0001    *CODE    000060
         0000    *DATA    000015
         0002    *BLANK   000000
         0003    STATIC   000454
         0004    BJSCOM   000107


   EXTERNAL REFERENCES (BLOCK, NAME)

         0005    BJPRCS
         0006    NERR3$


   STORAGE ASSIGNMENT FOR VARIABLES (BLOCK, TYPE, RELATIVE LOCATION, NAME)

    0001     000005 112G       0003 R 000000 A          0003 R 000002 B          0003 R 000004 BB         0003 R 000014 BBE
    0003 R 000016 BC           0003 R 000020 BD         0003 R 000030 BEE        0003 R 000050 BHE        0003 R 000052 BIF
    0004 R 000000 BJ           0004 R 000022 BJBET      0004 R 000047 BJEVA      0004 R 000025 BJGAM      0004 R 000033 BJPE
    0004 R 000037 BJPH         0004 R 000043 BJPK       0004 R 000030 BJXI       0003 R 000054 BKE        0003 R 000056 BLF
    0003 R 000060 BLM          0003 R 000070 BLPBV      0003 R 000072 BLTP       0003 R 000074 BLX        0003 R 000076 BMSF
    0003 R 000106 BPBVE        0003 R 000110 BPBVO      0003 R 000112 BPK        0003 R 000114 BR         0003 R 000116 BTE
    0003 R 000120 BTEF         0003 R 000122 BTO        0003 R 000124 BTPE       0003 R 000126 BTPO       0003 R 000130 BVE
    0003 R 000132 BVEF         0003 R 000134 BVO        0003 R 000136 BVOF       0003 R 000140 BWTSF      0003 R 000142 BWVSF
    0003 R 000144 BXE          0003 R 000146 CMSF       0003 R 000156 CTSF       0003 R 000160 CVSF       0003 R 000162 DELFB
    0003 R 000172 DELNM        0003 R 000174 DELSR      0003 R 000176 DFK        0003 R 000200 DFKPBV     0003 R 000202 DFKT
    0003 R 000204 DFKTP        0003 R 000206 DFKX       0003 R 000404 DUMMYS     0003 R 000210 FMC        0003 R 000212 FPBV
    0003 R 000214 FTF          0003 R 000216 FTP        0003 R 000220 FTS        0003 R 000222 FVF        0003 R 000224 FVS
    0003 R 000226 FVSF         0003 R 000230 FXF        0003 R 000232 GAMMA      0003 R 000234 GR         0003 R 000236 GT
    0003 R 000240 K            0003 I 000242 KB         0003 R 000244 LC         0003 R 000246 MODLEV     0000 I 000001 ND
    0003 R 000266 NEMU         0000 I 000000 NO         0003 R 000270 PBE        0003 R 000272 PDFV       0003 R 000274 PE
```

```
0003 R 000276 PH        0003 R 000300 PHIO      0003 R 000302 PK        0003 R 000304 PP        0003 R 000306 PT
0003 R 000310 PV        0003 R 000312 RBE       0003 R 000314 RC        0003 R 000316 RHOB      0003 R 000326 RHOPBV
0003 R 000330 RHOT      0003 R 000332 RHOTP     0003 R 000334 RHOV      0003 R 000336 RHOX      0003 R 000340 RKE
0003 R 000342 RPK       0003 R 000344 RTE       0003 R 000346 RTO       0003 R 000350 RTPR      0003 R 000352 RTSB
0003 R 000354 RTSFR     0003 R 000356 RVE       0003 R 000360 RVO       0003 R 000362 RVOF      0003 R 000364 RVSF
0003 R 000366 SNRCOM    0003 R 000370 SNRCST    0003 R 000372 SNTRDB    0003 R 000374 ST        0003 R 000376 TAPERA
0003 R 000400 TAPERB    0003 R 000402 TRC
```

```
00101          SUBROUTINE PREPRO
00103          REAL     K      , LC     , NEMU   , MODLEV                          JUL68 CA
00104          COMMON /STATIC/        A      (2), B      (2), BB    (2,4)        , JUL68 JW
00104         $BBE   (2), BC    (2), BD    (2,4)          , BEE   (2,8)        , JUL68 JW
00104         $BHE   (2), BIF   (2), BKE   (2), BLF   (2), BLM (2,4), BLPBV (2), JUL68 JW
00104         $BLTP  (2), BLX   (2), BMSF  (2,4)          , BPBVE (2),           JUL68 JW
00104         $BPBVO (2), BPK   (2), BR    (2), BTE   (2), BTEF  (2), BTO   (2), JUL68 JW
00104         $BTPE  (2), BTPO  (2), BVE   (2), BVEF  (2), BVO   (2), BVOF  (2), JUL68 JW
00104         $BWTSF (2), BWVSF (2), BXE   (2), CMSF  (2,4)          , CTSF  (2), JUL68 JW
00104         $CVSF  (2), DELFB (2,4)          , DELNM (2), DELSR (2), DFK   (2), JUL68 JW
00104         $DFKPBV(2), DFKT  (2), DFKTP (2), DFKX  (2), FMC   (2), FPBV  (2), JUL68 JW
00104         $FTF   (2), FTP   (2), FTS   (2), FVF   (2), FVS   (2), FVSF  (2), JUL68 JW
00104         $FXF   (2), GAMMA (2), GR    (2), GT    (2), K     (2), KB    (2), JUL68 JW
00104         $LC    (2), MODLEV(2,8)          , NEMU  (2), PBE   (2), PDEV  (2), JUL68 JW
00104         $PE    (2), PH    (2), PHIO  (2), PK    (2), PP    (2), PT    (2), JUL68 JW
00104         $PV    (2), RBE   (2), RC    (2), RHOB  (2,4)          , RHOPBV(2), JUL68 JW
00104         $RHOT  (2), RHOTP (2), RHOV  (2), RHOX  (2), RKE   (2), RPK   (2), JUL68 JW
00104         $RTE   (2), RTO   (2), RTPR  (2), RTSB  (2), RTSFR (2), RVE   (2), JUL68 JW
00104         $RVO   (2), RVOF  (2), RVSF  (2), SNRCOM(2), SNRCST(2), SNTRDB(2), JUL68 JW
00104         $ST    (2), TAPERA(2), TAPERB(2), TRC   (2)                        JUL68 JW
00105          COMMON /STATIC/ DUMMYS(40)                                          JUL68 JW
00106          COMMON      /BJSCOM/   BJ(3,2,3), BJBET(3),  BJGAM(3),  BJXI(3)  ,
00106         2            BJPE(2,2), BJPH(2,2), BJPK(2,2)
00107          COMMON      /BJSCOM/   BJEVA(2,2,8)                                 03/06/CA
00107    C
00107    C SET HIGHEST ORDER J-BESSEL FUNCTION DESIRED
00107    C
00110          ND          = 2
00110    C     ND          = 1 MEANS   UPLINK  VALUES
00110    C     ND          = 2 MEANS DOWNLINK  VALUES
```

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                 SUBROUTINE PREPRO                                                              DATE  310768  PAGE      3

00111             DO 100 ND = 1,2
00111         C CALCULATION OF J-BESSEL FUNCTIONS
00114             CALL BJPRCS (ND     , PV     (ND), BJ     (1,ND,1))
00115             CALL BJPRCS (ND     , PT     (ND), BJ     (1,ND,2))
00116             CALL BJPRCS (ND     , PK     (ND), BJ     (1,ND,3))
00117         100 CONTINUE
00121         900 RETURN
00122             END

        END OF UNIVAC 1108 FORTRAN V COMPILATION.      0 *DIAGNOSTIC* MESSAGE(S)
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13.10 SUBROUTINE REPØRT

```
                    SUBROUTINE REPORT                                   DATE  060868  PAGE      1

& FOR REPORT,REPORT                                                          22&08&42
UNIVAC 1108 FORTRAN V LEVEL    2206 0018 F501FF
THIS COMPILATION WAS DONE ON 06 AUG 68 AT 22&08&42

  SUBROUTINE REPORT      ENTRY POINT 001025

  STORAGE USED (BLOCK, NAME, LENGTH)

      0001    *CODE     001036
      0000    *DATA     002250
      0002    *BLANK    000000
      0003    LISTC     012127

  EXTERNAL REFERENCES (BLOCK, NAME)

      0004    FSBSFL
      0005    NRNL$
      0006    NWDU$
      0007    NIO1$
      0010    NIO2$
      0011    NRBU$
      0012    NERR2$
      0013    NERR3$

  STORAGE ASSIGNMENT FOR VARIABLES (BLOCK, TYPE, RELATIVE LOCATION, NAME)

   0001    000122 10L       0001    000437 100L      0000    001605 1000F     0001    000463 110L      0001    000030 141G
   0001    000037 147G      0001    000061 163G      0001    000103 200G      0001    000511 200L      0000    002153 2000F
   0001    000535 210L      0000    001610 2100F     0001    000133 216G      0000    001660 2200F     0000    001735 2300F
   0000    002013 2400F     0001    000234 242G      0001    000112 25L       0001    000275 260G      0001    000321 271G
   0001    000311 30L       0001    000561 300L      0001    000341 301G      0001    000354 307G      0001    000210 31L
   0001    000605 310L      0000    002034 3100F     0001    000366 314G      0001    000251 32L       0000    002041 3200F
   0000    002047 3300F     0001    000465 340G      0000    002057 3400F     0001    000504 347G      0001    000537 363G
   0001    000554 372G      0001    000631 400L      0001    000607 406G      0001    000655 410L      0001    000624 415G
   0001    000657 431G      0001    000674 440G      0001    000731 452G      0001    000741 460G      0001    000761 470G
   0000    002174 49F       0001    000333 50L       0001    000701 500L      0001    000735 510L      0000    002112 5100F
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            SUBROUTINE REPORT                                                                      DATE  060868  PAGE    2

0000     002061 5200F       0000     002213 521F        0000     002167 5300F       0000     002071 5400F       0000     002100 5500F
0001     000765 600L        0000     002203 6000F       0001     000421 90L         0001     000771 9000L       0000 R 001565 CNTPAR
0003 I 000002 DATAPE        0000 R 001545 DOWN          0000 R 000000 DT            0000 I 001546 I            0000 I 001553 ICNT
0000 I 001565 IER           0000 I 001555 II            C003 I 006271 INFOA         0003 I 003645 INFOI        0003 I 000007 INFOS
0000 I 001440 IT            0003 I 000000 IVAR          0000 I 001543 I$            0000 I 001547 J            0000 I 001564 JJ
0000 I 001561 K             0000 I 001560 KK            0000 I 001550 LISTID        0003 I 000001 N            0003 I 000006 NFW
0003 I 000005 NLINES        0003 I 000003 NLIST         0000 I 001552 NLNS          0000 I 001556 NN           0003 I 000004 NPAGES
0000 I 001563 NPOINT        0000 I 001505 NVAR          0000 R 001551 START         0000 R 001552 STOP         0000 R 001515 TEMP
0000 R 001554 UDLINK        0000 R 001557 ULINK         C000 R 001544 UP            0000 R 001533 VARIA


00101          SUBROUTINE REPORT                                                    JUL68 CA
00101    C                                                                          01/04/GG
00101    C *** INPUT                                                                01/04/GG
00101    C      IVAR  -- FLAG TELLING WHICH VARIABLE BEING VARIED                   01/04/GG
00101    C               (1=RANGE , 2=SIGNAL TO NOISE RATIO)                        01/04/GG
00101    C      N     -- FLAG TELLING WHICH LINK (1=DOWNLINK, 2=UPLINK)             01/04/GG
00101    C      NFW   -- SIZE OF RECORDS ON THE DATA TAPE                           01/04/GG
00101    C      DATAPE-- LOGICAL UNIT OF DATA TAPE                                  01/04/GG
00101    C      NLIST -- NUMBER OF REPORT CARDS TO BE READ                          01/04/GG
00101    C      NPAGES-- NUMBER OF PAGES PER REPORT                                 01/04/GG
00101    C      NLINES-- NUMBER OF LINES PER PAGE                                   01/04/GG
00101    C                                                                          01/04/GG
00103          COMMON /LISTC/ IVAR, N, DATAPE, NLIST, NPAGES, NLINES, NFW,          JUL68 CA
00103         $INFOS(150,13), INFOI(100,13), INFOA(150,13)                          JUL68 CA
00104          INTEGER DATAPE
00105          DIMENSION DT(800), IT(37), NVAR(8), TEMP(14), VARIA(4,2)             JUL68 CA
00106          DATA IT / 438, 508, 714, 688, 500, 718, 694, 438, 508, 594, 706,     JUL68 CA
00106         $500, 634, 616, 618, 620, 622, 624, 626, 628, 438, 726, 710, 730,     JUL68 CA
00106         $500, 668, 670, 584, 586, 722, 672, 674, 588, 590, 438, 642, 506/     JUL68 CA
00110          DATA  UP, DOWN/4H  UP, 4HDOWN/
00113          DATA ((VARIA(I,J),I=1,4),J=1,2) /5HRANGE,1H ,1H ,1H ,6HRECEIV,6HEDAPR68 CA
00113         $ SIG,6HNAL LE,3HVEL/                                                 APR68 CA
00115          NAME LIST /REPSPC/ LISTID, START, STOP, NVAR                         APR68 CA
00116     1000 FORMAT (I10,2F10.2,6I5)                                              01/04/GG
00117     2100 FORMAT(1H1,12X,8HRECEIVED,6X,3HPRN,8X,5HVOICE,5X,9HTELEMETRY,5X,3HJUL68 JW
00117         $BIT,11X,5HVOICE,5X,9HTELEMETRY/15X,5HPOWER,6X,6HMARGIN,3X,2(4X,3HSJUL68 JW
00117         $NR,5X),2X,5HERROR,8X,8HPOST SNR,4X,8HPOST SNR/15X,5H(DBM),2(7X,4H(JUL68 JW
00117         $DB)),8X,4H(DB),7X,4HRATE,11X,4H(DB),8X,4H(DB)/)                      JUL68 JW
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00120   2200 FORMAT (13H1     RECEIVED, 7X, 3HPRN, 7X,19HBACKUP     TELEMETRY,5X,01/04/GG
00120       2 20HBIT           HARCLINE, 14X, 12HEVA SNR (CB) /                      JUL68 CA
00120       37X, 5HPOWER, 6X,  6HMARGIN,4X, 6HVCICE ,2(3HSNR,6X),1X,5HERRCR,8X,01/04/GG
00120       4 8HSNR (DB), 16X, 8HCHANNELS/                                         C1/C4/GG
00120       5 7X, 5H(DBM), 3(7X,4H(DB),1X),6X, 4HRATE, 8X,17H/CHANNEL 4     1/5,01/04/GG
00120       6 9X, 3H2/6, 9X, 3H3/7/)                                               C1/04/GG
00121   2300 FCRMAT(13H1     RECEIVEC, 2X,34HFM VCICE SNR  FM TELE    FM TELEVI,C1/04/GG
00121       $5X,3HBIT,19X,22HFM EVA BIOMED SNR (DB)/                              JUL68 JW
00121       37X,5HPOWER,5X,8HPRE/PCST,3X,30HMETRY SNR    SICN  SNR     ERROR,12X,JUL68 CA
00121       $12HPREDETECTION,11X,13HPOSTDETECTION /                               AUG68 JW
00121       5 7X, 5H(DBM), 3(7X,4H(DB),1X), 6X, 4HRATE, 10X, 3H1/3,               JUL68 CA
00121       6 9X, 3H2/4, 9X, 3H1/2,9X,3H2/4/)                                     JUL68 CA
00122   2400 FORMAT(1H1,38X,8HRECEIVED,5X,2(6HKEYING,6X)/41X,5HPOWER,7X,3HSNR,8JUL68 JW
00122       $X,6HMARGIN/41X,5H(DBM),2(7X,4H(DB),1X)/)                             JUL68 JW
00123   3100 FORMAT(8X,4F12.2,1PE12.3,0P2F12.2)                                   JUL68 JW
00124   3200 FCRMAT(4F12.2,1PE12.3,CP4F12.2/60X,4F12.2)                           JUL68 JW
00125   3300 FORMAT(4F12.2,1PE12.3,0P4F12.2/12X,F12.2,36X,4F12.2)                 JUL68 JW
00126   34C0 FORMAT(34X,3F12.2)                                                   JUL68 JW
00127   5200 FCRMAT (1H1,18X,2HID,29X,11HDESCRIPTION,28X,4HLINK/)
00130   5400 FORMAT (1H ,17X,I3,5X,18HID NUMBER IN ERROR   )
00131   55C0 FCRMAT (1H1,5X,46H***** NO LIST OF VARIABLES GIVEN FOR LIST ID=5 )
00132        ICNT = 428 + N                                                       JUL68 JW
00133        IF (IVAR .EQ. 2)ICNT = 438 + N                                       JUL68 JW
00135        UDLINK = UP                                                          01/06/GG
00136        IF (N .NE. 2)  UDLINK = DCWN                                         01/06/GG
00140        DO 9000 II=1,NLIST                                                   01/11/GG
00140  C                                                                          JUL68 CA
00140  C *** INITIALIZE INPUT DATA                                                JUL68 CA
00143        LISTID = 5                                                           JUL68 JW
00144        START = 0.0                                                          JUL68 CA
00145        STOP = 0.0                                                           JUL68 CA
00146        DO 9 I=1,8                                                           JUL68 JW
00151      9 NVAR(I) = 0                                                          JUL68 JW
00151  C                                                                          JUL68 CA
00151  C *** READ INPUT DATA                                                      JUL68 CA
00153        READ(5,REPSPC)                                                       APR68 CA
00153  C                                                                          JUL68 CA
00156        WRITE(6,5100) LISTID, START, STOP, (NVAR(I),I=1,8)                   APR68 CA
00167   5100 FORMAT(1H1,9X,26HREPORT SPECIFICATION DATA-,/1H014X,15HREPORT TYPEAPR68 CA
00167       $ NO.I2/15X,13HSTART LIMIT =,1PE9.3,/15X,12HSTCP LIMIT =,E9.3,/15X,APR68 CA
00167       $50HVARIABLES TO BE REPORTED (REPORT TYPE NO. 5 ONLY)-,     I5,7(1HAPR68 CA
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00167            $,,I4))                                                     APR68 CA
00170            WRITE (6,2000) UDLINK                                       01/06/GG
00173       2000 FORMAT(1H1,19(/),45X,19HPREDICTION ANALYSIS,/44X,A4,      17APR68 CA
00173           $HLINK COMBINATIONS)                                         APR68 CA
00174            IF (LISTID .NE. 5)  GO TO 50                                01/06/GG
00176            NN = 0                                                      01/06/GG
00177            DO 20 I = 1, 8                                              APR68 CA
00202            IF (NVAR(I) .EQ. 0) GO TO 25                                01/06/GG
00204         20 NN = I                                                      JUL68 CA
00206         25 IF (NN .NE. 0)  GO TO 10                                    01/06/GG
00210            WRITE (6,5500)                                              01/06/GG
00212            GO TO 9000                                                  01/11/GG
00213         10 WRITE(6,5200)                                               APR68 CA
00215            DO 30 I=1,NN                                                01/06/GG
00220            ULINK = UP                                                  01/06/GG
00221            IF (MOD(NVAR(I),2).NE.0)  ULINK = DOWN                      01/06/GG
00223            IF((NVAR(I) .GE. 301) .AND. (NVAR(I) .LE. 500)) GO TO 31    JUL68 CA
00225            IF((NVAR(I) .GE. 501) .AND. (NVAR(I) .LE. 800)) GO TO 32    JUL68 CA
00227            WRITE (6,5400) NVAR(I)                                      01/06/GG
00232            GO TO 30                                                    01/06/GG
00233         31 KK = NVAR(I) - 300                                          01/06/GG
00234            K = KK/2                                                    01/06/GG
00235            IF (K*2 .NE. KK)  K=K+1                                     01/06/GG
00237            WRITE(6,5300) NVAR(I), (INFOI(K,J),J=2,12), ULINK           APR68 CA
00247       5300 FORMAT(18X,I3,3X,10A6,A1,4X,A4)                             APR68 CA
00250            GO TO 30                                                    01/06/GG
00251         32 KK = NVAR(I) - 500                                          01/06/GG
00252            K = KK/2                                                    01/06/GG
00253            IF (K*2 .NE. KK)  K=K+1                                     01/06/GG
00255            WRITE(6,5300) NVAR(I), (INFOA(K,J),J=2,12), ULINK           APR68 CA
00265         30 CONTINUE                                                    01/06/GG
00267            WRITE (6,49) (VARIA(I,IVAR),I=1,4)                          APR68 CA
00275         49 FORMAT(1H0,17X,23HINDEPENDENT VARIABLE = , 4A6)             APR68 CA
00276         50 NLNS = 0                                                    01/06/GG
00277            READ (DATAPE) DT, NPOINT                                    JUL68 CA
00306            DO 500 JJ=1,NPOINT                                          JUL68 JW
00311            IF (JJ .NE. 1)READ(DATAPE)DT                                JUL68 JW
00320            CNTPAR = DT(ICNT)                                           01/06/GG
00321            IF(START - STOP) 55, 90, 55                                 JUL68 CA
00324         55 IF ((CNTPAR.LT.START) .OR. (CNTPAR.GT.STOP))   GO TO 600    01/06/GG
00326         90 CONTINUE                                                    01/06/GG
```

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00327          NLNS = NLNS + 1                                      01/06/GG
00330          GO TO (100,200,300,400,500), LISTID                  01/06/GG
00331      100 IF ((NLNS.NE.1) .AND.(NLNS.LE.NLINES))  GO TO 110    01/06/GG
00333          NLNS = 1                                             01/06/GG
00334          WRITE (6,2100)                                       01/06/GG
00336      110 CONTINUE                                             01/10/GG
00337          DO 120 I=1,7                                         01/10/GG
00342          J = IT(I) + N                                        01/10/GG
00343      120 TEMP(I) = DT(J)                                      01/10/GG
00345          WRITE (6,3100)  (TEMP(I),I=1,7)                      JUL68 CA
00353          GO TO 600                                            01/06/GG
00354      200 IF ((NLNS.NE.1) .AND. (NLNS.LE.NLINES))  GO TO 210   01/06/GG
00356          NLNS = 1                                             01/06/GG
00357          WRITE (6,2200)                                       01/06/GG
00361      210 CONTINUE                                             01/10/GG
00362          DO 220 I=1,13                                        01/10/GG
00365          J = IT(I+7) + N                                      01/10/GG
00366      220 TEMP(I) = DT(J)                                      01/10/GG
00370          WRITE(6,3200)(TEMP(I),I=1,13)                        JUL68 JW
00376          GO TO 600                                            01/06/GG
00377      300 IF ((NLNS.NE.1).AND.(NLNS.LE.NLINES))  GO TO 310     01/06/GG
00401          WRITE (6,2300)                                       01/06/GG
00403          NLNS = 1                                             01/06/GG
00404      310 CONTINUE                                             01/10/GG
00405          DO 320 I=1,14                                        01/10/GG
00410          J = IT(I+20) + N                                     01/10/GG
00411      320 TEMP(I) = DT(J)                                      01/10/GG
00413          WRITE(6,3300)TEMP                                    JUL68 JW
00421          GO TO 600                                            01/06/GG
00422      400 IF ((NLNS.NE.1) .AND. (NLNS.LE.NLINES))  GO TO 410   01/06/GG
00424          NLNS = 1                                             01/06/GG
00425          WRITE (6,2400)                                       01/06/GG
00427      410 CONTINUE                                             01/10/GG
00430          DO 420 I=1,3                                         01/10/GG
00433          J = IT(I+34) + N                                     01/10/GG
00434      420 TEMP(I) = DT(J)                                      01/10/GG
00436          WRITE (6,3400) (TEMP(I),I=1,3)                       JUL68 JW
00444          GO TO 600                                            01/06/GG
00445      500 IF ((NLNS.NE.1) .AND. (NLNS.LE.NLINES)) GO TO 510    01/06/GG
00447          NLNS  =1                                             01/06/GG
00450          WRITE (6,6000) (NVAR(J),J=1,NN)                      01/06/GG
```

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00456    152*     6000 FORMAT(12H1INDEPENDENT/3X,8HVARIABLE,6X,8(I3,5X))                      APR68 CA
00457    153*      510 DO 520 J=1,NN                                                          01/06/GG
00462    154*          K = NVAR(J)                                                            JUL68 CA
00463    155*      520 TEMP(J) = DT(K)                                                        01/11/GG
00465    156*          WRITE(6,521) CNTPAR, (TEMP(J),J=1,NN)                                  APR68 CA
00474    157*      521 FORMAT(2X,9(1PE9.3,3X))                                                APR68 CA
00475    158*      600 CONTINUE                                                               JUL68 JW
00477    159*     9000 CALL FSBSFL(DATAPE,0,IER)                                              JUL68 JW
00501    160*          CALL FSBSFL(DATAPE,1,IER)                                              JUL68 CA
00502    161*          RETURN                                                                 JUL68 CA
00503    162*          END                                                                    JUL68 CA

        END OF UNIVAC 1108 FORTRAN V COMPILATION.      0 *DIAGNOSTIC* MESSAGE(S)
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13.11 SUBROUTINE ZERØUT

```
              SUBROUTINE ZEROUT                                              DATE  310768  PAGE     1

& FOR ZEROUT,ZEROUT                                                               17&56&55
UNIVAC 1108 FORTRAN V LEVEL   2206 0018 F5018F
THIS COMPILATION WAS DONE ON 31 JUL 68 AT 17&56&56

   SUBROUTINE ZEROUT     ENTRY POINT 000025

   STORAGE USED (BLOCK, NAME, LENGTH)

       0001    *CODE    000031
       0000    *DATA    000011
       0002    *BLANK   000000
       0003    ANSCOM   000454
       0004    INTERM   000310


   EXTERNAL REFERENCES (BLOCK, NAME)

       0005    NERR3$


   STORAGE ASSIGNMENT FOR VARIABLES (BLOCK, TYPE, RELATIVE LOCATION, NAME)

    0001   000002 105G       0003 R 000000 A         0004 R 000000 B         0000 I 000000 I


00101      1*          SUBROUTINE ZEROUT
00103      2*         COMMON /ANSCOM/ A(300) /INTERM/ B(200)                           JUL68 CA
00104      3*         DO 100 I = 1, 300                                                JUL68 CA
00107      4*          A(I)   = 0.
00110      5*     100 IF (I .LE. 201)B(I) = 0.                                         JUL68 JW
00113      6*          RETURN
00114      7*          END

      END OF UNIVAC 1108 FORTRAN V COMPILATION.     0 *DIAGNOSTIC* MESSAGE(S)
```

13.12 THE UTILITY PROGRAM, UTILT1

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                THE UTILITY PROGRAM, UTILT1                                         DATE  310768  PAGE     1

& FOR UTILT1,UTILT1                                                                    17&56&56
UNIVAC 1108 FORTRAN V LEVEL   22C6 0018 F5018F
THIS COMPILATION WAS DONE ON 31 JUL 68 AT 17&56&57

   MAIN PROGRAM

   STORAGE USED (BLOCK, NAME, LENGTH)

         0001     *CODE     000067
         0000     *DATA     000044
         0002     *BLANK    000000


   EXTERNAL REFERENCES (BLOCK, NAME)

         0003     FSBSFL
         0004     NREW$
         0005     NWDU$
         0006     NIO2$
         0007     NRDU$
         0010     NIO1$
         0011     NWDC$
         0012     NSTOP$


   STORAGE ASSIGNMENT FOR VARIABLES (BLOCK, TYPE, RELATIVE LOCATION, NAME)

    0000     000021 1F          0001    000023 115G       00C1    000035 124G       0001    000046 133G       0001    000015 2L
    0000     000030 3F          0000    000032 4F         000C I 000000 FNDFLG     0000 I 000001 IARRAY     0000 I 000017 IER
    0000 I 000020 I$


00100      1*    C .........................................................................
00100      2*    C .                                                                        .
00100      3*    C .   UTILT1                                      C. ARGILA, JULY '68      .
00100      4*    C .                                                                        .
```

```
00100    C .   DESCRIPTION-                                                       .
00100    C .      UTILT1 IS A UTILITY SUPPORT PROGRAM FOR USE WITH THE COMMUNICATION .
00100    C .   SIMULATION (COMSIM) PROGRAM.  THE COMSIM PROGRAM CONTAINS A DECK OF    .
00100    C .   PARAMETER DESCRIPTION CARDS ON A SECOND FILE OF THE PROGRAM PCF TAPE.  .
00100    C .   UTILT1 PUNCHES THIS DECK OF PARAMETER DESCRIPTION CARDS AND PRINTS A   .
00100    C .   CORRESPONDING LISTING.                                                 .
00100    C .                                                                          .
00100    C .   INPUT-                                                                 .
00100    C .      NO CARD INPUT IS REQUIRED.  THE COMSIM PROGRAM PCF TAPE MUST BE     .
00100    C .   MOUNTED ON UNIT 'X'.  UPON TERMINATION UTILT1 WILL LEAVE THIS TAPE IN  .
00100    C .   POSITION FOR COMSIM EXECUTION.                                         .
00100    C .                                                                          .
00100    C .   OUTPUT-                                                                .
00100    C .      THE PARAMETER DESCRIPTION DECK IS PUNCHED AND PRINTED.  PUNCH OUTPUT .
00100    C .   MAY BE APPROXIMATED AT 350 CARDS.  PRINT OUTPUT MAY BE ESTIMATED AT 10 .
00100    C .   PAGES.                                                                 .
00100    C .                                                                          .
00100    C ............................................................................
00101          INTEGER ENDFLG
00103          DIMENSION IARRAY(14)
00104          DATA ENDFLG /5H $END/
00106          REWIND 27
00107          WRITE(6,1)
00111        1 FORMAT(1H1,40X,27HPARAMETER DESCRIPTION CARDS)
00112          CALL FSBSFL(27,1,IER)
00113        2 READ(27,3) IARRAY
00121        3 FORMAT(13A6,1A2)
00122          WRITE(6,4) IARRAY
00130        4 FORMAT(1X,13A6,1A2)
00131          PUNCH 3, IARRAY
00137          IF(IARRAY(1) .NE. ENDFLG) GO TO 2
00141          CALL FSBSFL(27,0,IER)
00142          STOP
00143          END

     END OF UNIVAC 1108 FORTRAN V COMPILATION.      0 *DIAGNOSTIC* MESSAGE(S)
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13.13 THE UTILITY PROGRAM, UTILT2

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                THE UTILITY PROGRAM, UTILT2                                    DATE  310768  PAGE     1

& FOR UTILT2,UTILT2                                                                 17&56&58
UNIVAC 1108 FORTRAN V LEVEL   2206 0018 F5018F
THIS COMPILATION WAS DONE ON 31 JUL 68 AT 17&56&58

  MAIN PROGRAM

  STORAGE USED (BLOCK, NAME, LENGTH)

       0001    *CODE    000171
       0000    *DATA    000047
       0002    *BLANK   000000


  EXTERNAL REFERENCES (BLOCK, NAME)

       0003    FSBSFL
       0004    NRNL$
       0005    NWNL$
       0006    NREW$
       0007    NRDU$
       0010    NIO1$
       0011    NIO2$
       0012    NWDU$
       0013    NWEF$
       0014    NSTOP$


  STORAGE ASSIGNMENT FOR VARIABLES (BLOCK, TYPE, RELATIVE LOCATION, NAME)

   0001    000067 1L          0001    000032 123G        0001    000050 134G        0001    000062 142G        0001    000101 153G
   0001    000113 161G        0001    000125 167G        0001    000142 177G        0001    000072 2L          0000    000027 3F
   0000    000031 4F          0001    000024 5L          0001    000132 6L          0000    000034 7F          0000 I  000000 ENDFLG
   0000 I  000001 IARRAY      0000 I  000020 IER         0000 I  000017 IFLAG       0000 I  000021 I$


00100      1*    C ...............................................................................
```

```
00100   C .                                                                         .
00100   C .   UTILT2                                        C. ARGILA, JULY '68     .
00100   C .                                                                         .
00100   C .   DESCRIPTION-                                                          .
00100   C .      UTILT2 IS A UTILITY SUPPORT PROGRAM FOR USE WITH THE COMMUNICATION .
00100   C .   SIMULATION PROGRAM (COMSIM).  THE COMSIM PROGRAM CONTAINS A DECK OF   .
00100   C .   PARAMETER DESCRIPTION CARDS ON A SECOND FILE OF THE PROGRAM PCF TAPE. .
00100   C .   UTILT2 IS USED WHEN GENERATING A NEW PROGRAM PCF TAPE TO EITHER ALTER .
00100   C .   OR REPLACE THIS DECK OF PARAMETER DESCRIPTION CARDS.                  .
00100   C .                                                                         .
00100   C .   INPUT-                                                                .
00100   C .      THE FORTRAN NAMELIST '$INPUT' IS USED TO INPUT THE SINGLE INPUT    .
00100   C .   PARAMETER, IFLAG.  IFLAG=1 INDICATES OLD PARAMETER DESCRIPTION CARD DECK .
00100   C .   IS TO BE ALTERED.  IFLAG=2 INDICATES THIS DECK IS TO BE REPLACED.  IFLAG .
00100   C .   IS NOT INITIALIZED.   THE ALTER CARDS OR REPLACEMENT DECK MUST FOLLOW  .
00100   C .   THIS NAMELIST.  NO ' $END' CARD IS NECESSARY TO TERMINATE THIS DECK.  .
00100   C .   THE OLD PROGRAM PCF TAPE IS ASSUMED TO BE MOUNTED ON UNIT 'Y'.        .
00100   C .                                                                         .
00100   C .   OUTPUT-                                                               .
00100   C .      THE NEW PARAMETER DESCRIPTION CARD DECK IS GENERATED ON THE SECOND .
00100   C .   FILE OF THE NEW PROGRAM PCF TAPE, ASSUMED TO BE MOUNTED ON UNIT 'X'.  .
00100   C .   IT IS ASSUMED THAT THE NEW PROGRAM PCF TAPE HAS BEEN POSITIONED AT THE .
00100   C .   BEGINNING OF THE SECOND FILE BEFORE UTILT2 IS EXECUTED.  UPON TERMINATION.
00100   C .   UTILT2 WILL LEAVE THE NEW PROGRAM PCF TAPE IN POSITION FOR COMSIM     .
00100   C .   EXECUTION.                                                            .
00100   C .                                                                         .
00100   C ...........................................................................
00100   C
00101         INTEGER ENDFLG
00103         DIMENSION IARRAY(14)
00104         NAMELIST /INPUT/ IFLAG
00105         DATA ENDFLG /5H $END/
00107         READ(5,INPUT)
00112         WRITE(6,INPUT)
00115         IF(IFLAG .EQ. 2)GO TO 2
00117         REWIND 28
00120         CALL FSBSFL(28,1,IER)
00121       5 READ(28,3) IARRAY
00127       3 FORMAT(13A6,1A2)
00130         IF(IARRAY(1) .EQ. ENDFLG) GO TO 1
00132         WRITE(27,3) IARRAY
```

```
00140        WRITE(6,4) IARRAY
00146      4 FORMAT(1X,13A6,1A2)
00147        GO TO 5
00150      1 REWIND 28
00151      2 READ(5,3,END=6) IARRAY
00157        WRITE(27,3) IARRAY
00165        WRITE(6,4) IARRAY
00173        GO TO 2
00174      6 IARRAY(1) = ENDFLG
00175        WRITE(27,3) IARRAY
00203        WRITE(6,7) ENDFLG
00206      7 FORMAT(1X,1A6)
00207        END FILE 27
00210        CALL FSBSFL(27,-1,IER)
00211        STOP
00212        END
```

END OF UNIVAC 1108 FORTRAN V COMPILATION.   0 *DIAGNOSTIC* MESSAGE(S)