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HANDLE VIA
BYEMAN
CONTROL SYSTEM

~~(S)~~ NATIONAL RECONNAISSANCE OFFICE
WASHINGTON, D.C.

THE NRO STAFF

13 February 1978

MEMORANDUM FOR SS-3, MAJOR GEIGER
SS-7, CDR SEYMOUR
SS-4A, MAJOR SMITH

SUBJECT: Description of Mission 7345

Attached is a copy of the description of Mission 7345. Please note that while it is currently classified BYEMAN/EARPOP, plans are to publish this manual at the TALENT KEYHOLE level. Please review and provide your comments to me by COB 24 February 1978.

M. H. MANAHAN
CDR USN
SS-4 SIGINT Branch

HANDLE VIA
BYEMAN
CONTROL SYSTEM

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DESCRIPTION OF MISSION 7345

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1. General

This document is intended to assist the user in understanding Mission 7345 system operation. It is also intended to serve as an aid in requesting tasking.

1.1 Mission Objective. The Mission 7345 objective is to collect technical intelligence and perform general search in the 4-18 GHz frequency range. Mission 7345 will intercept both pulse and CW signals from a 340 N.M. altitude near-polar orbit.

1.2 System Description. The Mission 7345 is spin stabilized, with its spin rate and spin axis orientation controlled (by ground command) throughout the life of the mission so as to assure proper scanning of the earth's surface by the intercept antennas.

The spacecraft (Figure 1) includes nine signal intercept antennas, seven signal intercept receivers, three tape recorders, four down link transmitters, two command and telemetry (TC) antennas, and two command systems. The tape recorders are loaded, one at a time, with intercept data from the receivers, and then dumped one or two at a time via the downlink transmitters to a ground site. Intercept data can also be transponded in real time.

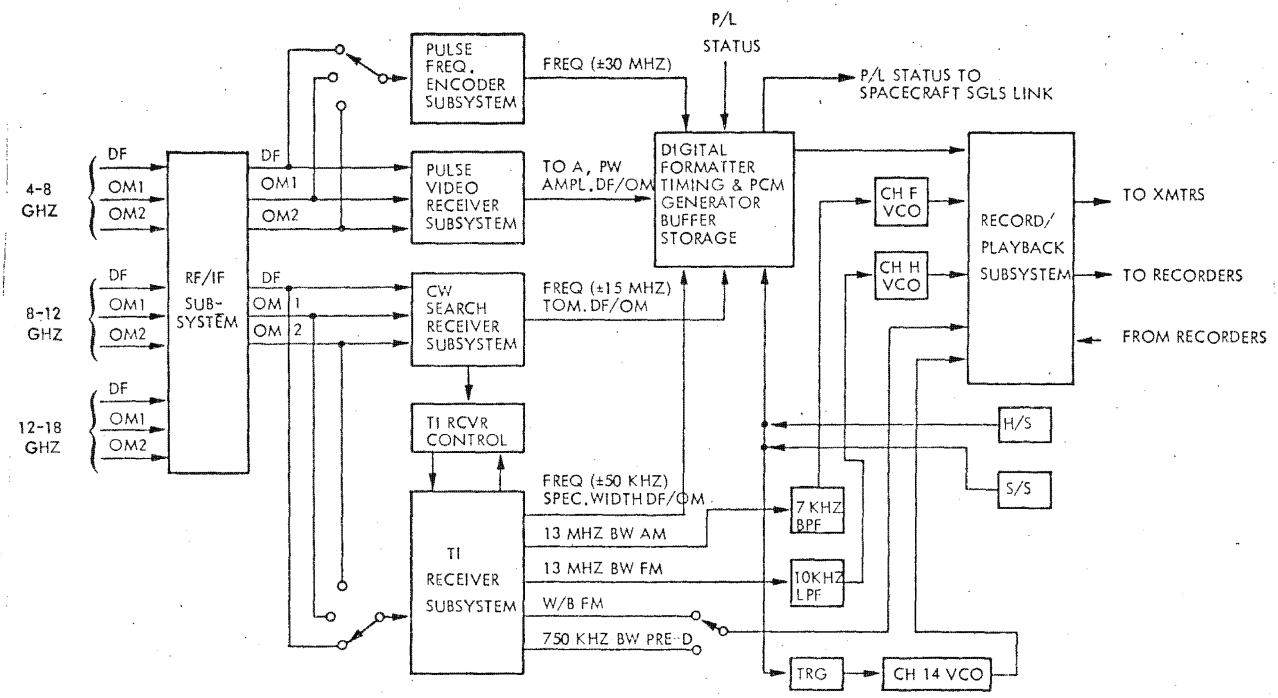

Figure 1 RAQUEL IA Payload System Simplified Block Diagram

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Two of the downlink transmitters are reserved for intercept data and one is reserved for spacecraft status data. A fourth transmitter is available to replace any one of the others that might fail during the mission.

The spacecraft carries batteries to power its equipment, plus solar arrays to recharge the batteries. The power system produces enough energy to operate the intercept receivers for the following periods.

Tape Recorder Readin to Readout Ratio	Best Case	Worst Case
1:1	191 Min/day	55 Min/day
4:1	367 Min/day	115 Min/day

2. Measured Parameters

The payload consists of three pulse receivers, three CW search receivers and a TI receiver. Each of these receivers makes certain measurements of intercepted signals which are digitized and output in a common PCM data stream.

In addition to the PCM data, the TI receiver outputs three analog signals. These are the signals from an AM detector and a FM discriminator, plus a pre-detection signal. There is also an option to replace this pre-D signal with the output of a wideband discriminator so as to allow analysis of broadband FM signals.

2.1 Pulse Signal Measurements. The pulse intercept system measures the following parameters of pulse signals intercepted from three high gain direction finding (df) antennas or from six near omni directional (mainbeam) antennas:

	Parameter	Resolution	Accuracy
a.	Radio Frequency	50 MHz	±30 MHz
b.	Pulsewidth	0.1 usec	±.1 usec
c.	Signal amplitude	1 dB	±3 dB
d.	Time of arrival of the pulse leading edge (TOA)	1 usec	±.5 usec
e.	Ratio of DF to omni power	7 dB	

2.2 CW Signal Measurements. The CW intercept system measures the following parameters of CW signals intercepted from the three high gain direction finding (df) antennas or from the six near omni directional (mainbeam) antennas:

	Parameter	Resolution	Accuracy
a.	Frequency	10 MHz	±15 MHz
b.	Signal amplitude	1.5 dB	±3 dB
c.	Time of Measurement	187.5 usec	±187.5 usec
d.	Ratio of DF to omni power	7 dB	±7 dB

2.3 TI Receiver Measurements. The TI receiver measures the following parameters of CW signals intercepted from the high gain antennas or the omni directional antennas:

Parameter	Resolution	Accuracy
a. Frequency	100 kHz	±200 kHz
b. Wideband amplitude		
c. One of:		
Spectrum width	100 kHz	
Narrowband amplitude		
d. Time of measurement	187.5 usec	±187.5 usec

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3.0 Antenna Systems

The satellite carries two antenna systems: A pair of antennas for telemetry and command (TC) and nine antennas for signal intercept.

3.1 Telemetry and Command Antennas. Two TC antennas are oriented so that at least one of them provides adequate contact with the Satellite Control Facility (SCF) ground command and data readout stations whenever desired, regardless of spacecraft orientation. The TC antennas can be used simultaneously for commanding and data transmission.

3.2 Intercept Antennas. The nine intercept antennas consist of three antennas for each of the 4-8 GHz, 8-12 GHz, and 12-18 GHz bands.

The three antennas of a set (for a given band) consist of one high-gain pencil-beam antenna plus two low-gain, widebeam antennas. The pencil beam antenna in each set is a DF antenna, while the two widebeam antennas form a near omni-directional pair. There are three pulse and three CW receivers, one each connected to the DF antennas, and two each connected to the omni antennas. The DF antennas used to geoposition emitters by intercept of sidelobe emission, while the omni antennas are used to intercept the mainbeam emissions of emitters plus act as inhibit antennas to prevent mainbeam poke-through of the sidelobe intercept antennas.

4.0 Intercept Receivers

The payload includes seven receivers: Three pulse receivers, three CW search receivers, and one TI receiver.

4.1 Pulse Receivers. The pulse receivers instantaneously monitor one of seven 2-GHz bands between 4 and 18 GHz. The same 2 GHz band is monitored by all three receivers (the DF receiver and the two omni receivers). Figure 2 is a simplified block diagram of the pulse receivers.

4.1.1 Frequency Measurement. The pulse receivers include one PFM (pulse frequency measurement) subsystem. This is a single channel device that can be connected to any one of the pulse receivers.

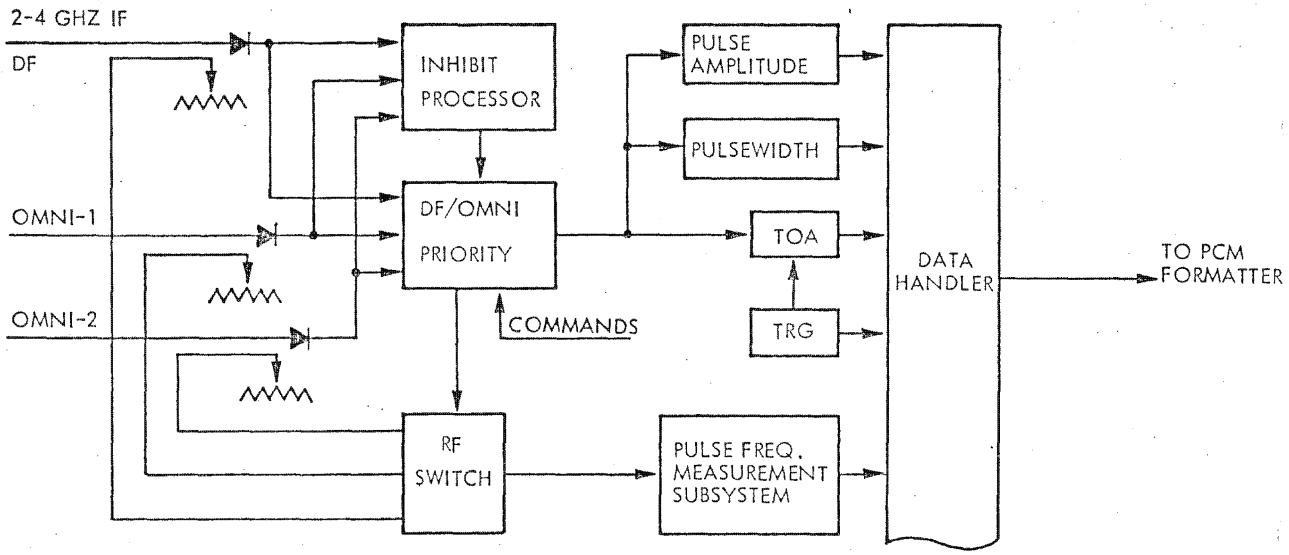

Figure 2. Pulse Receiver Simplified Block Diagram

The PFM subsystem consists of an array of filters (each with 50 MHz bandwidth) driven in parallel via a limiter. Each filter output is detected and compared to a threshold. The limiter assures that only the signal frequency with the strongest instantaneous input component can exceed threshold.

Each time a pulse is received, the limiter output is checked to determine if the pulse was present in the PFM subsystem, and if it is present, the threshold circuits are checked to locate the signal's frequency.

The PFM also tests for a "crossover" condition, in which a signal is present in the crossover region of two adjacent filters.

There are 40 filters spread in frequency across the 2000 MHz instantaneous IF bandwidth and two at each end for a total of 44 filters. Each of the filters has a bandwidth of approximately 50 MHz. This channelized filter band ensures that a frequency measurement will be made on any pulse no matter where it lies in the IF passband.

4.1.2 Pulsewidth Measurement. The duration of each intercepted pulse is measured using a 10 MHz clock and a 7 stage binary counter. This covers the range of 0.1 to 12.7 usec pulsewidth.

Pulses near noise threshold have the pulsewidth measurement suppressed in order to prevent improper measurements due to variations in signal amplitude (and therefore width) due to noise. Pulse reports lacking the PW information are identified by a reported width of zero.

The 10-MHz clock is derived from the time reference generator, and so is both stable, and well defined. As a result the PW measurement is accurate to within ±0.1 usec for pulsewidths under 2.4 usec, and to within ±0.2 usec for pulsewidths of 2.4 to 12.7 usec.

4.1.3 Time of Arrival (TOA). The time of arrival of each pulse is measured using a 1 MHz clock and a counter that is reset twice every 375 usec (alternating at 187 and 188 usec). This last is the time required to output two lines (96 bits) of the PCM data stream. A second counter is incremented once per reset, and so contains the line number in which interception occurred.

The above provides all the information needed to identify the TOA of the leading edge of each pulse with a resolution of 1 usec. All timing is referenced to the time reference generator clock, and so is essentially 100 percent accurate.

4.1.4 Amplitude. The amplitude of each intercepted pulse is measured in each of the three pulse receivers. Whenever the signal in any receiver exceeds threshold, the amplitude of the strongest of the three is stored and digitized for inclusion in the pulse report.

The reported amplitude is the peak amplitude reached during the first 100 nsec of the pulse. It is reported with a resolution of 1 dB and has a range of 31 dB above threshold.

4.1.5 Sensitivity. The pulse receivers have a nominal sensitivity of -74 dBm not including antenna gain. The actual sensitivity varies a nominal ±3 dB across any selected 2 GHz band.

This sensitivity applies to each of the three pulse receivers. The two omni receiver sensitivities can be reduced by command if desired.

4.1.6 Dynamic Range. The pulse receivers have a dynamic range of approximately 32 dB above threshold.

4.2 CW Search Receiver. The CW search receivers monitor part or all of any 2 GHz band between 4 and 18 GHz. There are some constraints as to the bands to which the CW receivers can be tuned depending on the band selected for the pulse receivers.

The CW search receivers use a sweeping YIG local oscillator to scan the selected 2000 MHz IF bandwidth 5333 times per second. Each CW signal is seen twice per scan - first when the YIG is tuned 10 MHz above it, and again when the YIG is tuned 10 MHz below it. Only signals seen at both of these times are accepted as CW.

Figure 3 is a block diagram of the CW receiver.

4.2.1 Frequency Coverage. The CW search receivers scan the selected IF band starting at any desired point within the band (resolution of 80 MHz) and continuing toward the low edge of the band. Scan width can be set to 2000 MHz (full band), 1000 MHz, or 500 MHz. If the scan selected extends past

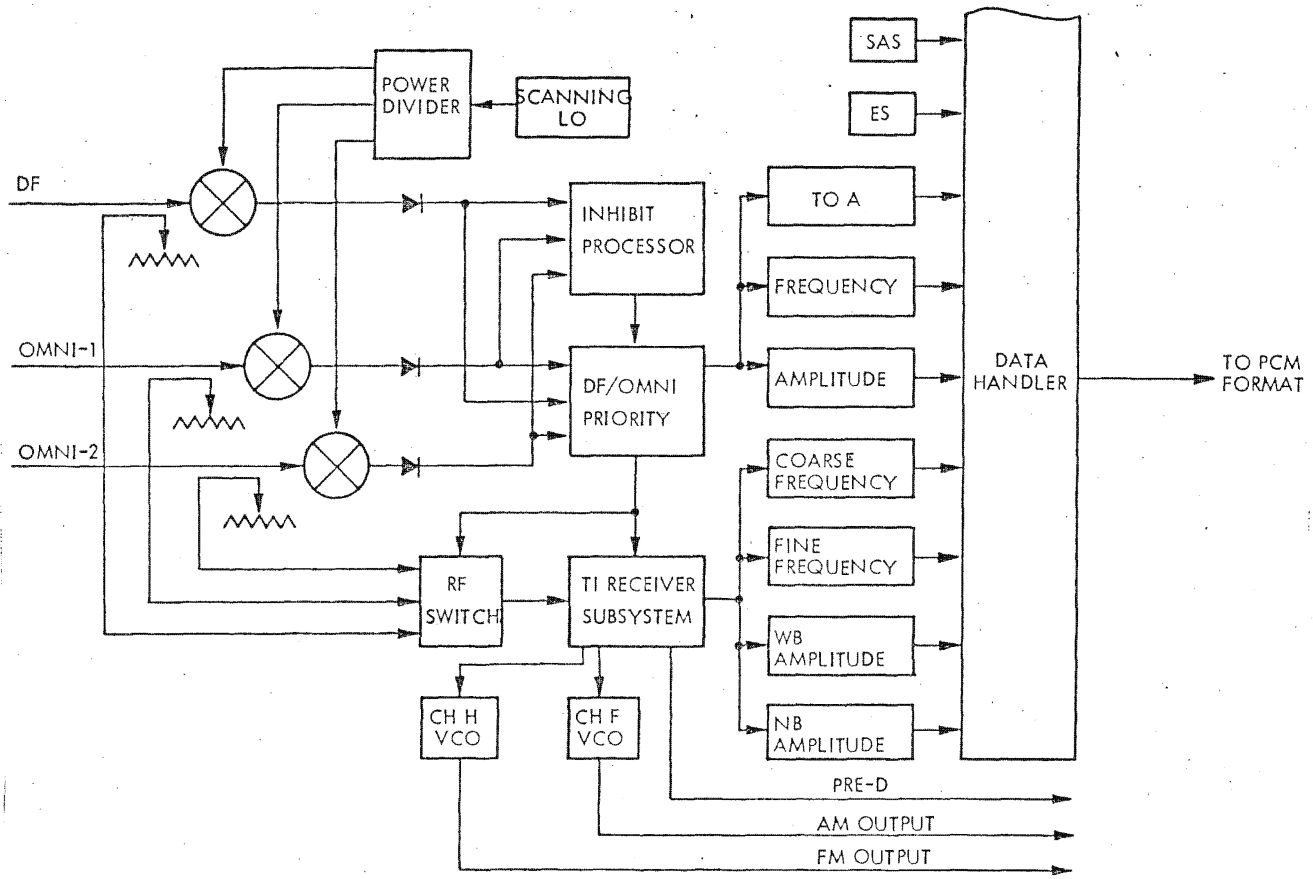

Figure 3 CW Receiver Simplified Block Diagram

the lower band edge, the actual scan is stopped slightly outside the (2 GHz) band.

The receiver scans at different sweep rates, depending on the selected scan width as follows:

Selected Scan Width	Nominal Scan Rate
2000 MHz	1.26 MHz/usec
1000 MHz	.63 MHz/usec
500 MHz	.31 MHz/usec

4.2.2 Frequency Measurement. Each time a CW signal is detected, the frequency of the sweeping YIG LO is measured to determine the CW signal frequency. The CW frequency is reported with a resolution of 10 MHz, and an accuracy of ±15 MHz peak to peak (10 MHz 2 sigma).

4.2.3 Amplitude. The CW receivers compare the signal amplitude measured in each receiver to a threshold voltage. Whenever any one exceeds the threshold, the receiver having the highest amplitude is selected as representing that signal. If, in addition, a CW confirm (signal seen twice in same channel, at same frequency) occurs, the amplitude is stored and digitized with a resolution of approximately 2 dB.

4.2.4 Sensitivity. Each of the CW search receivers has a sensitivity as follows:

Sweep Range	Sensitivity
2000 MHz	-94 dBm ±3 dB
1000 MHz	-95.5 dBm ±3 dB
500 MHz	-97 dBm ±3 dB

Between 13.5 and 14 GHz, the above sensitivities are all reduced by 3 dB.

4.2.5 Dynamic Range. The CW receivers have a dynamic range of 40 dB.

This range is spur-free in bands 2-7 (4-16 GHz). For the DF receiver it is also spur free in band 8 (16-18 GHz). However, in the omni receivers, an image response is present above 17 GHz with a rejection of about 20 dB. It is expected that signals above 17 GHz that are more than 20 dB above threshold will be very rate if not non-existant and certainly will be easily recognized. Thus, no uncertainty as to actual signal parameters will occur due to this response.

4.3 TI Receiver. The TI receiver monitors signals intercepted by one of the three CW receivers. Since the monitor point is before the CW YIG, the full 2 GHz bandwidth is available to the TI receiver.

The TI receiver can be operated either independently (frequency and intercept antenna pre-selected by command) or in conjunction with the CW search receivers (frequency and channel determined by intercepted signals in the search receivers).

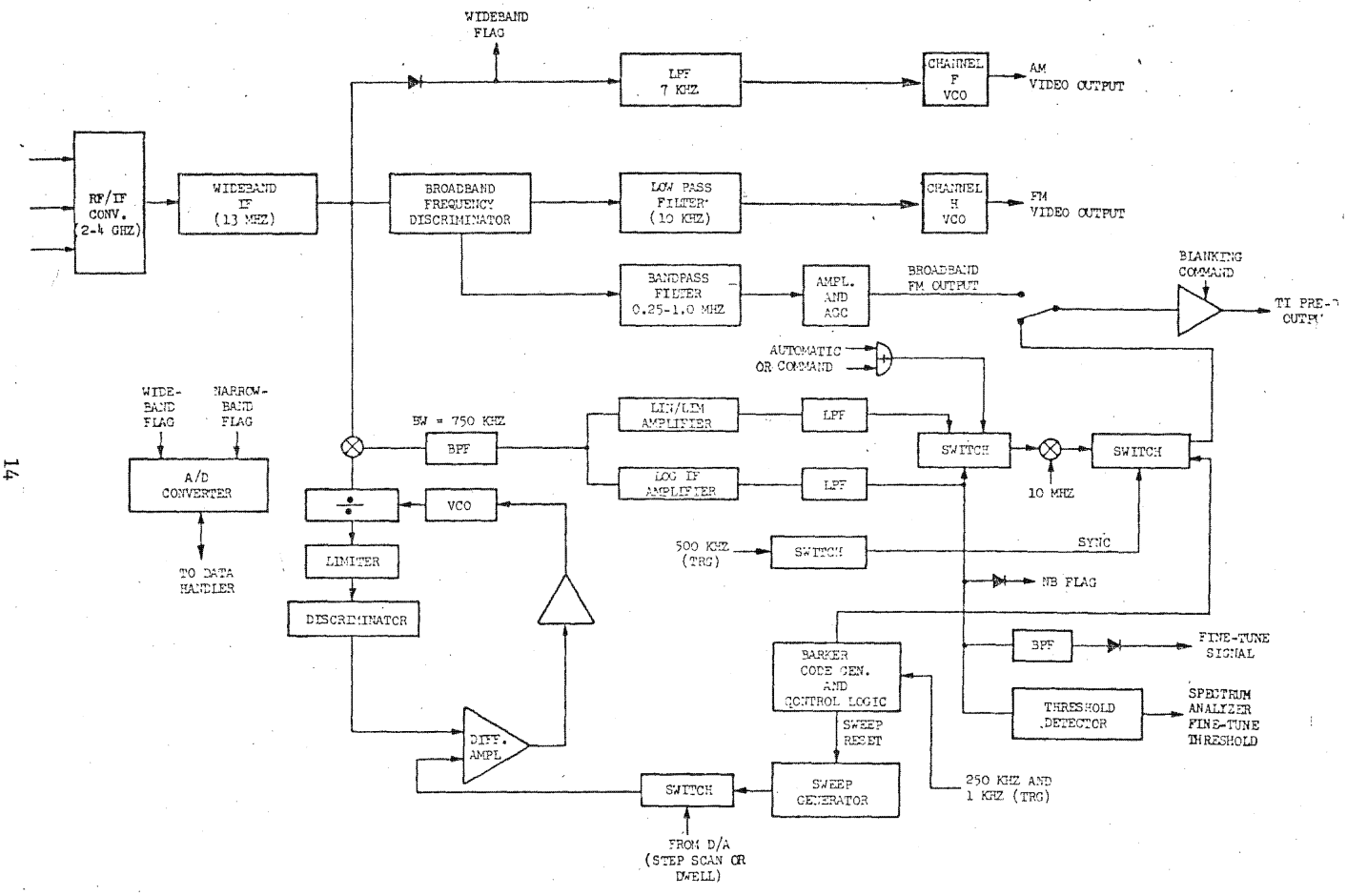

Figure 4 - TI Receiver Simplified Block Diagram

The TI receiver can, in addition, be set to monitor a fixed 750 kHz wide window constantly, or to sweep this window repetitively across a 13 MHz bandwidth in which case, the TI receiver operates as a spectrum analyzer.

Figure 4 shows a block diagram of the TI receiver.

4.3.1 Frequency Measurement. The TI receiver reports the frequency to which it is tuned with a resolution of 100 kHz anywhere from 4 GHz to 18 GHz.

4.3.2 Amplitude. The TI receiver measures the total detected power in the selected 13 MHz bandwidth.

It also reports the signal amplitude in the 750 kHz window if the narrow band mode is selected. In spectrum analysis mode this report is replaced by a signal spectrum width report.

4.3.4 Tuning Options. The TI receiver has the following tuning options:

a) One sweep, narrowband handover. The TI receiver first scans a 13-MHZ bandwidth across a 40 to 60 MHz window centered on the CW receiver reported frequency in 10 MHz steps and picks the strongest step for coarse tune. Then it scans a 200 MHz bandwidth across the selected 13-MHz IF and selects the strongest step as the desired intercept frequency. It then initiates a dwell at that frequency.

b) Two sweep, narrowband handover. This is identical to a) except the 13 MHz bandwidth is scanned twice. If the strongest step on each of the two scans agree to within 700 kHz, the average of the scans is selected for the dwell. Otherwise the tune-up is aborted. An option exists to abort to the spectrum analysis mode.

c) Spectrum Analysis Handover. The TI receiver performs a coarse tune as in a) and b), but then immediately goes to the spectrum analysis mode (one sweep of a 750 kHz bandwidth filter across the 13 MHz IF each 1 msec).

d) Fixed Tune, One or Two Sweep. The TI receiver is coarse tuned by command. Thus, an intercept of a signal by one of the CW search receivers is not required. The fine tuning procedure occurs as in a) and b), starting whenever the signal first exceeds the TI coarse threshold.

e) Fixed Tune, Spectrum Analysis. The TI receiver operates in the spectrum analysis mode at all times. Reports are issued only when a signal exceeds the TI coarse threshold.

In options a, b, and c, the tune-up is aborted if the signal is not detected above threshold during coarse tuning

In options a, b, and d the tune-up is also aborted if the signal is not detected above threshold in all fine tune scans.

4.3.5 Analog Outputs. The TI receiver generates four analog signals: two 750 kHz wide and two narrow signals. Only one of the 750 kHz signals is output at any given time.

a. Pre-D. A 750 kHz predetection segment of the TI receiver bandwidth is translated to the 250-1000 kHz band and output to the tape recorder as Pre-D. This is the normal wideband analog output from the TI receiver.

b. Wideband FM. A 750 kHz postdetection signal from a wideband FM discriminator is available as an alternate to the Pre-D signal. This signal is useful for analyzing wideband FM signals.

c. Amplitude Modulation. The output of an AM detector with a 13-MHz predetection bandwidth provided on a Channel H VCO. The post-detection video bandwidth of this signal is limited to 10 kHz by a low pass filter.

d. Frequency Modulation. The output of a FM discriminator with a 13-MHz predetection bandwidth provided on a channel H VCO. The post-detection bandwidth of this signal is limited to 10 kHz by a low pass filter.

Analog signals c) and d) may be suppressed by command if added signal to noise ratio of the wideband analog signal is desired.

4.3.6 Frequency Coverage. The TI receiver has access to all signals in the entire 2 GHz band selected by the CW receiver. Handovers from the CW receivers to the TI receivers are restricted to frequency ranges actually monitored by the CW receiver.

In addition, the TI receiver defines a window within the available 2 GHz band. Start and stop frequencies of this band are given with a 40 MHz resolution.

The TI receiver can be configured to accept only those handovers that are inside this window, or only those outside this window, or both those inside and outside the window (ignoring the window).

Fixed tune operation involves selecting a 13-MHz window anywhere in the available 2 GHz band. The resoltuion of this selection is 10 MHz. Then a normal fine tune within this window sets the narrow band tuning (not required for spectrum analysis).

4.4 Spurious Signal Rejection. The extent to which spurious responses are inhibited depends on the frequency of the stimulating signal. Maximum rejection is obtained for signals outside the selected front-end TDA bandwidth.

For pulsed signals, the next-best rejection occurs for undesired responses to signals in the pulse receiver's selected band, because such signals provide a desired response that helps to suppress spurious responses.

Table 1 presents the minimum rejection. The reduced CW rejection between 17 and 18 GHz applies only to the omni channels - the DF channel spurious rejection is still 37 dB.

The figure of 10 dB rejection for 3.5-4 GHz applies only at 4 GHz - the rejection is greater at lower frequencies, reaching 50 dB by 3.5 GHz.

Table 1

Input Frequency	Selected Band	Pulse Rejection	CW Rejection
F<3.5 GHz	4 - 6 GHz	50 dB	50 dB
F>8.5 GHz		50	50
4- 6 GHz		37	36
6- 8 GHz		23	36
F<3.5 GHz	6 - 8 GHz	50 dB	50 dB
F>8.5 GHz		50	50
4-6 GHz		23	36
6-8 GHz		37	36
F<7.5 GHz	8 -10 GHz	50 dB	50 dB
F>12.5 GHz		50	50
8-10 GHz		37	36
10-12 GHz		23	36
F<7.5 GHz	10-12 GHz	50 dB	50 dB
F>12.5 GHz		50	50
8-10 GHz		23	36
10-12 GHz		37	36
F<11.5 GHz	12-14 GHz	50 dB	50 dB
F>18.5 GHz		50	50
12-14 GHz		37	36
14-18 GHz		23	36
F<11.5 GHz	14-16	50 dB	50 dB
F>18.5 GHz		50	50
12-14		23	36
14-16 GHz		37	36
16-18 GHz		23	36
F<11.5 GHz	16-17 GHz	50 dB	50 dB
F>18.5 GHz		50	50
12-16 GHz		23	36
12-17 GHz		37	36
17-18 GHz		37	20
3.5-4	Any	10 dB	10 dB

4.5 Test Signal Generator. An internal calibrator provides tests signals to all intercept receivers. These signals are injected at RF ahead of the TDA's, i.e., immediately after the input ports from the antennas.

A comb of frequencies is generated, such that there is one spectral line in each of the 2 GHz widebands between 4 and 18 GHz.

4.5.1 Pulse Receiver Calibration. A sequence of pulses is input, such that the pulse receivers detect alternately a DF and an omni pulse. Both omni channels are stimulated, each at two levels. All measurement circuits are tested plus the channel selection (inhibit) logic.

4.5.2 CW and TI Receiver Calibration. A CW signal is input, first in the DF channels, and then alternating between the two omni channels (two periods in each omni channel). These CW signals are frequency modulated at a 1 kHz rate. The FM deviation is proportional to the RF frequency ($\pm$100 kHz in band 2, $\pm$300 kHz in band 8).

4.5.3 PFM Calibration. In addition to the RF input at the payload front-end, an IF input directly to the PFM subsystem is available as part of the TSG output.

The TSG pre-empts the CW YIG L.O. for this portion of the calibration cycle. The YIG sweeps across the entire 2-4 GHz first IF, stimulating each PFM filter in turn to verify that all 44 are functioning.

5.0 Command Capability. The payload stores two command configurations to be used during tape recorder read-in or bypass periods, i.e., during signal interception periods.

5.1 Common Commands. A portion of the two configurations is controlled in common by a group of real time commands (See Table 2). This common portion includes the following:

a) Selection of primary or back-up devices for the following items:

* 1 GHz master reference for 1st L.O.
* 80 MHz master reference for TI synthesizer
* YIG oscillator in CW receiver
* YIG oscillator as replacement for TI synthesizer

b) Enable/disable of TI receiver

c) Selection of one command configuration as control of configuration selection.

In addition this common portion also controls functions used during telemetry periods, namely:

a) Telemetry on/off

b) Status on/off

c) Selection of tape recorders for read-out

d) Selection of down-link transmitters

e) Selection of down-link format

Table 2

Set Commands

R1 CMND	P/L CMND	Content
.00-3T	SC-39	TI Power Off
.01-1T	SC- 1	Status On
-2T	SC- 2	TM-On
-3T	SC- 2	
.03-1T	SC- 3	R/U T/R-1
-1T	SC- 3	
-2T	SC- 4	R/U T/R-2
-2T	SC- 4	
-3T	SC- 5	R/U T/R-3
-3T	SC- 5	
.06-1T	SC- 9	BBU-1 to XMTR-3
-2T	SC-11	BBU-2 to XMTR-3
-3T	SC-13	XMTRS XFER
.13-1T	SC-15	Bypass Enable
.15-2T	SC-29	B&A Option 2
-3T	SC-31	BBU-1 1:1
-4T	SC-33	BBU-2 1:1
-5T	SC-35	BBU-1:TRK-2 @ 4:1
-6T	SC-37	BBU-2:TRK-2 @ 4:1
.16-1T	SC-17	USE TRG-2
-2T	SC-19	STEER PE: MEM-8
-3T	SC-21	USE B/U 1 GHZ
-4T	SC-23	USE BRU B0 MHZ
-5T	SC-25	Enable B/U YIG
-6T	SC-27	B/U YIG @ TI

Reset Commands

RT CMND	P/L CMND	Content
.00-3F	SC-38	TI Power Enable
.02-2F	SC-7A	Status Off
-1F	SC-7	TM Off
	SC-7	
.03-1F	SC-6A	Stop T/R 1
.02-6F	SC-6	Stop All T/R's
.03-2F	SC-6B	Stop T/R 2
.02-6F	SC-6	Stop All T/R's
.03-3F	SC-6C	Stop T/R 3
.02-6F	SC-6	Stop All T/R's
.06-1F	SC-8	BBU-1 To XMTR-1
-2F	SC-10	BBU-2 To XMTR-2
-3F	SC-12	XMTRS NORMAL
.13-1F	SC-14	Bypass Disable
.15-2F	SC-28	B&A Option 1
-3F	SC-30	BBU-1 4:1
-4F	SC-32	BBU-2 4:1
-5F	SC-34	BBU-1:TRK-1 @ 4:1
-6F	SC-36	BBU-2:TRK-1 @ 4:1
.16-1F	SC-16	USE TRG-1
-2F	SC-18	STEER PE: MEM-A
-3F	SC-20	USE PRIM 1 GHZ
-4F	SC-32	USE PRIM 80 MHZ
-5F	SC-24	Disable B/U YIG
-6F	SC-26	B/U YIG @ CW

5.2 The remainder of the two configurations is stored in two identical command memories. Each memory consists of twelve 8-bit registers, for a total of 96 bits. See table 3 for these registers and the commands used to control them.

a) RF Band Selection. Each configuration selects one 2-GHz band in the 4-12 GHz range, and one in the 12-18 GHz band. The pulse and CW receivers each independently select one of these two bands.

b) Configuration Assignment. There are four primary timer events that can be used to initiate a read-in. Each of these events can be assigned configuration A or B, or it can be assigned to use both configurations, alternating approximately every second between the two.

Only the configuration selected by the common commands will effect the configuration assignments.

c) Input Format. The tape recorders can be used at either a 4:1 or 1:1 readin to readout ratio. The readin time of a full tape at the 4:1 rate is approximately 22 minutes. The readout time is 1/4 of the readin time or approximately 5.5 minutes.

The 1:1 data format consists of the three TI analog signals, a VCO with the TRG signal, and a 50 kHz reference tone on track 1, and 256 KBPS biphase-Mark PCM on track 2.

Table 3

COMMAND MEMORY ORGANIZATION

Frequency Band Selection

SFW	Register	Memory Bank	MC	BB 9 10 11
00	1	A	5	000
01	13	B	6	100

Binary Bits	Function
12 13	2 GHZ RANGE, C AND X BAND
0 0	4-6 GHZ 2
0 1	6-8 GHZ 3
1 0	8-10 GHZ 4
1 1	10-12 GHZ 5
14 15	2 GHZ RANGE, KU BAND
0 0	12-14 GHZ 6
0 1	14-16 GHZ 7
1 0	16-18 GHZ 8
1 1	NA (16-18) (8)
16	PULSE BAND SELECT
0	C AND X BANDS (4-12 GHZ)
1	KU BAND (12-18 GHZ)
17	CW BAND SELECT
0	C AND X BANDS (4-12 GHZ)
1	KU BAND (12-18 GHZ)
18 19	SPARE

Table 3

COMMAND MEMORY ORGANIZATION (Cont.)

Read-in Configuration

SFW	Register	Memory Bank	MC	BB 9 10 11
02	2	A	5	001
03	14	B	6	101

Binary Bits	Function
12	TAPE RECORDER READ-IN MODE
0	1:1 MODE
1	4:1 MODE
13 14	BUFFER STORAGE CONFIGURATION
0 0	USE PRIMARY BUFFER
0 1	USE BACKUP BUFFER
1 X*	BYPASS BUFFER STORAGE
15 16	TSG OPERATION
0 0	TSG SEQUENCE AT TURN-ON ONLY
0 1	TSG AT TURN-ON AND 1-MINUTE INTERVALS
1 0	TSG AT 1-MINUTE INTERVALS ONLY
1 1	NO TSG
17 18 19	SPARE

*X Indicates state of bit is either 1 or 0.

Table 3

COMMAND MEMORY ORGAINZATION (Cont.)

Pre-D Data, TI Receiver

SFW	Register	Memory Bank	MC	BB 9 10 11
04	3	A	5	010
05	15	B	6	110

Binary Bits	Function
12	PRE-D/WBFM SELECTION
0	PRE-D
1	WIDE BAND FM
13	PRE-D/REFERENCE TONE SELECTION (1:1 MODE)
0	PRE-D/WBFM
1	REFERENCE TONES (250 KHZ, 500 KHZ, 1 MHZ)
14	PRE-D OUTPUT LIN/LOG
0	LINEAR-LIMIT
1	LOG
15	PRE-D ENHANCEMENT
0	PRE-D NORMAL LEVEL
1	PRE-D ENHANCED
16	PRE-D BLANKING
0	NORMAL BLANKING
1	ALWAYS UNBLANKED
17	TI NO ACTIVITY FINE FREQUENCY
0	FIXED (USE LAST FINE STEP)
1	SPECTRUM ANALYSIS MODE
18	TI FINE THRESHOLD FAIL OPTION
0	GO TO SPECTRUM ANALYSIS MODE
1	ABORT THIS SIGNAL
19	TI COARSE THRESHOLD
0	NORMAL THRESHOLD
1	INCREASED 5 DB

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Table 3

COMMAND MEMORY ORGANIZATION (Cont.)

PE Steering

SFW	Register	Memory Bank	MC	BB 9 10 11
06	4	A	5	011
07	16	B	6	111

Binary Bits	Function
12	PE-1 STEERING
0	SELECT MEMORY BANK A WITH PE-1
1	SELECT MEMORY BANK B WITH PE-1
13	PE-2 STEERING
0	SELECT MEMORY BANK A WITH PE-2
1	SELECT MEMORY BANK B WITH PE-2
14	PE-3A STEERING
0	SELECT MEMORY BANK A WITH PE-3A
1	SELECT MEMORY BANK B WITH PE-3A
15	PE-4A STEERING
0	SELECT MEMORY BANK A WITH PE-4A
1	SELECT MEMORY BANK B WITH PE-4A
16	A/B TOGGLE MODE, PE-1
0	SELECT NORMAL MEMORY MODE WITH PE-1
1	SELECT A/B TOGGLE MODE WITH PE-1
17	A/B TOGGLE MODE, PE-2
0	SELECT NORMAL MEMORY MODE WITH PE-2
1	SELECT A/B TOGGLE MODE WITH PE-2
18	A/B TOGGLE MODE, PE-3A
0	SELECT NORMAL MEMORY MODE WITH PE-3A
1	SELECT A/B TOGGLE MODE WITH PE-3A
19	A/B TOGGLE MODE, PE-4A
0	SELECT NORMAL MEMORY MODE WITH PE-4A
1	SELECT A/B TOGGLE MODE WITH PE-4A

Table 3

COMMAND MEMORY ORGANIZATION (Cont.)

Pulse Receiver Control

SFW	Register	Memory Bank	MC	BB 9 10 11
08	5	A	5	100
09	17	B	7	000

Binary Bits	Function
12 13	PULSE RECEIVER DATA SELECTION
0 0	DF AND OMNI DATA
0 1	DF DATA ONLY
1 0	OMNI DATA ONLY
1 1	NO PULSE DATA
14	PULSE RECEIVER INHIBIT MARGIN
0	NORMAL
1	+5 DB
15 16	PULSE RECEIVER OMNI SENSITIVITY
0 0	NORMAL
0 1	DECREASE 5 DB
1 0	DECREASE 10 DB
1 1	NA (DECREASE 10 DB)
17	TSG - PULSE MODE
0	ENABLED
1	DISABLED
18 19	SPARE

Table 3

COMMAND MEMORY ORGANIZATION (Cont)

PFM Control

SFW	Register	Memory Bank	MC	BB 9 10 11
10	6	A	5	101
11	18	B	7	001

Binary Bits	Function
12 13	PFM ANTENNA SELECTION
0 0	DF/OMNI - DF PRIORITY
0 1	DF ONLY
1 0	OMNI ONLY
1 1	DF/OMNI - OMNI PRIORITY
14 15	SPARE
16	TSG - PFM MODE
0	ENABLED
1	DISABLED
17 18 19	SPARE

Table 3

SFW	Register	Memory Bank	MC	BB 9 10 11
12	7	A	5	110
13	19	B	7	010

Binary Bits	Function
12 13	CW RECEIVER SWEEP RANGE
0 0	2 GHZ SWEEP
0 1	1 GHZ SWEEP
1 0	0.5 GHZ SWEEP
1 1	NA (0.5 GHZ)

CW RECEIVER START SWEEP FREQUENCY

14 15 16 17 18	IF	BND2	BND3	BND4	BND5	BND6	BND7	BND8
0 0 0 0 0	2000	6000	8000	10000	12000	14000	16000	18000
0 0 0 0 1	2080	5920	7920	9920	11920	13920	15920	17920
0 0 0 1 0	2160	5840	7840	9840	11840	13840	15840	17840
0 0 0 1 1	2240	5760	7760	9760	11760	13760	15760	17760
0 0 1 0 0	2320	5680	7680	9680	11680	13680	15680	17680
0 0 1 0 1	2400	5600	7600	9600	11600	13600	15600	17600
0 0 1 1 0	2480	5520	7520	9520	11520	13520	15520	17520
0 0 1 1 1	2560	5440	7440	9440	11440	13440	15440	17440
0 1 0 0 0	2640	5360	7360	9360	11360	13360	15360	17360
0 1 0 0 1	2720	5280	7280	9280	11280	13280	15280	17280
0 1 0 1 0	2800	5200	7200	9200	11200	13200	15200	17200
0 1 0 1 1	2880	5120	7120	9120	11120	13120	15120	17120
0 1 1 0 0	2960	5040	7040	9040	11040	13040	15040	17040
0 1 1 0 1	3040	4960	6960	8960	10950	12960	14950	16960
0 1 1 1 0	3120	4880	6880	8880	10880	12880	14880	16880
0 1 1 1 1	3200	4800	6800	8800	10800	12800	14800	16800
1 0 0 0 0	3280	4720	6720	8720	10720	12720	14720	16720
1 0 0 0 1	3360	4640	6640	8640	10640	12640	14640	16640
1 0 0 1 0	3440	4560	6560	8560	10560	12560	14560	16560
1 0 0 1 1	3520	4480	6480	8480	10480	12480	14480	16480
1 0 1 0 0	3600	4400	6400	8400	10400	12400	14400	16400
1 0 1 0 1	3680	4320	6320	8320	10320	12320	14320	16320
1 0 1 1 0	3760	4240	6240	8240	10240	12240	14240	16240
1 0 1 1 1	3840	4160	6160	8160	10160	12160	14160	16160
1 1 0 0 0	3920	4080	6080	8080	10080	12080	14080	16080
1 1 0 0 1	4000	4000	6000	8000	10000	12000	14000	16000
1 1 0 1 0	4000	4000	6000	8000	10000	12000	14000	16000
1 1 0 1 1	4000	4000	6000	8000	10000	12000	14000	16000
1 1 1 0 0	4000	4000	6000	8000	10000	12000	14000	16000
1 1 1 0 1	4000	4000	6000	8000	10000	12000	14000	16000
1 1 1 1 0	4000	4000	6000	8000	10000	12000	14000	16000
1 1 1 1 1	4000	4000	6000	8000	10000	12000	14000	16000
19	SPARE							

Table 3

COMMAND MEMORY ORGANIZATION

CW Receiver Control

SFW	Register	Memory Bank	MC	BB 9 10 11
14	8	A	5	111
15	20	B	7	011

Binary Bits	Function
12 13	CW RECEIVER DATA SELECTION
0 0	DF AND OMNI DATA
0 1	DF DATA ONLY
1 0	OMNI DATA ONLY
1 1	NO CW DATA
14	CW RECEIVER INHIBIT MARGIN
0	NORMAL
1	+ 5 DB
15	CW OF THRESHOLD
0	NORMAL
1	ELEVATED 5 DB
16	CW OMNI THRESHOLD
0	NORMAL
1	ELEVATED 5 DB
17	TSG - CW MODE
0	ENABLED
1	DISABLED
18 19	SPARE

Table 3

COMMAND MEMORY ORGANIZATION (Cont.)

TI Receiver Fixed Frequency

SFW	Register	Memory Bank	MC	BB 9 10 11
16	9	A	6	000
17	21	B	7	100

Binary Bits								Function							
12	13	14	15	16	17	18	19	TI FIXED TUNE MODE FREQUENCY							
								IF	BND2	BND3	BND4	BND5	BND6	BND7	BND8
0	0	0	0	0	0	0	0	2000	6000	8000	10000	12000	14000	16000	18000
0	0	0	0	0	0	0	1	2000	6000	8000	10000	12000	14000	16000	18000
0	0	0	0	0	0	1	0	2000	6000	8000	10000	12000	14000	16000	18000
0	0	0	0	0	0	1	1	2000	6000	8000	10000	12000	14000	16000	18000
0	0	0	0	0	1	0	0	2000	6000	8000	10000	12000	14000	16000	18000
0	0	0	0	0	1	0	1	2000	6000	8000	10000	12000	14000	16000	18000
0	0	0	0	0	1	1	0	2000	6000	8000	10000	12000	14000	16000	18000
0	0	0	0	0	1	1	1	2000	6000	8000	10000	12000	14000	16000	18000
0	0	0	0	1	0	0	0	2000	6000	8000	10000	12000	14000	16000	18000
0	0	0	0	1	0	0	1	2000	6000	8000	10000	12000	14000	16000	18000
0	0	0	0	1	0	1	0	2000	6000	8000	10000	12000	14000	16000	18000
0	0	0	0	1	0	1	1	2000	6000	8000	10000	12000	14000	16000	18000
0	0	0	0	1	1	0	0	2000	6000	8000	10000	12000	14000	16000	18000
0	0	0	0	1	1	0	1	2000	6000	8000	10000	12000	14000	16000	18000
0	0	0	0	1	1	1	0	2000	6000	8000	10000	12000	14000	16000	18000
0	0	0	0	1	1	1	1	2000	6000	8000	10000	12000	14000	16000	18000
0	0	0	1	0	0	0	0	2000	6000	8000	10000	12000	14000	16000	18000
0	0	0	1	0	0	0	1	2000	6000	8000	10000	12000	14000	16000	18000
0	0	0	1	0	0	1	0	2000	6000	8000	10000	12000	14000	16000	18000
0	0	0	1	0	0	1	1	2000	6000	8000	10000	12000	14000	16000	18000
0	0	0	1	0	1	0	0	2000	6000	8000	10000	12000	14000	16000	18000
0	0	0	1	0	1	0	1	2000	6000	8000	10000	12000	14000	16000	18000
0	0	0	1	0	1	1	0	2000	6000	8000	10000	12000	14000	16000	18000
0	0	0	1	0	1	1	1	2000	6000	8000	10000	12000	14000	16000	18000
0	0	0	1	1	0	0	0	2000	6000	8000	10000	12000	14000	16000	18000
0	0	0	1	1	0	0	1	2000	6000	8000	10000	12000	14000	16000	18000
0	0	0	1	1	0	1	0	2000	6000	8000	10000	12000	14000	16000	18000
0	0	0	1	1	0	1	1	2000	6000	8000	10000	12000	14000	16000	18000
0	0	0	1	1	1	0	0	2000	6000	8000	10000	12000	14000	16000	18000
0	0	0	1	1	1	0	1	2010	5990	7990	9990	11990	13990	15990	17990
0	0	0	1	1	1	1	0	2020	5980	7980	9980	11980	13980	15980	17980
0	0	0	1	1	1	1	1	2030	5970	7970	9970	11970	13970	15970	17970
0	0	1	0	0	0	0	0	2040	5960	7960	9960	11960	13960	15960	17960

Table 3

COMMAND MEMORY ORGANIZATION (Cont.)

TI Receiver Fixed Frequency (Cont.)

SFW	Register	Memory Bank	MC	BB 9 10 11
16	9	A	6	000
17	21	B	7	100

Binary Bits								Function							
12	13	14	15	16	17	18	19	TI FIXED TUNE MODE FREQUENCY							
								IF	BND2	BND3	BND4	BND5	BND6	BND7	BND8
0	0	1	0	0	0	0	1	2050	5950	7950	9950	11950	13950	15950	17950
0	0	1	0	0	0	1	0	2060	5940	7940	9940	11940	13940	15940	17940
0	0	1	0	0	0	1	1	2070	5930	7930	9930	11930	13930	15930	17930
0	0	1	0	0	1	0	0	2080	5920	7920	9920	11920	13920	15920	17920
0	0	1	0	0	1	0	1	2090	5910	7910	9910	11910	13910	15910	17910
0	0	1	0	0	1	1	0	2100	5900	7900	9900	11900	13900	15900	17900
0	0	1	0	0	1	1	1	2110	5890	7890	9890	11890	13890	15890	17890
0	0	1	0	1	0	0	0	2120	5880	7880	9880	11880	13880	15880	17880
0	0	1	0	1	0	0	1	2130	5870	7870	9870	11870	13870	15870	17870
0	0	1	0	1	0	1	0	2140	5860	7860	9860	11860	13860	15860	17860
0	0	1	0	1	0	1	1	2150	5850	7850	9850	11850	13850	15850	17850
0	0	1	0	1	1	0	0	2160	5840	7840	9840	11840	13840	15840	17840
0	0	1	0	1	1	0	1	2170	5830	7830	9830	11830	13830	15830	17830
0	0	1	0	1	1	1	0	2180	5820	7820	9820	11820	13820	15820	17820
0	0	1	0	1	1	1	1	2190	5810	7810	9810	11810	13810	15810	17810
0	0	1	1	0	0	0	0	2200	5800	7800	9800	11800	13800	15800	17800
0	0	1	1	0	0	0	1	2210	5790	7790	9790	11790	13790	15790	17790
0	0	1	1	0	0	1	0	2220	5780	7780	9780	11780	13780	15780	17780
0	0	1	1	0	0	1	1	2230	5770	7770	9770	11770	13770	15770	17770
0	0	1	1	0	1	0	0	2240	5760	7760	9760	11760	13760	15760	17760
0	0	1	1	0	1	0	1	2250	5750	7750	9750	11750	13750	15750	17750
0	0	1	1	0	1	1	0	2260	5740	7740	9740	11740	13740	15740	17740
0	0	1	1	0	1	1	1	2270	5730	7730	9730	11730	13730	15730	17730
0	0	1	1	1	0	0	0	2280	5720	7720	9720	11720	13720	15720	17720
0	0	1	1	1	0	0	1	2290	5710	7710	9710	11710	13710	15710	17710
0	0	1	1	1	0	1	0	2300	5700	7700	9700	11700	13700	15700	17700
0	0	1	1	1	0	1	1	2310	5690	7690	9690	11690	13690	15690	17690
0	0	1	1	1	1	0	0	2320	5680	7680	9680	11680	13680	15680	17680
0	0	1	1	1	1	0	1	2330	5670	7670	9670	11670	13670	15670	17670
0	0	1	1	1	1	1	0	2340	5660	7660	9660	11660	13660	15660	17660
0	0	1	1	1	1	1	1	2350	5650	7650	9650	11650	13650	15650	17650
0	1	0	0	0	0	0	0	2360	5640	7640	9640	11640	13640	15640	17640
0	1	0	0	0	0	0	1	2370	5630	7630	9630	11630	13630	15630	17630

Table 3

COMMAND MEMORY ORGANIZATION (Cont.)

TI Receiver Fixed Frequency (Cont.)

SFW	Register	Memory Bank	MC	BB 9 10 11
16	9	A	6	000
17	21	B	7	100

Binary Bits								Function							
12	13	14	15	16	17	18	19	TI FIXED TUNE MODE FREQUENCY							
								IF	BND2	BND3	BND4	BND5	BND6	BND7	BND8
0	1	0	0	0	0	1	0	2380	5620	7620	9620	11620	13620	15620	17620
0	1	0	0	0	0	1	1	2390	5610	7610	9610	11610	13610	15610	17610
0	1	0	0	0	1	0	0	2400	5600	7600	9600	11600	13600	15600	17600
0	1	0	0	0	1	0	1	2410	5590	7590	9590	11590	13590	15590	17590
0	1	0	0	0	1	1	0	2420	5580	7580	9580	11580	13580	15580	17580
0	1	0	0	0	1	1	1	2430	5570	7570	9570	11570	13570	15570	17570
0	1	0	0	1	0	0	0	2440	5560	7560	9580	11560	13560	15560	17560
0	1	0	0	1	0	0	1	2450	5550	7550	9550	11550	13550	15550	17550
0	1	0	0	1	0	1	0	2460	5540	7540	9540	11540	13540	15540	17540
0	1	0	0	1	0	1	1	2470	5530	7530	9530	11530	13530	15530	17530
0	1	0	0	1	1	0	0	2480	5520	7520	9520	11520	13520	15520	17520
0	1	0	0	1	1	0	1	2490	5510	7510	9510	11510	13510	15510	17510
0	1	0	0	1	1	1	0	2500	5500	7500	9500	11500	13500	15500	17500
0	1	0	0	1	1	1	1	2510	5490	7490	9490	11490	13490	15490	17490
0	1	0	1	0	0	0	0	2520	5480	7480	9480	11480	13480	15480	17480
0	1	0	1	0	0	0	1	2530	5470	7470	9470	11470	13470	15470	17470
0	1	0	1	0	0	1	0	2540	5460	7460	9460	11460	13460	15460	17460
0	1	0	1	0	0	1	1	2550	5450	7450	9450	11450	13450	15450	17450
0	1	0	1	0	1	0	0	2560	5440	7440	9440	11440	13440	15440	17440
0	1	0	1	0	1	0	1	2570	5430	7430	9430	11430	13430	15430	17430
0	1	0	1	0	1	1	0	2580	5420	7420	9420	11420	13420	15420	17420
0	1	0	1	0	1	1	1	2590	5410	7410	9410	11410	13410	15410	17410
0	1	0	1	1	0	0	0	2600	5400	7400	9400	11400	13400	15400	17400
0	1	0	1	1	0	0	1	2610	5390	7390	9390	11390	13390	15390	17390
0	1	0	1	1	0	1	0	2620	5380	7380	9380	11380	13380	15380	17380
0	1	0	1	1	0	1	1	2630	5370	7370	9370	11370	13370	15370	17370
0	1	0	1	1	1	0	0	2640	5360	7360	9360	11360	13360	15360	17360
0	1	0	1	1	1	0	1	2650	5350	7350	9350	11350	13350	15350	17350
0	1	0	1	1	1	1	0	2660	5340	7340	9340	11340	13340	15340	17340
0	1	0	1	1	1	1	1	2670	5330	7330	9330	11330	13330	15330	17330
0	1	1	0	0	0	0	0	2680	5320	7320	9320	11320	13320	15320	17320
0	1	1	0	0	0	0	1	2690	5310	7310	9310	11310	13310	15310	17310

Table 3

COMMAND MEMORY ORGANIZATION (Cont.)

TI Receiver Fixed Frequency (Cont.)

SFW	Register	Memory Bank	MC	BB 9 10 11
16	9	A	6	000
17	21	B	7	100

Binary Bits								Function							
12	13	14	15	16	17	18	19	TI FIXED TUNE MODE FREQUENCY							
								IF	BND2	BND3	BND4	BND5	BND6	BND7	BND8
0	1	1	0	0	0	1	0	2700	5300	7300	9300	11300	13300	15300	17300
0	1	1	0	0	0	1	1	2710	5290	7290	9290	11290	13290	15290	17290
0	1	1	0	0	1	0	0	2720	5280	7280	9280	11280	13280	15280	17280
0	1	1	0	0	1	0	1	2730	5270	7270	9270	11270	13270	15270	17270
0	1	1	0	0	1	1	0	2740	5260	7260	9260	11260	13260	15260	17260
0	1	1	0	0	1	1	1	2750	5250	7250	9250	11250	13250	15250	17250
0	1	1	0	1	0	0	0	2760	5240	7240	9240	11240	13240	15240	17240
0	1	1	0	1	0	0	1	2770	5230	7230	9230	11230	13230	15230	17230
0	1	1	0	1	0	1	0	2780	5220	7220	9220	11220	13220	15220	17220
0	1	1	0	1	0	1	1	2790	5210	7210	9210	11210	13210	15210	17210
0	1	1	0	1	1	0	0	2800	5200	7200	9200	11200	13200	15200	17200
0	1	1	0	1	1	0	1	2810	5190	7190	9190	11190	13190	15190	17190
0	1	1	0	1	1	1	0	2820	5180	7180	9180	11180	13180	15180	17180
0	1	1	0	1	1	1	1	2830	5170	7170	9170	11170	13170	15170	17170
0	1	1	1	0	0	0	0	2840	5160	7160	9160	11160	13160	15160	17160
0	1	1	1	0	0	0	1	2850	5150	7150	9150	11150	13150	15150	17150
0	1	1	1	0	0	1	0	2860	5140	7140	9140	11140	13140	15140	17140
0	1	1	1	0	0	1	1	2870	5130	7130	9130	11130	13130	15130	17130
0	1	1	1	0	1	0	0	2880	5120	7120	9120	11120	13120	15120	17120
0	1	1	1	0	1	0	1	2890	5110	7110	9110	11110	13110	15110	17110
0	1	1	1	0	1	1	0	2900	5100	7100	9100	11100	13100	15100	17100
0	1	1	1	0	1	1	1	2910	5090	7090	9090	11090	13090	15090	17090
0	1	1	1	1	0	0	0	2920	5080	7080	9080	11080	13080	15080	17080
0	1	1	1	1	0	0	1	2930	5070	7070	9070	11070	13070	15070	17070
0	1	1	1	1	0	1	0	2940	5060	7060	9060	11060	13060	15060	17060
0	1	1	1	1	0	1	1	2950	5050	7050	9050	11050	13050	15050	17050
0	1	1	1	1	1	0	0	2960	5040	7040	9040	11040	13040	15040	17040
0	1	1	1	1	1	0	1	2970	5030	7030	9030	11030	13030	15030	17030
0	1	1	1	1	1	1	0	2980	5020	7020	9020	11020	13020	15020	17020
0	1	1	1	1	1	1	1	2990	5010	7010	9010	11010	13010	15010	17010
1	0	0	0	0	0	0	0	3000	5000	7000	9000	11000	13000	15000	17000
1	0	0	0	0	0	0	1	3010	4990	6990	8990	10990	12990	14990	16990
1	0	0	0	0	0	1	0	3020	4980	6980	8980	10980	12980	14980	16980

Table 3

COMMAND MEMORY ORGANIZATION (Cont.)

TI Receiver Fixed Frequency (Cont.)

SFW	Register	Memory Bank	MC	BB 9 10 11
16	9	A	6	000
17	21	B	7	100

Binary Bits								Function							
12	13	14	15	16	17	18	19	TI FIXED TUNE MODE FREQUENCY							
								IF	BND2	BND3	BND4	BND5	BND6	BND7	BND8
1	0	0	0	0	0	1	1	3030	4970	6970	8970	10970	12970	14970	16970
1	0	0	0	0	1	0	0	3040	4960	6960	8960	10960	12960	14960	16960
1	0	0	0	0	1	0	1	3050	4950	6950	8950	10950	12950	14950	16950
1	0	0	0	0	1	1	0	3060	4940	6940	8940	10940	12940	14940	16940
1	0	0	0	0	1	1	1	3070	4930	6930	8930	10930	12930	14930	16930
1	0	0	0	1	0	0	0	3080	4920	6920	8920	10920	12920	14920	16920
1	0	0	0	1	0	0	1	3090	4910	6910	8910	10910	12910	14910	16910
1	0	0	0	1	0	1	0	3100	4900	6900	8900	10900	12900	14900	16900
1	0	0	0	1	0	1	1	3110	4890	6890	8890	10890	12890	14890	16890
1	0	0	0	1	1	0	0	3120	4880	6880	8880	10880	12880	14880	16880
1	0	0	0	1	1	0	1	3130	4870	6870	8870	10870	12870	14870	16870
1	0	0	0	1	1	1	0	3140	4860	6860	8860	10860	12860	14860	16860
1	0	0	0	1	1	1	1	3150	4850	6850	8850	10850	12850	14850	16850
1	0	0	1	0	0	0	0	3160	4840	6840	8840	10840	12840	14840	16840
1	0	0	1	0	0	0	1	3170	4830	6830	8830	10830	12830	14830	16830
0	0	0	1	0	0	1	0	3180	4820	6820	8820	10820	12810	14820	16820
1	0	0	1	0	0	1	1	3190	4810	6810	8810	10810	12810	14810	16810
1	0	0	1	0	1	0	0	3200	4800	6800	8800	10800	12800	14800	16800
1	0	0	1	0	1	0	1	3210	4790	6790	8790	10790	12790	14790	16790
1	0	0	1	0	1	1	0	3220	4780	6780	8780	10780	12780	14780	16780
1	0	0	1	0	1	1	1	3230	4770	6770	8770	10770	12770	14770	16770
1	0	0	1	1	0	0	0	3240	4760	6760	8760	10760	12760	14760	16760
1	0	0	1	1	0	0	1	3250	4750	6750	8750	10750	12750	14750	16750
1	0	0	1	1	0	1	0	3260	4740	6740	8740	10740	12740	14740	16740
1	0	0	1	1	0	1	1	3270	4730	6730	8730	10730	12730	14730	16730
1	0	0	1	1	1	0	0	3280	4720	6720	8720	10720	12720	14720	16720
1	0	0	1	1	1	0	1	3290	4710	6710	8710	10710	12710	14710	16710
1	0	0	1	1	1	1	0	3300	4700	6700	8700	10700	12700	14700	16700
1	0	0	1	1	1	1	1	3310	4690	6690	8690	10690	12690	14690	16690
1	0	1	0	0	0	0	0	3320	4680	6680	8680	10680	12680	14680	16680
1	0	1	0	0	0	0	1	3330	4670	6670	8670	10670	12670	14670	16670
1	0	1	0	0	0	1	0	3340	4660	6660	8660	10660	12660	14660	16660

Table 3

COMMAND MEMORY ORGANIZATION (Cont.)

TI Receiver Fixed Frequency (Cont.)

SFW	Register	Memory Bank	MC	BB 9 10 11
16	9	A	6	000
17	21	B	7	100

Binary Bits								Function							
12	13	14	15	16	17	18	19	TI FIXED TUNE MODE FREQUENCY							
								IF	BND2	BND3	BND4	BND5	BND6	BND7	BND8
1	0	1	0	0	0	1	1	3350	4650	6650	8650	10650	12650	14650	16650
1	0	1	0	0	1	0	0	3360	4640	6640	8640	10640	12640	14640	16640
1	0	1	0	0	1	0	1	3370	4630	6630	8630	10630	12630	14630	16630
1	0	1	0	0	1	1	0	3380	4620	6620	8620	10620	12620	14620	16620
1	0	1	0	0	1	1	1	3390	4610	6610	8610	10610	12610	14610	16610
1	0	1	0	1	0	0	0	3400	4600	6600	8600	10600	12600	14600	16600
1	0	1	0	1	0	0	1	3410	4590	6590	8590	10590	12590	14590	16590
1	0	1	0	1	0	1	0	3420	4580	6580	8580	10580	12580	14580	16580
1	0	1	0	1	0	1	1	3430	4570	6570	8570	10570	12570	14570	16570
1	0	1	0	1	1	0	0	3440	4560	6560	8560	10560	12560	14560	16560
1	0	1	0	1	1	0	1	3450	4550	6550	8550	10550	12550	14550	16550
1	0	1	0	1	1	1	0	3460	4540	6540	8540	10540	12540	14540	16540
1	0	1	0	1	1	1	1	3470	4530	6530	8530	10530	12530	14530	16530
1	0	1	1	0	0	0	0	3480	4520	6520	8520	10520	12520	14520	16520
1	0	1	1	0	0	0	1	3490	4510	6510	8510	10510	12510	14510	16510
1	0	1	1	0	0	1	0	3500	4500	6500	8500	10500	12500	14500	16500
1	0	1	1	0	0	1	1	3510	4490	6490	8490	10490	12490	14490	16490
1	0	1	1	0	1	0	0	3520	4480	6480	8480	10480	12480	14480	16480
1	0	1	1	0	1	0	1	3530	4470	6470	8470	10470	12470	14470	16470
1	0	1	1	0	1	1	0	3540	4460	6460	8460	10460	12460	14460	16460
1	0	1	1	0	1	1	1	3550	4450	6450	8450	10450	12450	14450	16450
1	0	1	1	1	0	0	0	3560	4440	6440	8440	10440	12440	14440	16440
1	0	1	1	1	0	0	1	3570	4430	6430	8430	10430	12430	14430	16430
1	0	1	1	1	0	1	0	3580	4420	6420	8420	10420	12420	14420	16420
1	0	1	1	1	0	1	1	3590	4410	6410	8410	10410	12410	14410	16410
1	0	1	1	1	1	0	0	3600	4400	6400	8400	10400	12400	14400	16400
1	0	1	1	1	1	0	1	3610	4390	6390	8390	10390	12390	14390	16390
1	0	1	1	1	1	1	0	3620	4380	6380	8380	10380	12380	14380	16380
1	0	1	1	1	1	1	1	3630	4370	6370	8370	10370	12370	14370	16370
1	1	0	0	0	0	0	0	3640	4360	6360	8360	10360	12360	14360	16360
1	1	0	0	0	0	0	1	3650	4350	6350	8350	10350	12350	14350	16350
1	1	0	0	0	0	1	0	3660	4340	6340	8340	10340	12340	14340	16340

Table 3

COMMAND MEMORY ORGANIZATION (Cont.)

TI Receiver Fixed Frequency (Cont.)

SFW	Register	Memory Bank	MC	BB 9 10 11
16	9	A	6	000
17	21	B	7	100

Binary Bits								Function							
12	13	14	15	16	17	18	19	TI FIXED TUNE MODE FREQUENCY							
								IF	BND2	BND3	BND4	BND5	BND6	BND7	BND8
1	1	0	0	0	0	1	1	3670	4330	6330	8330	10330	12330	14330	16330
1	1	0	0	0	1	0	0	3680	4320	6320	8320	10320	12320	14320	16320
1	1	0	0	0	1	0	1	3690	4310	6310	8310	10310	12310	14310	16310
1	1	0	0	0	1	1	0	3700	4300	6300	8300	10300	12300	14300	16300
1	1	0	0	0	1	1	1	3710	4290	6290	8290	10290	12290	14290	16290
1	1	0	0	1	0	0	0	3720	4280	6280	8280	10280	12280	14280	16280
1	1	0	0	1	0	0	1	3730	4270	6270	8270	10270	12270	14270	16270
1	1	0	0	1	0	1	0	3740	4260	6260	8260	10260	12260	14260	16260
1	1	0	0	1	0	1	1	3750	4250	6250	8250	10250	12250	14250	16250
1	1	0	0	1	1	0	0	3760	4240	6240	8240	10240	12240	14240	16240
1	1	0	0	1	1	0	1	3770	4230	6230	8230	10230	12230	14230	16230
1	1	0	0	1	1	1	0	3780	4220	6220	8220	10220	12220	14220	16220
1	1	0	0	1	1	1	1	3790	4210	6210	8210	10210	12210	14210	16210
1	1	0	1	0	0	0	0	3800	4200	6200	8200	10200	12200	14200	16200
1	1	0	1	0	0	0	1	3810	4190	6190	8190	10190	12190	14190	16190
1	1	0	1	0	0	1	0	3820	4180	6180	8180	10180	12180	14180	16180
1	1	0	1	0	0	1	1	3830	4170	6170	8170	10170	12170	14170	16170
1	1	0	1	0	1	0	0	3840	4160	6160	8160	10160	12160	14160	16160
1	1	0	1	0	1	0	1	3850	4150	6150	8150	10150	12150	14150	16150
1	1	0	1	0	1	1	0	3860	4140	6140	8140	10140	12140	14140	16140
1	1	0	1	0	1	1	1	3870	4130	6130	8130	10130	12130	14130	16130
1	1	0	1	1	0	0	0	3880	4120	6120	8120	10120	12120	14120	16120
1	1	0	1	1	0	0	1	3890	4110	6110	8110	10110	12110	14110	16110
1	1	0	1	1	0	1	0	3900	4100	6100	8100	10100	12100	14100	16100
1	1	0	1	1	0	1	1	3910	4090	6090	8090	10090	12090	14090	16090
1	1	0	1	1	1	0	0	3920	4080	6080	8080	10080	12080	14080	16080
1	1	0	1	1	1	0	1	3930	4070	6070	8070	10070	12070	14070	16070
1	1	0	1	1	1	1	0	3940	4060	6060	8060	10060	12060	14060	16060
1	1	0	1	1	1	1	1	3950	4050	6050	8050	10050	12050	14050	16050
1	1	1	0	0	0	0	0	3960	4040	6040	8040	10040	12040	14040	16040
1	1	1	0	0	0	0	1	3970	4030	6030	8030	10030	12030	14030	16030
1	1	1	0	0	0	1	0	3980	4020	6020	8020	10020	12020	14020	16020

Table 3

COMMAND MEMORY ORGANIZATION (Cont.)

TI Receiver Fixed Frequency (Cont.)

SFW	Register	Memory Bank	MC	BB 9 10 11
16	9	A	6	000
17	21	B	7	100

Binary Bits								Function							
12	13	14	15	16	17	18	19	TI FIXED TUNE MODE FREQUENCY							
								IF	BND2	BND3	BND4	BND5	BND6	BND7	BND8
1	1	1	0	0	0	1	1	3990	4010	6010	8010	10010	12010	14010	16010
1	1	1	0	0	1	0	0	4000	4000	6000	8000	10000	12000	14000	16000
1	1	1	0	0	1	0	1	4000	4000	6000	8000	10000	12000	14000	16000
1	1	1	0	0	1	1	0	4000	4000	6000	8000	10000	12000	14000	16000
1	1	1	0	0	1	1	1	4000	4000	6000	8000	10000	12000	14000	16000
1	1	1	0	1	0	0	0	4000	4000	6000	8000	10000	12000	14000	16000
1	1	1	0	1	0	0	1	4000	4000	6000	8000	10000	12000	14000	16000
1	1	1	0	1	0	1	0	4000	4000	6000	8000	10000	12000	14000	16000
1	1	1	0	1	0	1	1	4000	4000	6000	8000	10000	12000	14000	16000
1	1	1	0	1	1	0	0	4000	4000	6000	8000	10000	12000	14000	16000
1	1	1	0	1	1	0	1	4000	4000	6000	8000	10000	12000	14000	16000
1	1	1	0	1	1	1	0	4000	4000	6000	8000	10000	12000	14000	16000
1	1	1	0	1	1	1	1	4000	4000	6000	8000	10000	12000	14000	16000
1	1	1	1	0	0	0	0	4000	4000	6000	8000	10000	12000	14000	16000
1	1	1	1	0	0	0	1	4000	4000	6000	8000	10000	12000	14000	16000
1	1	1	1	0	0	1	0	4000	4000	6000	8000	10000	12000	14000	16000
1	1	1	1	0	0	1	1	4000	4000	6000	8000	10000	12000	14000	16000
1	1	1	1	0	1	0	0	4000	4000	6000	8000	10000	12000	14000	16000
1	1	1	1	0	1	0	1	4000	4000	6000	8000	10000	12000	14000	16000
1	1	1	1	0	1	1	0	4000	4000	6000	8000	10000	12000	14000	16000
1	1	1	1	0	1	1	1	4000	4000	6000	8000	10000	12000	14000	16000
1	1	1	1	1	0	0	0	4000	4000	6000	8000	10000	12000	14000	16000
1	1	1	1	1	0	0	1	4000	4000	6000	8000	10000	12000	14000	16000
1	1	1	1	1	0	1	0	4000	4000	6000	8000	10000	12000	14000	16000
1	1	1	1	1	0	1	1	4000	4000	6000	8000	10000	12000	14000	16000
1	1	1	1	1	1	0	0	4000	4000	6000	8000	10000	12000	14000	16000
1	1	1	1	1	1	0	1	4000	4000	6000	8000	10000	12000	14000	16000
1	1	1	1	1	1	1	0	4000	4000	6000	8000	10000	12000	14000	16000
1	1	1	1	1	1	1	1	4000	4000	6000	8000	10000	12000	14000	16000

Table 3

COMMAND MEMORY ORGANIZATION (Cont.)

TI Receiver

SFW	Register	Memory Bank	MC	BB 9 10 11
18	10	A	6	001
19	22	B	7	101

Binary Bits								Function							
12	13	14	15	16	17	18	19	TI ACCEPT/REJECT BAND START FREQUENCY							
								IF	BND2	BND3	BND4	BND5	BND6	BND7	BND8
0	0	0	0	0	0			2000	6000	8000	10000	12000	14000	16000	18000
0	0	0	0	0	1			2000	6000	8000	10000	12000	14000	16000	18000
0	0	0	0	1	0			2000	6000	8000	10000	12000	14000	16000	18000
0	0	0	0	1	1			2000	6000	8000	10000	12000	14000	16000	18000
0	0	0	1	0	0			2000	6000	8000	10000	12000	14000	16000	18000
0	0	0	1	0	1			2000	6000	8000	10000	12000	14000	16000	18000
0	0	0	1	1	0			2000	6000	8000	10000	12000	14000	16000	18000
0	0	0	1	1	1			2000	6000	8000	10000	12000	14000	16000	18000
0	0	1	0	0	0			2040	5960	7960	9960	11960	13960	15960	17960
0	0	1	0	0	1			2080	5920	7920	9920	11920	13920	15920	17920
0	0	1	0	1	0			2120	5880	7880	9880	11880	13880	15880	17880
0	0	1	0	1	1			2160	5840	7840	9840	11840	13840	15840	17840
0	0	1	1	0	0			2200	5800	7800	9800	11800	13800	15800	17800
0	0	1	1	0	1			2240	5760	7760	9760	11760	13760	15760	17760
0	0	1	1	1	0			2280	5720	7720	9720	11720	13720	15720	17720
0	0	1	1	1	1			2320	5680	7680	9680	11680	13680	15680	17680
0	1	0	0	0	0			2360	5640	7640	9640	11640	13640	15640	17640
0	1	0	0	0	1			2400	5600	7600	9600	11600	13600	15600	17600
0	1	0	0	1	0			2440	5560	7560	9560	11560	13560	15560	17560
0	1	0	0	1	1			2480	5520	7520	9520	11520	13520	15520	17520
0	1	0	1	0	0			2520	5480	7480	9480	11480	13480	15480	17480
0	1	0	1	0	1			2560	5440	7440	9440	11440	13440	15440	17440
0	1	0	1	1	0			2600	5400	7400	9400	11400	13400	15400	17400
0	1	0	1	1	1			2640	5360	7360	9360	11360	13360	15360	17360
0	1	1	0	0	0			2680	5320	7320	9320	11320	13320	15320	17320
0	1	1	0	0	1			2720	5280	7280	9280	11280	13280	15280	17280
0	1	1	0	1	0			2760	5240	7240	9240	11240	13240	15240	17240
0	1	1	0	1	1			2800	5200	7200	9200	11200	13200	15200	17200
0	1	1	1	0	0			2840	5160	7160	9160	11160	13160	15160	17160
0	1	1	1	0	1			2880	5120	7120	9120	11120	13120	15120	17120
0	1	1	1	1	0			2920	5080	7080	9080	11080	13080	15080	17080
0	1	1	1	1	1			2960	5040	7040	9040	11040	13040	15040	17040

Table 3

COMMAND MEMORY ORGANIZATION (Cont.)

TI Receiver (Cont.)

SFW	Register	Memory Bank	MC	BB 9 10 11
18	10	A	6	001
19	22	B	7	101

Binary Bits								Function							
12	13	14	15	16	17	18	19	TI ACCEPT/REJECT BAND START FREQUENCY							
								IF	BND2	BND3	BND4	BND5	BND6	BND7	BND8
1	0	0	0	0	0			3000	5000	7000	9000	11000	13000	15000	17000
1	0	0	0	0	1			3040	4960	6960	8960	10960	12960	14960	16960
1	0	0	0	1	0			3080	4920	6920	8920	10920	12920	14920	16920
1	0	0	0	1	1			3120	4880	6880	8880	10880	12880	14880	16880
1	0	0	1	0	0			3160	4840	6840	8840	10840	12840	14840	16840
1	0	0	1	0	1			3200	4800	6800	8800	10800	12800	14800	16800
1	0	0	1	1	0			3240	4760	6760	8760	10760	12760	14760	16760
1	0	0	1	1	1			3280	4720	6720	8720	10720	12720	14720	16720
1	0	1	0	0	0			3320	4680	6680	8680	10680	12680	14680	16680
1	0	1	0	0	1			3360	4640	6640	8640	10640	12640	14640	16640
1	0	1	0	1	0			3400	4600	6600	8600	10600	12600	14600	16600
1	0	1	0	1	1			3440	4560	6560	8560	10560	12560	14560	16560
1	0	1	1	0	0			3480	4520	6520	8520	10520	12520	14520	16520
1	0	1	1	0	1			3520	4480	6480	8480	10480	12480	14480	16480
1	0	1	1	1	0			3560	4440	6440	8440	10440	12440	14440	16440
1	0	1	1	1	1			3600	4400	6400	8400	10400	12400	14400	16400
1	1	0	0	0	0			3640	4360	6360	8360	10360	12360	14360	16360
1	1	0	0	0	1			3680	4320	6320	8320	10320	12320	14320	16320
1	1	0	0	1	0			3720	4280	6280	8280	10280	12280	14280	16280
1	1	0	0	1	1			3760	4240	6240	8240	10240	12240	14240	16240
1	1	0	1	0	0			3800	4200	6200	8200	10200	12200	14200	16200
1	1	0	1	0	1			3840	4160	6160	8160	10160	12160	14160	16160
1	1	0	1	1	0			3880	4120	6120	8120	10120	12120	14120	16120
1	1	0	1	1	1			3920	4080	6080	8080	10080	12080	14080	16080
1	1	1	0	0	0			3960	4040	6040	8040	10040	12040	14040	16040
1	1	1	0	0	1			4000	4000	6000	8000	10000	12000	14000	16000
1	1	1	0	1	0			4000	4000	6000	8000	10000	12000	14000	16000
1	1	1	0	1	1			4000	4000	6000	8000	10000	12000	14000	16000
1	1	1	1	0	0			4000	4000	6000	8000	10000	12000	14000	16000
1	1	1	1	0	1			4000	4000	6000	8000	10000	12000	14000	16000
1	1	1	1	1	0			4000	4000	6000	8000	10000	12000	14000	16000
1	1	1	1	1	1			4000	4000	6000	8000	10000	12000	14000	16000

Table 3

COMMAND MEMORY ORGANIZATION (Cont.)

TI Receiver (Cont.)

SFW	Register	Memory Bank	MC	BB 9 10 11
18	10	A	6	001
19	22	B	7	101

Binary Bits	Function
18 19	TI RECEIVER ANTENNA SELECTION
0 0	DF/OMNI WITH DF PRIORITY
0 1	DF ONLY
1 0	OMNI ONLY
1 1	DF/OMNI WITH OMNI PRIORITY

Table 3

COMMAND MEMORY ORGANIZATION (Cont.)

TI Receiver (Cont.)

SFW	Register	Memory Bank	MC	BB 9 10 11
20	11	A	6	010
21	23	B	7	110

Binary Bits								Function							
12	13	14	15	16	17	18	19	TI ACCEPT/REJECT BAND END FREQUENCY							
								IF	BND2	BND3	BND4	BND5	BND6	BND7	BND8
0	0	0	0	0	0			2000	6000	8000	10000	12000	14000	16000	18000
0	0	0	0	0	1			2000	6000	8000	10000	12000	14000	16000	18000
0	0	0	0	1	0			2000	6000	8000	10000	12000	14000	16000	18000
0	0	0	0	1	1			2000	6000	8000	10000	12000	14000	16000	18000
0	0	0	1	0	0			2000	6000	8000	10000	12000	14000	16000	18000
0	0	0	1	0	1			2000	6000	8000	10000	12000	14000	16000	18000
0	0	0	1	1	0			2000	6000	8000	10000	12000	14000	16000	18000
0	0	0	1	1	1			2000	6000	8000	10000	12000	14000	16000	18000
0	0	1	0	0	0			2040	5960	7960	9960	11960	13960	15960	17960
0	0	1	0	0	1			2080	5920	7920	9920	11920	13920	15920	17920
0	0	1	0	1	0			2120	5880	7880	9880	11880	13880	15880	17880
0	0	1	0	1	1			2160	5840	7840	9840	11840	13840	15840	17840
0	0	1	1	0	0			2200	5800	7800	9800	11800	13800	15800	17800
0	0	1	1	0	1			2240	5760	7760	9760	11760	13760	15760	17760
0	0	1	1	1	0			2280	5720	7720	9720	11720	13720	15720	17720
0	0	1	1	1	1			2320	5680	7680	9680	11680	13680	15680	17680
0	1	0	0	0	0			2360	5640	7640	9640	11640	13640	15640	17640
0	1	0	0	0	1			2400	5600	7600	9600	11600	13600	15600	17600
0	1	0	0	1	0			2440	5560	7560	9560	11560	13560	15560	17560
0	1	0	0	1	1			2480	5520	7520	9520	11520	13520	15520	17520
0	1	0	1	0	0			2520	5480	7480	9480	11480	13480	15480	17480
0	1	0	1	0	1			2560	5440	7440	9440	11440	13440	15440	17440
0	1	0	1	1	0			2600	5400	7400	9400	11400	13400	15400	17400
0	1	0	1	1	1			2640	5360	7360	9360	11360	13360	15360	17360
0	1	1	0	0	0			2680	5320	7320	9320	11320	13320	15320	17320
0	1	1	0	0	1			2720	5280	7280	9280	11280	13280	15280	17280
0	1	1	0	1	0			2760	5240	7240	9240	11240	13240	15240	17240
0	1	1	0	1	1			2800	5200	7200	9200	11200	13200	15200	17200
0	1	1	1	0	0			2840	5160	7160	9160	11160	13160	15160	17160
0	1	1	1	0	1			2880	5120	7120	9120	11120	13120	15120	17120
0	1	1	1	1	0			2920	5080	7080	9080	11080	13080	15080	17080
0	1	1	1	1	1			2960	5040	7040	9040	11040	13040	15040	17040
1	0	0	0	0	0			3000	5000	7000	9000	11000	13000	15000	17000

Table 3

COMMAND MEMORY ORGANIZATION (Cont.)

TI Receiver (Cont.)

SFW	Register	Memory Bank	MC	BB 9 10 11
20	11	A	6	010
21	23	B	7	110

Binary Bits						Function							
12	13	14	15	16	17	TI ACCEPT/REJECT BAND END FREQUENCY							
						1F	BND2	BND3	BND4	BND5	BND6	BND7	BND8
1	0	0	0	0	1	3040	4960	6960	8960	10960	12960	14960	16960
1	0	0	0	1	0	3080	4920	6920	8920	10920	12920	14920	16920
1	0	0	0	1	1	3120	4880	6880	8880	10880	12880	14880	16880
1	0	0	1	0	0	3160	4840	6840	8840	10840	12840	14840	16840
1	0	0	1	0	1	3200	4800	6800	8800	10800	12800	14800	16800
1	0	0	1	1	0	3240	4760	6760	8760	10760	12760	14760	16760
1	0	0	1	1	1	3280	4720	6720	8720	10720	12720	14720	16720
1	0	1	0	0	0	3320	4680	6680	8680	10680	12680	14680	16680
1	0	1	0	0	1	3360	4640	6640	8640	10640	12640	14640	16640
1	0	1	0	1	0	3400	4600	6600	8600	10600	12600	14600	16600
1	0	1	0	1	1	3440	4560	6560	8560	10560	12560	14560	16560
1	0	1	1	0	0	3480	4520	6520	8520	10520	12520	14520	16520
1	0	1	1	0	1	3520	4480	6480	8480	10480	12480	14480	16480
1	0	1	1	1	0	3560	4440	6440	8440	10440	12440	14440	16440
1	0	1	1	1	1	3600	4400	6400	8400	10400	12400	14400	16400
1	1	0	0	0	0	3640	4360	6360	8360	10360	12300	14360	16360
1	1	0	0	0	1	3680	4320	6320	8320	10320	12320	14320	16320
1	1	0	0	1	0	3720	4280	6280	8280	10280	12280	14280	16280
1	1	0	0	1	1	3760	4240	6240	8240	10240	12240	14240	16240
1	1	0	1	0	0	3800	4200	6200	8200	10200	12200	14200	16200
1	1	0	1	0	1	3840	4160	6160	8160	10160	12160	14160	16160
1	1	0	1	1	0	3880	4120	6120	8120	10120	12120	14120	16120
1	1	0	1	1	1	3920	4080	6080	8080	10080	12080	14080	16080
1	1	1	0	0	0	3960	4040	6040	8040	10040	12040	14040	16040
1	1	1	0	0	1	4000	4000	6000	8000	10000	12000	14000	16000
1	1	1	0	1	0	4000	4000	6000	8000	10000	12000	14000	16000
1	1	1	0	1	1	4000	4000	6000	8000	10000	12000	14000	16000
1	1	1	1	0	0	4000	4000	6000	8000	10000	12000	14000	16000
1	1	1	1	0	1	4000	4000	6000	8000	10000	12000	14000	16000
1	1	1	1	1	0	4000	4000	6000	8000	10000	12000	14000	16000
1	1	1	1	1	1	4000	4000	6000	8000	10000	12000	14000	16000

Table 3

COMMAND MEMORY ORGANIZATION (Cont.)

TI Receiver (Cont.)

SFW	Register	Memory Bank	MC	BB 9 10 11
20	11	A	6	010
21	23	B	7	110

Binary Bits	Function
18	TI DF SIGNAL MODE
0	NORMAL (2 SIGNALS)
1	ONE DF SIGNAL ONLY
19	SPARE

Table 3

COMMAND MEMORY ORGANIZATION (Cont.)

TI Receiver (Cont.)

SFW	Register	Memory Bank	MC	BB 9 10 11
22	12	A	6	011
23	24	B	7	111

Binary Bits	Function
12 13	TI WIDE BAND TUNING MODE
0 0	TUNE FULL BAND
0 1	ACCEPT BAND ONLY
1 0	REJECT BAND ONLY
1 1	FIXED TUNED (SINGLE 10 MHZ STEP)
14 15	TI NO ACTIVITY/FIXED FREQUENCY ANTENNA
0 0	DF ANTENNA
0 1	OMNI-1 ANTENNA
1 0	OMNI-2 ANTENNA
1 1	OMNI-2 ANTENNA
16 17 18	TI NARROW BAND TUNING MODE
No Function 0 0	SPECTRUM ANALYSIS
0 1	1 SWEEP MODE
1 0	2 SWEEP MODE
1 1	2 SWEEP MODE
19	TI "LIKE" RESULTS FAIL OPTION
0	GO TO SPECTRUM ANALYSIS MODE
1	ABORT THIS SIGNAL

The 4:1 data format consists of 256 KBPS PCM (it may be either NRZ-S or bi-phase-mark encoded) on each track (identical PCM on each track).

d. PCM Buffer. The payload includes two PCM buffers, each holding 64 intercept words. Each command configuration must select the normal buffer, or the back-up buffer, or select buffer bypass (used only in the event of buffer failure).

e. Test Signal Generator. Each command configuration includes three enable bits: One each for the pulse CALIB, the CW CALIB, and the PFM CALIB. It also specified TSG timing as:

a) Start of each read-in and once/minute
b) Start of each read-in only
c) Once per minute only
d) TSG off

f. Pulse Receiver. Each command configuration includes two enable bits - One for DF reports, the other for omni reports. If neither is present, all pulse reports will be suppressed. In addition, the omni channel threshold can be raised by 5 or 10 dB to reduce the number of omni reports in a dense environment. This does not affect the DF to omni comparison, and so leaves sidelobe inhibition intact. The DF to omni comparison can be affected by a 5 dB offset that is available to eliminate all DF intercepts that do not exceed the omni level by at least 5 dB.

g. PFM Control. Each command configuration specifies which IF channels may be monitored by the PFM. If both DF and omni are allowed, the configuration selects one or the other as a priority channel (i.e., the alternate will be ignored so long as there is activity in the priority channel).

h. CW Receiver. Each command configuration selects a starting frequency (80 MHz resolution) and a sweep range (2000, 1000, or 500 MHz) for the CW search receiver. Each command configuration also includes two enable bits: one for DF reports, the other for omni reports. These enable bits affect the PCM stream only - handovers to the TI receiver are not affected. Each command configuration selects either full or -5 DB sensitivity for the DF channel and, separately, for the omni channels. Each command configuration selects either zero or 5 dB bias in favor or omni for the DF-omni comparison. This provides increased sidelobe inhibit margin.

i. TI Receiver Tuning. Each command configuration selects a 13 MHz window in the 2 GHz band. The resolution of this selection is 10-MHz. This is the TI receiver coarse tune frequency in fixed frequency mode, and between dwells in all modes.

The TI tuning mode is also selected - fixed tune, CW handover within a special window only, or CW handover outside that window only, or CW handover at any frequency. Further, each command configuration defines this special window with a start and a stop frequency (40 MHz resolution to each limit point). Each configuration specifies which channels to monitor - DF only, omni only, or both. If both are selected, one is given priority.

j. TI Mode. Each command configuration specifies which IF channel to monitor, and whether to use spectrum analysis or narrowband mode between dwells. They also specify either spectrum analysis, one-sweep narrowband, or two sweep narrowband for dwell periods. If narrowband is selected, the TI receiver can be ordered to change to spectrum analysis any time a fine tune up fails to locate the signal. The TI receiver analog outputs can be blanked between dwells, or left active. The pre-D signal can be taken from a linear amplifier or a log amplifier. The Pre-D signal can be replaced by the WBFM discriminator output, or by a repeating sequence or reference tones (used only as a test mode).

The channel F and H VCO signals can be suppressed and the pre-D channel gain increased to enhance the pre-D signal to noise ratio at the ground.

k. TI Sensitivity. The TI sensitivity can be reduced 2 dB by command.

6.0 Data Format

6.1 Payload Analog Output. The payload analog output to track 1 of the flight tape recorders when in the 1:1 mode consists of the summation of the following analog signals from the TI receiver:

a) One of three choices, to wit:

- o 250-1000 kHz predetection analog
- o 250-1000 kHz WBFM discriminator postdetection analog
- o Repeating sequence of 250, 500, and 1000 kHz tones

b) An FM discriminator signal on channel H VCO

c) An AM detector signal on channel F VCO

d) A 50 kHz reference tone

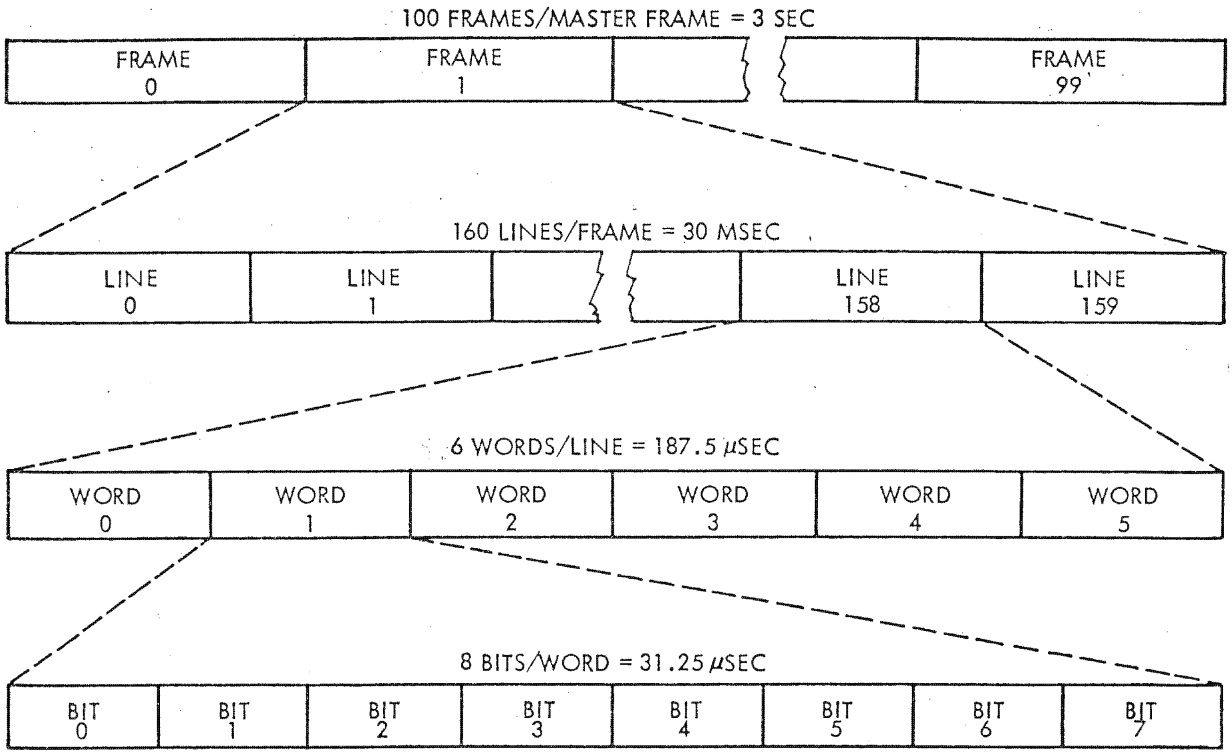
e) A time signal (AN-GSQ-53A) on channel 14 VCO

Items b) and c) can be omitted if a higher signal-to-noise ratio is desired for item a).

Signal	Frequency Range	Volts(P-P)
Pre-D or WBFM	250-1000 kHz	1.936 or 2.664
CH H VCO (FM)	165 ±25 kHz (0-10 kHz)	.454 or 0.0
CH F VCO (AM)	93 ±14 kHz (0 - 7 kHz)	.273 or 0.0
CH 14 VCO (Time)	22 ±1.65 kHz (250 ±25 Hz)	.154
Ref Tone	50 ±1 kHz	.182

6.2 Payload PCM Output. The payload digital data are output as a continuous PCM stream, formatted as shown in figures 5, 6 and 7.

The digital data consists of 48-bit intercept reports and 8-bit subcommutated data words. Each frame consists of a 48-bit sync line, two 48 bit subcom lines, and 157 lines that are available for any desired mixture of intercept reports. Any line not required for an intercept report is automatically filled with a no-data report.



3 SECONDS/MASTER FRAME
30 MSEC/FRAME
187.5 μSEC/LINE
31.25 μSEC/WORD
3.91 μSEC/BIT

Figure 5 Typical PCM Structure

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FRAME SYNC LINE

1	1	1	0	1	0	0	0
1	1	0	1	1	1	1	0
1	1	1	0	1	1	0	1
0	0	1	1	0	0	0	0
1	0	1	0	0	0	1	0
0	0	1	0	0	0	0	0

NO DATA LINE

HS	SAS	0	0	0	1	0	0
LINE COUNT (0-159)							
1	1	1	0	0	0	1	0
0	1	0	1	1	1	0	0
0	0	1	0	0	1	0	0
0	0	1	1	1	1	0	0

Figure 6 · Typical PCM Format

PULSE IWG

HS	TSG	DF/OM RATIO		CHANNEL/OM TH 01/02	DF/OM	1	0
LINE COUNT (0-159)							
PULSE TOA (0-187 USEC)							
PULSE WIDTH (0.1-12.7 USEC)							PFM X-OVER
PULSE FREQUENCY (2-4 GHz)						PFM CHANNEL DF/OM	01/02
PULSE AMPLITUDE (0-31 dB)					CH DF/OM	1	0

CW IWG

HS	TSG	DF/OM RATIO		CHANNEL/OM TH 01/02	DF/OM	0	1
LINE COUNT (0-159)							
CW FREQUENCY (2-4 GHz)							
0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0
CW AMPLITUDE (0-38.75 dB)					CH DF/OM	0	1

Figure 6 Typical PCM Format (Cont.)

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TI INITIALIZATION IWG (NB SEARCH)

HS	TSG	NB SWEEP NO.	CHANNEL 01/02 DF/OM	1	1
LINE COUNT (0-159)					
COARSE FREQUENCY (2-4 GHz)					
FINE FREQUENCY (12.7-MHz)					INIT 1
FINE SPECTRUM WIDTH (12.7 MHz)					NB SEARCH 0
WB AMPLITUDE			CH DF/OM	1	1

TI INITIALIZATION IWG (SPEC ANA)

HS	TSG	0	0	CHANNEL 01/02 DF/OM	1	1
LINE COUNT (0-159)						
COARSE FREQUENCY (2-4 GHz)						
FINE FREQUENCY (12.7 MHz)						INIT 1
FINE SPECTRUM WIDTH (12.7 MHz)						SA 1
WB AMPLITUDE				CH DF/OM	1	1

Figure 6 Typical PCM Format (Cont.)

TI START DWELL IWG (NB LOCK)

HS	TSG	START ID 1 0	CHANNEL 01/02 DF/OM	1	1
LINE COUNT (0-159)					
COARSE FREQUENCY (2-4 GHz)					
FINE FREQUENCY (12.7 MHz)					DWELL 0
NB AMPLITUDE			0	0	NB LOCK 0
WB AMPLITUDE			CH DF/OM	1	1

TI START DWELL IWG (SPEC ANA)

HS	TSG	START ID 1 0	CHANNEL 01/02 DF/OM	1	1
LINE COUNT (0-159)					
COARSE FREQUENCY (2-4 GHz)					
FINE FREQUENCY (12.7 MHz)					DWELL 0
FINE SPECTRUM WIDTH (12.7 MHz)					SA 1
WB AMPLITUDE			CH DF/OM	1	1

Figure 6 Typical PCM Format (Cont.)

TI DWELL IWG (NB LOCK)

HS	TSG	DWELL ID 0 0	CHANNEL 01/02 DF/OM	1	1
LINE COUNT (0-159)					
COARSE FREQUENCY (2-4 GHz)					
FINE FREQUENCY (12.7 MHz)					DWELL 0
NB AMPLITUDE			0	0	NB LOCK 0
WB AMPLITUDE			CH DF/OM	1	1

TI DWELL IWG (SPEC ANA)

HS	TSG	DWELL ID 0 0	CHANNEL 01/02 DF/OM	1	1
LINE COUNT (0-159)					
COARSE FREQUENCY (2-4 GHz)					
FINE FREQUENCY (12.7 MHz)					DWELL 0
FINE SPECTRUM WIDTH (12.7 MHz)					SA 1
WB AMPLITUDE			CH DF/OM	1	1

Figure 6 Typical PCM Format (Cont.)

TI END DWELL IWG (NB LOCK)

HS	TSG	END ID 1 1	CHANNEL 01/02 DF/OM	1	1
LINE COUNT (0-159)					
COARSE FREQUENCY (2-4 GHz)					
FINE FREQUENCY (12.7 MHz)					DWELL 0
NB AMPLITUDE			0	0	NB LOCK 0
WB AMPLITUDE			CH DF/OM	1	1

TI END DWELL IWG (SPEC ANA)

HS	TSG	END ID 1 1	CHANNEL 01/02 DF/OM	1	1
LINE COUNT (0-159)					
COARSE FREQUENCY (2-4 GHz)					
FINE FREQUENCY (12.7 MHz)					DWELL 0
FINE SPECTRUM WIDTH (12.7 MHz)					SA 1
WB AMPLITUDE			CH DF/OM	1	1

Figure 6 Typical PCM Format (Cont.)

SUBCOM: LINE 50

HS	0	HS ID	MEM (R)	MEM (F)	0	0	0
SFID							
SUBCOM WORD "A"							
HS UP LINE COUNT*							
HS DOWN LINE COUNT*							
5 LSB: MASTER FRAME COUNT					0	0	0

SUBCOM: LINE 100

HS	0	SAS ID	CW BAND	0	0	0
SUBCOM WORD "0"						
SAS ANGLE						
SAS LINE NUMBER						
SUBCOM WORD "G"						
C/X BAND		Ku BAND	PULSE BAND	0	0	0

Figure 7 Typical PCM Subcom Format

A 64 line buffer is included to permit intercept reports to be temporarily stored during short periods of high intercept rate. The buffer readouts at a 256 KBPS rate to the tape recorder or directly to the transmitters (during a bypass mode).

The PCM signal is bi-phase-mark encoded normally. NRZ-S encoding can be selected during a 4:1 tape recorder read-in period if there has been a hardware failure preventing the use of the bi-phase-mark encoded data.

6.3 Tape Recorder Input. The three tape recorders each provide two tracks having a frequency response from 1 kHz to 1000 kHz at 100 ips. At this speed, each tape recorder provides 5.5 minutes of read-in.

Each recorder can be operated at one quarter speed to provide 22 minutes of read-in, but the frequency response is then reduced to 250 Hz to 250 kHz. Read out is always accomplished in 5.5 minutes at full speed.

Accordingly, there are two tape recorder input formats; one for 1:1 readins, the other for 4:1 readins.

Signal Input	1:1 Format Track	4:1 Format Track
Payload Analog	1	Not Used
Payload PCM	2	Both 1 & 2

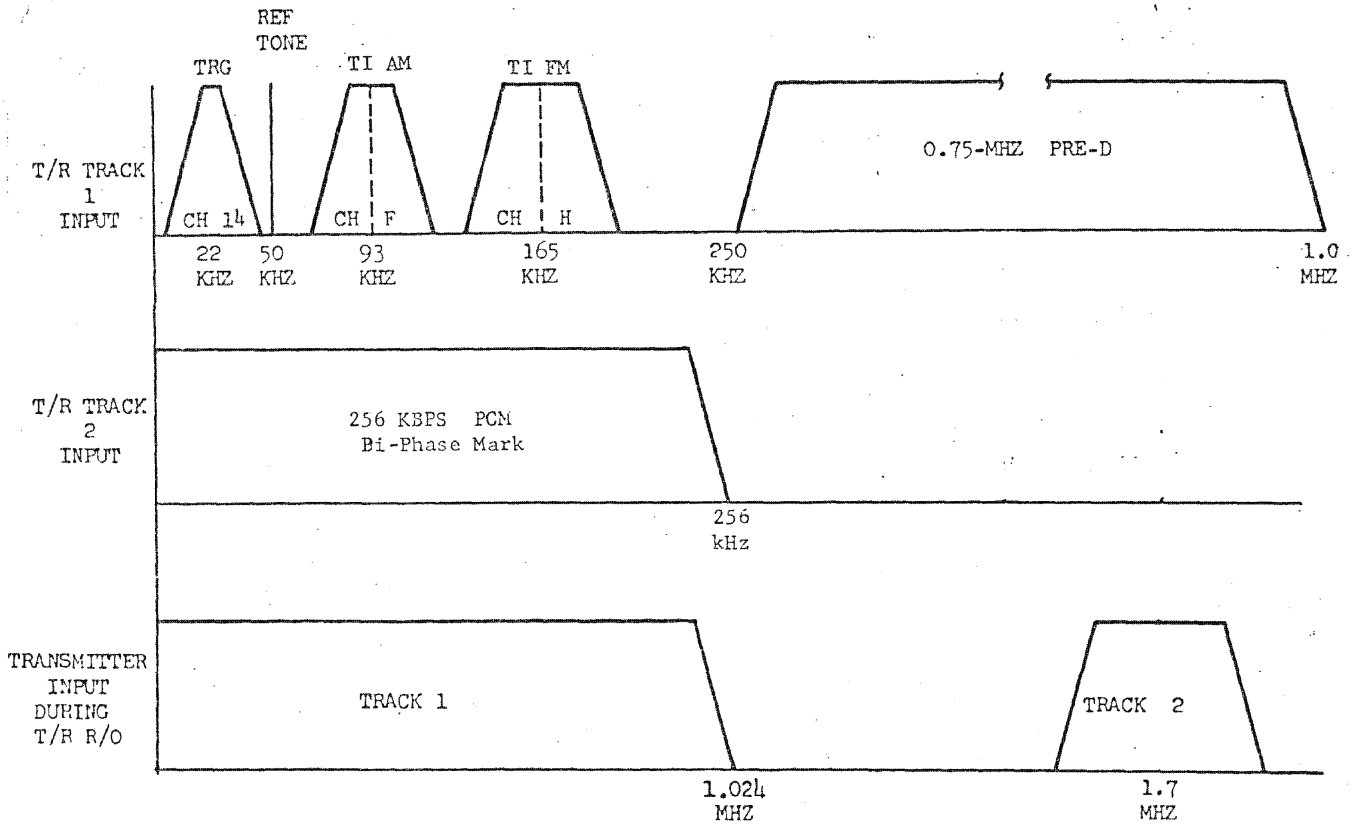

Figure 8 1:1 Mode Primary Data Format

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BIF003W/2-135288-78

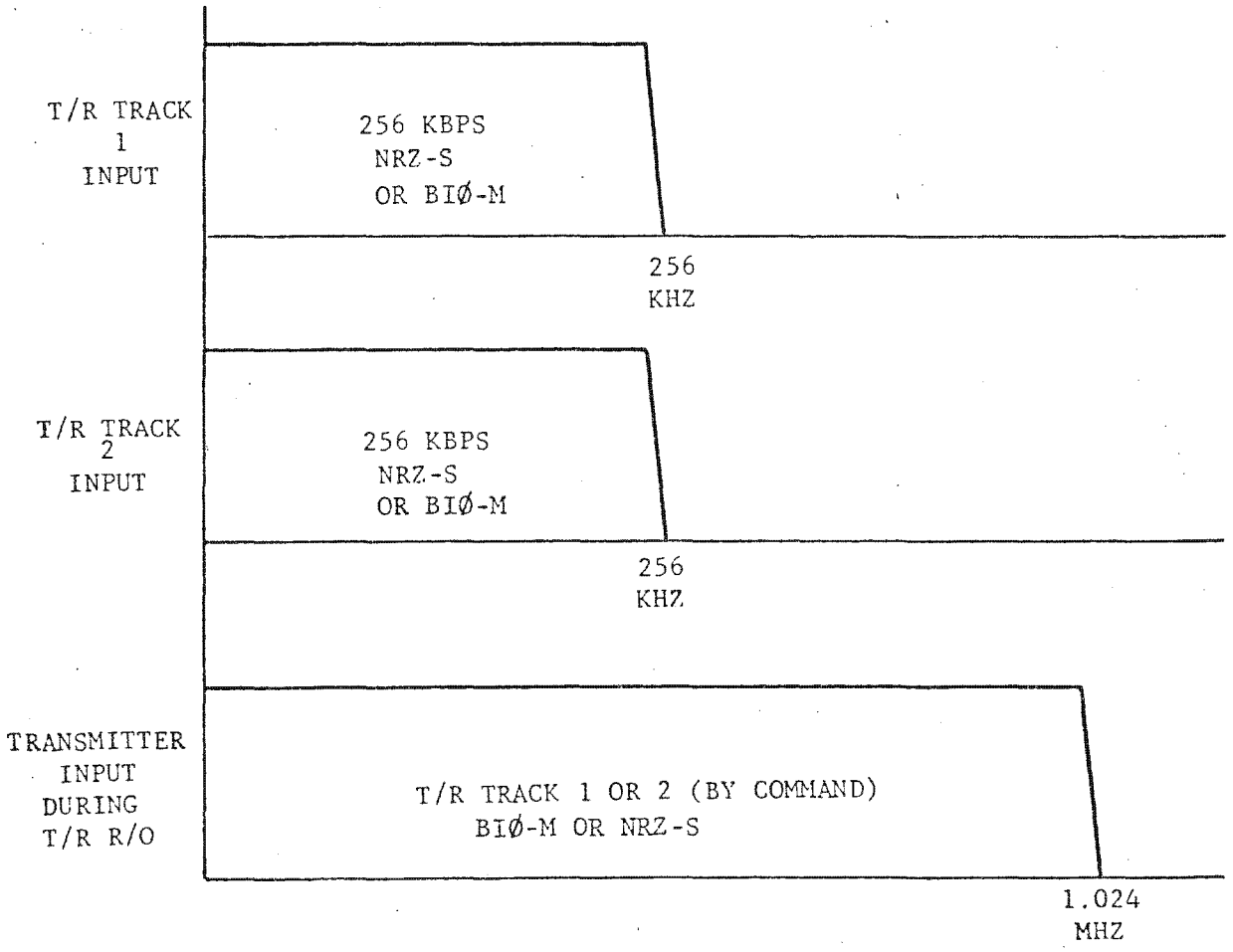

Figure 9 4:1 Mode Data Format

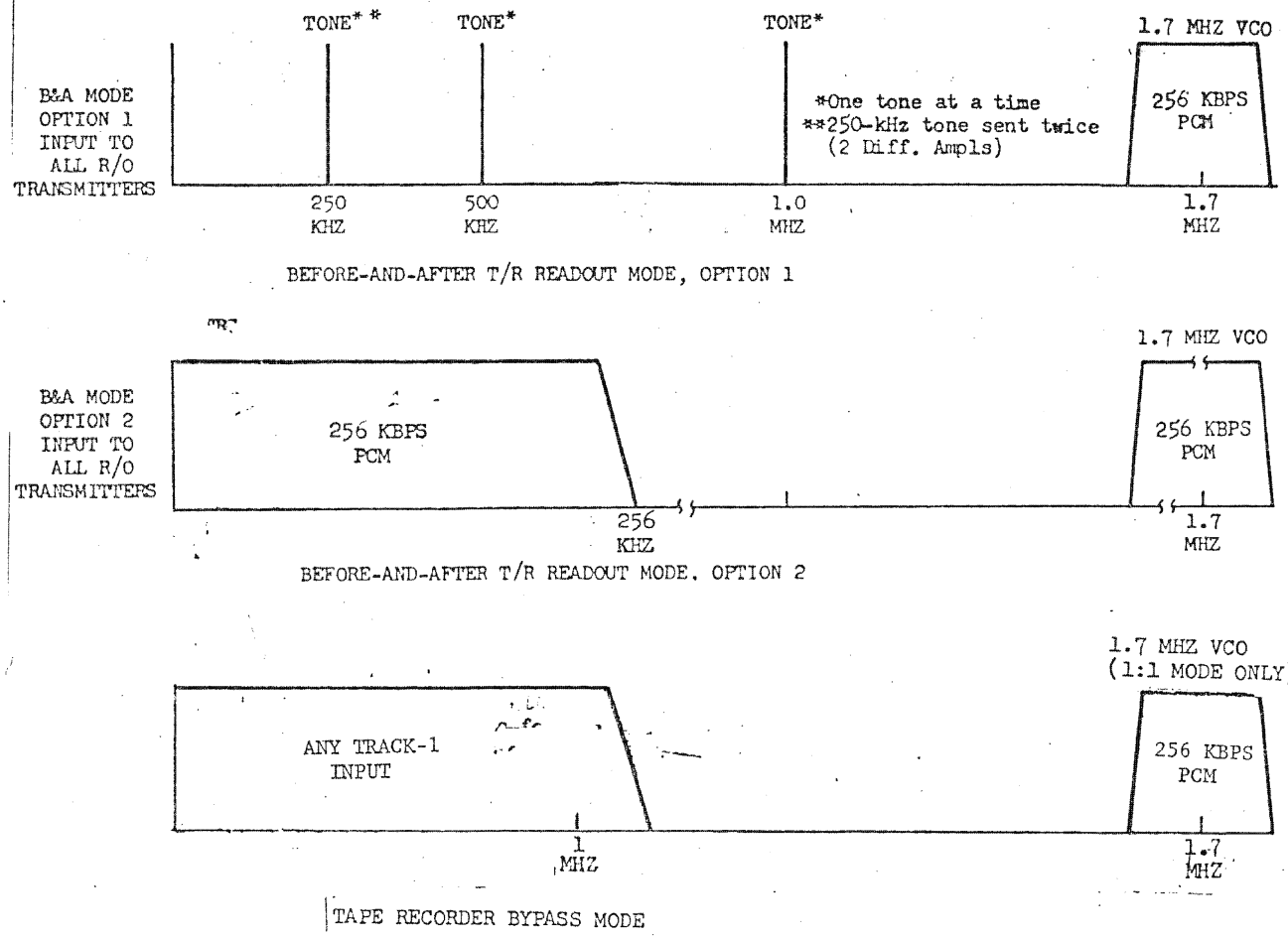

Figure 10 Data Formats for Tape Recorder B/A Mode and Bypass Mode

6.4 Downlink Format. Figures 8 thru 10 show the wideband downlink formats.

- 1:1 Read-out: In the 1:1 mode, the payload PCM on track 2 is amplified and clipped, then modulates a 1.7 MHz VCO. The VCO output is summed with the payload analog signal from track 1 to form a 2 MHz wide FM input to the downlink transmitter.

- 4:1 Read-out: In 4:1 mode, the payload PCM is selected from one track of the tape recorder, amplified, and then clipped. The resulting signal is used to FM the downlink transmitter.

- PM mode: For the PM mode, the tape recorder is configured for 1:1 instead of 4:1. The output is processed as a 4:1 readout, except the phase modulation input part of the downlink transmitter is used.

- Before and After Readout: In B&A mode, either the payload PCM or a repeating sequence of 250, 500, and 1000 kHz tones are output at baseband. If the selected readout mode is 1:1, the PCM will also appear modulating the 1.7 MHz VCO.

- Tape Recorder Bypass: In bypass mode, the format is identical to a readout format, except real-time payload signals are used. Either the 1:1 or the 4:1 format may be selected. If a tape recorder is in readin during the bypass period, the data will also be stored for later transmittal.

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