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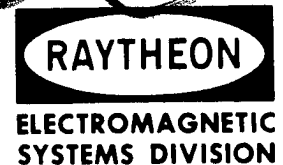
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APPENDIX 30
SYSTEM CONTROLLER - SORTER INTERFACE
FINAL SOFTWARE REPORT
DATA ITEM NO. A005

**INTEGRATED ELECTRONIC WARFARE SYSTEM
ADVANCED DEVELOPMENT MODEL (ADM)**

7800987-30
PREPARED FOR
NAVAL AIR DEVELOPMENT CENTER
WARMINSTER, PENNSYLVANIA
CONTRACT N62269-75-C-0070



1 OCTOBER 1977

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APPENDIX 30
SYSTEM CONTROLLER/SIGNAL SORTER INTERFACE
FINAL SOFTWARE REPORT
DATA ITEM A005

INTEGRATED ELECTRONIC WARFARE SYSTEM (IEWS)
ADVANCED DEVELOPMENT MODEL (ADM)

Contract No. N62269-75-C-0070

Prepared for:
Naval Air Development Center
Warminster, Pennsylvania

Prepared by:
RAYTHEON COMPANY
Electromagnetic Systems Division
6380 Hollister Avenue
Goleta, California 93017

1 OCTOBER 1977

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LEXINGTON, MASS. 02173

CODE IDENT NO.

49956

SPEC NO.

53959-JK-1002

SHEET

1 OF 61

REV 3

TYPE OF SPEC

INTERFACE CONTROL DOCUMENT

TITLE OF SPEC

SYSTEM CONTROLLER - SORTER ICD

FUNCTION	APPROVED	DATE	FUNCTION	APPROVED	DATE
WRITER	J. Kolanek	7/25/75			

REVISIONS

CHK	DESCRIPTION	REV	CHK	DESCRIPTION	REV
	Complete Revision 1/2/76	1			
py	Complete Revision 7/30/76	2			
CD	See Below 8/5/76	3			

Para. 3.1.2.3C

Was: (to Sorter)

Is: (from Sorter)

Para. 3.1.4.2.4

Change addresses from octal representation to hexadecimal.

Table I

Change addresses from binary representation to hexadecimal.

Figure 6

Add pin numbers.

[illegible]

SYSTEM CONTROLLER - SORTER
INTERFACE CONTROL DOCUMENT

1.0 SCOPE

This document shall describe the Classification Processor (CP) Bus which provides an interface between the Sorter and the System Controller. The functional as well as the detailed physical requirements shall be included in this document.

2.0 APPLICABLE DOCUMENTS

The following documents, of the latest issue in effect, form a part of this specification to the extent specified herein. In the event of conflict, the requirements of this specification shall govern.

53959-GT-0301	System Controller, ADM, IEWS, Unit Hardware Development Specification.
ESD-SB-001	Signal Sorter, IEWS, Equipment Design and Performance Specification.
CG-893645	IEWS Signal Sorter, Computer Program Performance Specification.

3.0 REQUIREMENTS

3.1 INTERFACE DEFINITION

3.1.1 General

An interface, referred to as the Classification Processor bus, shall be established between the System Controller and the Sorter for the purpose of transferring commands and data between the two units. In addition, provisions shall be made to allow the Special Test Equipment to be connected to this interface for the purpose of monitoring message traffic.

This interface shall be organized as shown in Figure 1, with the three units (the Sorter, System Controller and the Special Test Equipment) interconnected

SIZE	CODE IDENT NO.	DRAWING NO.
A	49956	53959-JK-1002
SCALE	REV 3	SHEET 2 of 61

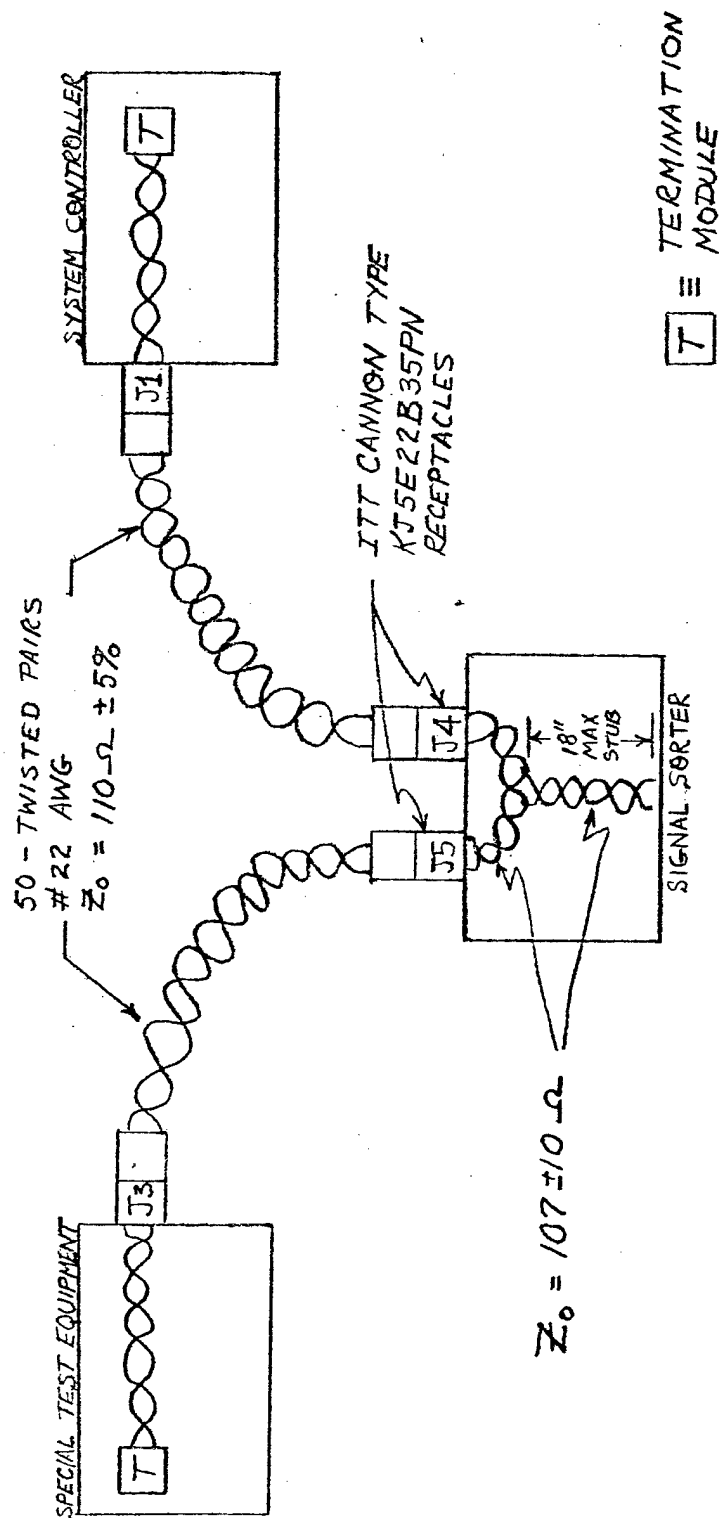


FIGURE 1. SYSTEM CONTROLLER-SIGNAL SORTER INTERFACE

SIZE A	CODE IDENT NO 49956	DRAWING NO. 53959-JK-1002
SCALE	REV 3	SHEET 3 of 61

using an asynchronous bus structure. Bus control shall reside within the System Controller.

3.1.2 Bus Structure

The Classification Processor bus shall consist of a RP-16 micro-processor bus structure. This bus shall consist of four sets of lines: address, data, control and interrupt.

3.1.2.1 Address Lines. There shall be sixteen address lines used to identify memory locations within the Sorter which are used to store or retrieve data involved in the information transfer.

3.1.2.2 Data Lines. There shall be sixteen data lines used to transfer data involved in the information transfer.

3.1.2.3 Control Lines. There shall be six control lines used to effect data transfers. These shall consist of the following

- a. read/write (to Sorter)
- b. request (to Sorter)
- c. skip (from Sorter)
- d. acknowledge (from Sorter)
- e. master clear (to Sorter)
- f. power fail (from Sorter)

3.1.2.4 Interrupts. There shall be a single interrupt line used to signal the System Controller that a high priority message transfer is required from the Sorter.

3.1.3 Bus Control

Bus control shall reside in the System Controller. Messages shall be considered to be transferred into the Sorter from the System Controller as a

SIZE	CODE IDENT NO.	DRAWING NO.
A	49956	53959-JK-1002
SCALE	REV	3
		SHEET 4 of 61

write operation while messages shall be considered to be transferred from the Sorter to the System Controller as a read operation. The Special Test Equipment shall be a listen-only device capable of monitoring and/or recording all bus messages.

3.1.4 Data Transfer Conventions

Data shall be transferred using one of three approaches:

- a. direct memory addressing
- b. message block transfer
- c. address control

3.1.4.1 Direct Memory Addressing. Direct memory addressing shall consist of directly addressing the memory location involved in the data transfer and employing a read or write operation to effect the data transfer. It is intended that this mode of operation be used primarily for Sorter program load operations.

3.1.4.2 Message Block Transfers. Normal operational command and data transfers shall be made using a message block transfer technique. A message block shall consist of sixteen word units as shown in Figure 2. The block shall be headed by a status word and a command word followed by up to fourteen additional data words. All message blocks shall be transferred using designated message buffer areas within the Sorter and four such areas shall be established.

- a. Sorter input low priority buffer
- b. Sorter output low priority buffer
- c. Sorter output high priority buffer
- d. Sorter input high priority buffer

3.1.4.2.1 Status Word. The status word shall consist of two fields, a valid bit and a length field. The valid bit shall be used to indicate valid data is contained within the buffer area. The word length field shall indicate the total number of words that the message block contains including the command word.

SIZE	CODE IDENT NO.	DRAWING NO.
A	49956	53959-JK-1002
SCALE	REV 3	SHEET 5 of 61

WORD

DATA

15	14	13	12	11	10	9	8	7	6	5	4	3	2	1	0
----	----	----	----	----	----	---	---	---	---	---	---	---	---	---	---

0	V		LENGTH
1		OP CODE	DATA
2			DATA
3			DATA
4			DATA
5			DATA
6			DATA
7			DATA
8			DATA
9			DATA
10			DATA
11			DATA
12			DATA
13			DATA
14			DATA
15			DATA

FIGURE 2. MESSAGE BLOCK FORMAT

SIZE	CODE IDENT NO	DRAWING NO.
A	49956	53959-JK-1002
SCALE	REV 3	SHEET 6 of 61

3.1.4.2.2 Op Code. The most significant byte of the second word shall be used to contain an OP CODE. This OP CODE shall identify the message type.

3.1.4.2.3 Low Priority Transfer Procedure. The two message buffers using polling transfer procedures shall have the first word in each buffer designated as a status location. This status word shall be used to control the entry and retrieval of messages from the buffer area. The source unit shall access and test the status word to determine when the buffer is empty and ready to accept the next message. The source unit shall wait until the buffer is empty, then enter the message into the buffer area. The last operation shall consist of modifying the status word to indicate that the buffer contains a message ready for transfer. The destination device will periodically test the status word to determine when a message is present. When a message is indicated, the destination device will read the message and its last operation shall consist of modifying the status word indicating that the buffer is available for the next message.

3.1.4.2.4 High Priority Transfer Procedure. The high priority message buffers shall employ an interrupt to initiate urgent message transfers between the Sorter and the System Controller. The status word shall be used to control the entry and retrieval of messages from the buffer area. The sending device (Sorter or System Controller) shall access the status word and test the valid bit to determine if the buffer is empty and ready to accept the next message. The sending device shall wait until the valid bit is zero then enter the message into the buffer area. The next operation shall consist of changing the status word to set the valid bit and indicate the message length. The last operation shall consist of writing to an interrupt generator to interrupt the destination device. The interrupt generators are located as follows:

Interrupt	Address
SC to Sorter	C010 (Hex)
Sorter to SC	C011 (Hex)

SIZE	CODE IDENT NO.	DRAWING NO.
A	49956	53959-JK-1002
SCALE	REV	3
	SHEET	7 of 61

The receiving device shall respond to such interrupts by reading the message block starting with the status word. Reading of the interrupt generator by the receiving device resets the interrupt but the sending device shall not enter a new message until the valid bit has been reset. The receiving device shall reset the valid bit as the last operation in the interrupt message transfer sequence.

3.1.4.3 Special Controls. The System Controller shall exercise certain special control functions over the Sorter by using dual store instruction sequences. A block of sixteen contiguous addresses shall be dedicated for use with these store instruction pairs. Five sequences of two store instructions each shall correspond to five special control functions. Each control function is effected by executing a store instruction pair from the System Controller to the effective address. Any stored data is irrelevant and ignored. Any addressing mode may be used which invokes one of the sixteen dedicated addresses. The functions and associated store instruction addresses are given in Table I.

3.1.4.3.1 Special Control Utilization. Utilization of the five functions is as follows:

- | | |
|---|--|
| 1. STOP | Halts the Sorter Supervisor after the next instruction fetch. |
| 2. INITIALIZE | Resets the Sorter Supervisor internal control register. Includes the STOP function. |
| 3. START after STOP | Initiates a continuous RUN beginning with the last fetched but unexecuted instruction. |
| 4. START after
INITIALIZE | Initiates a continuous RUN beginning with the instruction at the current value of the Program Counter. |
| 5. START and NEWSTART
(after INITIALIZE) | Initiates a continuous RUN from the address contained in memory location 0. |
| 6. Single INR | Executes one instruction and halts the Sorter Supervisor after the next instruction fetch. |

SIZE	CODE IDENT NO.	DRAWING NO.
A	49956	53959-JK-1002
SCALE	REV	SHEET
	3	8 of 61

TABLE I. Special Control Functions

Special Control Function	First Store Instruction Effective Address (HEX)	Second Store Instruction Effective Address (HEX)
Stop	FF8A	FF8B
Initialize	FF8F	FF8B
Start	FF89	FF8B
Newstart	FF81	FF8B
Single INR	FF88	FF8A

SIZE A	CODE IDENT NO. 49956	DRAWING NO. 53959-JK-1002
SCALE	REV 3	SHEET 9 of 61

3.2 PERFORMANCE

3.2.1 CP Bus Timing

3.2.1.1 Write Operations. Write operations shall consist of one word transfers using the timing diagram shown in Figure 3.

3.2.1.2 Read Operations. Read operations shall consist of one word transfers using the timing diagram shown in Figure 4.

3.2.2 Low Priority Retrieval Latency

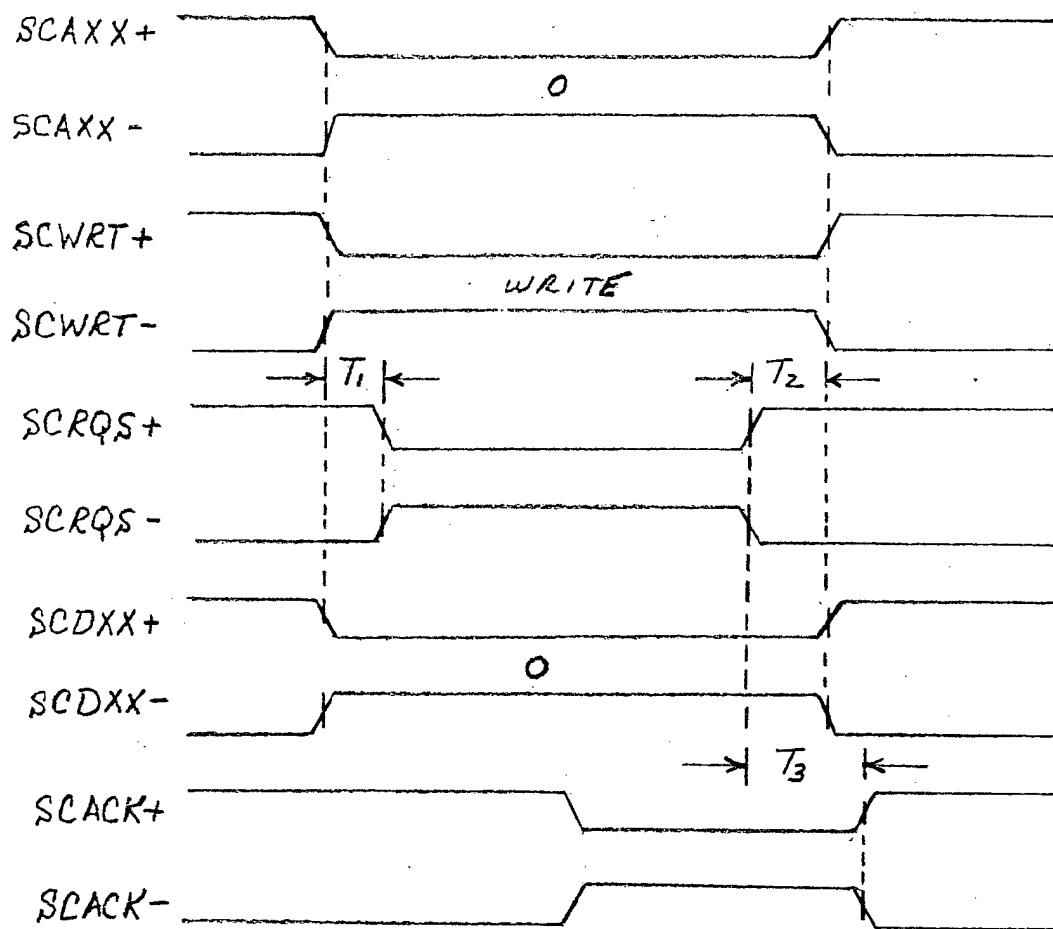
The destination device (Sorter or System Controller) of a message transferred using the polling technique shall accept the message and clear the buffer area on the average of one millisecond after the status word has been set to indicate the presence of a message.

3.3 DATA REQUIREMENTS

3.3.1 System Controller Inputs

The Sorter shall be capable of transferring the messages listed in Table II to the System Controller. The detailed message formats shall be as given in the following descriptions.

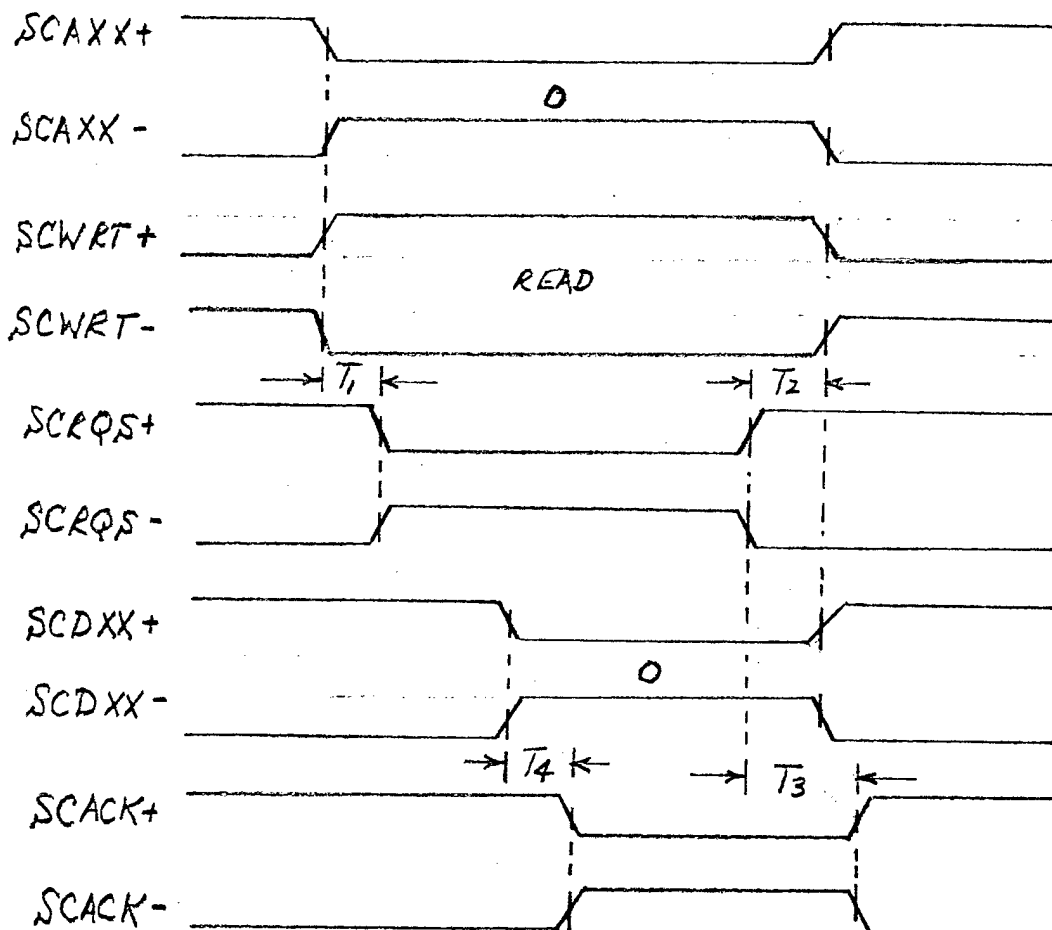
SIZE	CODE IDENT NO.	DRAWING NO.
A	49956	53959-JK-1002
SCALE	REV 3	SHEET 10 of 61



$$T_1 \geq 25, T_2 \geq 25, 75 \geq T_3 \geq 50$$

FIGURE 3. BUS TIMING, WRITE OPERATION

SIZE A	CODE IDENT NO 49956	DRAWING NO. 53959-JK-1002
SCALE	REV 3	SHEET 11 of 61



$T_1 \geq 25, T_2 \geq 25, 75 \geq T_3 \geq 50, T_4 \geq 25$
 (ALL TIMES IN NANSECONDS)

FIGURE 4. BUS TIMING, READ OPERATION

SIZE A	CODE IDENT NO 49956	DRAWING NO. 53959-JK-1002
SCALE	REV 3	SHEET 12 of 61

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CODE IDENT NO.

49956

SPEC NO.

53959-JK-1002

SHEET
13 of 61

REV 3

TABLE II. SORTER TO SC MESSAGES

PRIORITY	OP CODE	NAME	FUNCTION	PRIORITY	OP CODE	NAME	FUNCTION
L	80	PTDJA	CONTENTS OF TRACK FILE	L	8F	ALR-50	ALR-50 BITS DETECTED DURING A SUPERVISOR UPDATE OF FILE
H	81	NEW EMITTER ALERT	ADVISE SC OF THE DETECTION OF A NEW EMITTER	L	90	NPDM MESSAGE	LIST OF PDMS USED TO START A NEW EMITTER FILE
L	82	CAM FILE DUMP	INST DUMP OF NESU CAM FILES	L	91	MEMORY DUMP	TRANSFERS 8 WORDS OF MEMORY FROM THE SORTER SUPERVISOR TO THE SC
L	83	ADA READOUT	COPY NESU ADA FILE TO SC	L	92	MULTIFREQ FLAGS	MULTIFREQUENCY FLAGS DETECTED IN PDMS DURING SUPERVISOR UPDATE
H	84	THROTTLE ALERT	ALERTS THE SC THAT A THROTTLE FILE HAS BEEN ESTABLISHED	L	93	BIT STATUS	INITIATE OFF LINE BIT OPERATION
L	85	CONFIRM FILE CREATION	SUPPLIES FILE NUMBER FOR SC CREATED FILE				
H	86	ERROR ALERT	AN ERROR HAS BEEN DETECTED BY THE SUPERVISOR				
L	87	INACTIVE FILE ALERT	FILE IS NOT RECEIVING UPDATE PDMS				
L	88	LONG PULSE PARAMETERS	DATA ON SAMPLED LONG PULSES				
L	89	IB<1/4 FULL	INPUT BUFFER IS LESS THAN 1/4 FULL				
L	8A	IB>3/4 FULL	INPUT BUFFER GREATER THAN 3/4 FULL				
H	8B	FILES FULL	NEW EMITTER DETECTED BUT ALL FILES ARE FULL				
H	8C	THROTTLE FILES FULL	ALL 8 PD THROTTLE FILES ARE IN USE				
H	8D	BUS HUNG	SUPERVISOR BUS NOT RESPONDING				
H	8E	WATCHDOG TIMER	WATCHDOG TIMER NOT RESET				

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CODE IDENT NO.

49956

SPEC NO.

53959-JK-1002

SHEET

14 OF 61

REV

3

MESSAGE NAME- PULSE TRAIN DESCRIPTOR WORD (PTDW)
OPERATION CODE- 80FUNCTION TRANSMITS THE CONTENTS OF
THE SPECIFIED TRACK FILE
TO THE SYSTEM CONTROLLER

BIT POSITION

15	8	7	0
OP CODE 80		SFN	
15	12	11	0
LTOA		N	P
4	MSB	S	P
TAZ			
15	LTOA (LS 16 BITS)		
15	14	PRIA	
SCH R			
15	PRIB		
00			
15	8	7	4
TCODE		TTAMP	TPW
15	12	7	4
TOPRI	TOPW	TOF	TOAZ
15	TRACK FREQUENCY		
13	9	4	3
TCOUNT		TPAMP	T
		V	A
		W	T

FIELD	FUNCTION	UNITS	SCALE
SFN	SORTER FILE NUMBER		
TAZ	TRACK AZIMUTH	CELL	LSB=1
SCH R	TRACK HISTORY REQUEST FROM SC		
NS	TRACKER IN NEW SCAN MODE		
PP	PRI POINTER 0=A, 1=B		
LTOA	MS 4 BITS OF LAST TIME OF ARRIVAL	MICROSEC	2 ¹⁷
LTOA	LS 16 BITS OF LTOA	MICROSEC	1
PRI A	EST OF PRI SMALLEST IF DUAL MODE		
PRIB	EST OF PRI LARGEST IF DUAL MODE	MICROSEC	1
TF	TRACK FREQUENCY	MHZ	1.25
TT	TEST TRACK FILE FOR BITE		
TCW	IF SET, FILE IS OF CW EMITTER		
TA	IF SET, EMITTER FREQ AGILE		
TV	SET IF FILE CONTAINS VALID DATA		

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LEXINGTON, MASS. 02173

CODE IDENT NO.

49956

SPEC NO.

53959-JK-1002

SHEET

15 OF 61

REV 3

MESSAGE NAME- PTDW (CONT)
OPERATION CODE- 80

BIT POSITION

15	8	7	0
OP CODE 80		SFN	
15	12	11	10
LTOA		N	P
4 MSB		S	P
		TAZ	
15	0		
LTOA (LS 16 BITS)			
15	14	0	
SCIR		PRIA	
15	0		
00		PRIB	
15	8	7	4
TCODE		TTAMP	TPW
15	12	7	4
TQPRI	TQPW	TQF	TGAZ
15	0		
TRACK FREQUENCY			
13	9	4	3
TCOUNT		TPAMP	T
		V	A
		W	T

FIELD	FUNCTION	UNITS	SCALE
TCOUNT	NUMBER OF PDWS REQUESTED BY THE SUPERVISOR		
TPAMP	PEAK DETECTED SIGNAL AMPLITUDE, RESET BY PTDW REQ	DB	1.6 DB
TPW	TRACK PULSE WIDTH	CELL	NONLINEAR
TTAMP	MIN AMPL OF PDW TO BE XFERED ON AUX BUS	DB	3.2 DB
TCODE	DATA INSERTED BY SC		.5
TGAZ	AZIMUTH QUALITY		.5
TQF	FREQUENCY QUALITY		.5
TQPW	PULSE WIDTH QUALITY		.5
TQPRI	PRI QUALITY		.5

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RAYTHEON COMPANY
LEXINGTON, MASS. 02173

CODE IDENT NO.

49956

SPEC NO.

53959-JK-1002

SHEET

16 OF 61

REV 3

MESSAGE NAME- NEW EMITTER ALERT
OPERATION CODE- 81FUNCTION ADVISES SYSTEM CONTROLLER THAT
A NEW EMITTER HAS BEEN
DETECTED AND GIVES
EMITTER PARAMETERS

BIT POSITION

15	8	7	0
OP CODE 81		SFN	
15	12	11	10
LTOA		N	P
4	MSB	S	P
TAZ			
15	LTOA (LS 16 BITS)		
15	14	PRIA	
5	0	SCHR	
15	PRIB		
00			
15	8	7	4
TCODE		TTAMP	TPW
15	12	7	4
TQPRI	TQPW	TQF	TQAZ
15	TRACK FREQUENCY		
13	9	4	3
TCOUNT		TPAMP	T
		V	A
		2	1
		T	T
		C	T
		W	T

FIELD	FUNCTION	UNITS	SCALE
SFN	SORTER FILE NUMBER		
TAZ	TRACK AZIMUTH	CELL	LSB=1
SCHR	TRACK HISTORY REQUEST FROM SC		
NS	TRACKER IN NEW SCAN MODE		
PP	PRI POINTER 0=A, 1=B		
LTOA	MS 4 BITS OF LAST TIME OF ARRIVAL	MICROSEC	2 ¹⁷
LTOA	LS 16 BITS OF LTOA	MICROSEC	1
PRIA	EST OF PRI SMALLEST IF DUAL MODE		
PRIB	EST OF PRI LARGEST IF DUAL MODE	MICROSEC	1
TF	TRACK FREQUENCY	MHZ	
TT	TEST TRACK FILE FOR BITE		1.25
TCW	IF SET, FILE IS OF CW EMITTER		
TA	IF SET, EMITTER FREQ AGILE		
TV	SET IF FILE CONTAINS VALID DATA		

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LEXINGTON, MASS. 02173

CODE IDENT NO.

49956

SPEC NO.

53959-JK-1002

SHEET

17 OF 61

REV 3

MESSAGE NAME- NEW EMITTER ALERT (CONT)
OPERATION CODE- 81

BIT POSITION

15	8	7	0
OP CODE 81		SFN	
15	12	11	10
LTOA 4 MSB		N	P
		S	P
		TAZ	
15	LTOA (LS 16 BITS)		
15	14	0	
S		PRIA	
15	00	PRIB	
15	8	7	4
TCODE		TTAMP	TPW
15	12	7	4
TPPRI	TPPW	TQF	TGAZ
15	TRACK FREQUENCY		
13	9	4	3
TCOUNT		TPAMP	
		T	T
		V	A
		T	C
		W	T

FIELD	FUNCTION	UNITS	SCALE
TCOUNT	NUMBER OF PDWS REQUESTED BY THE SUPERVISOR		
TPAMP	PEAK DETECTED SIGNAL AMPLITUDE, RESET BY PTOW REQ	DB	1.6 DB
TPW	TRACK PULSE WIDTH	CELL	NONLINEAR
TTAMP	MIN AMPL OF PDW TO BE XFERED ON AUX BUS	DB	3.2 DB
TCODE	DATA INSERTED BY SC		.5
TGAZ	AZIMUTH QUALITY		.5
TQF	FREQUENCY QUALITY		.5
TPW	PULSE WIDTH QUALITY		.5
TPPRI	PRI QUALITY		.5

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LEXINGTON, MASS. 02173

CODE IDENT NO.

49956

SPEC NO.

53959-JK-1002

SHEET

18 OF 61

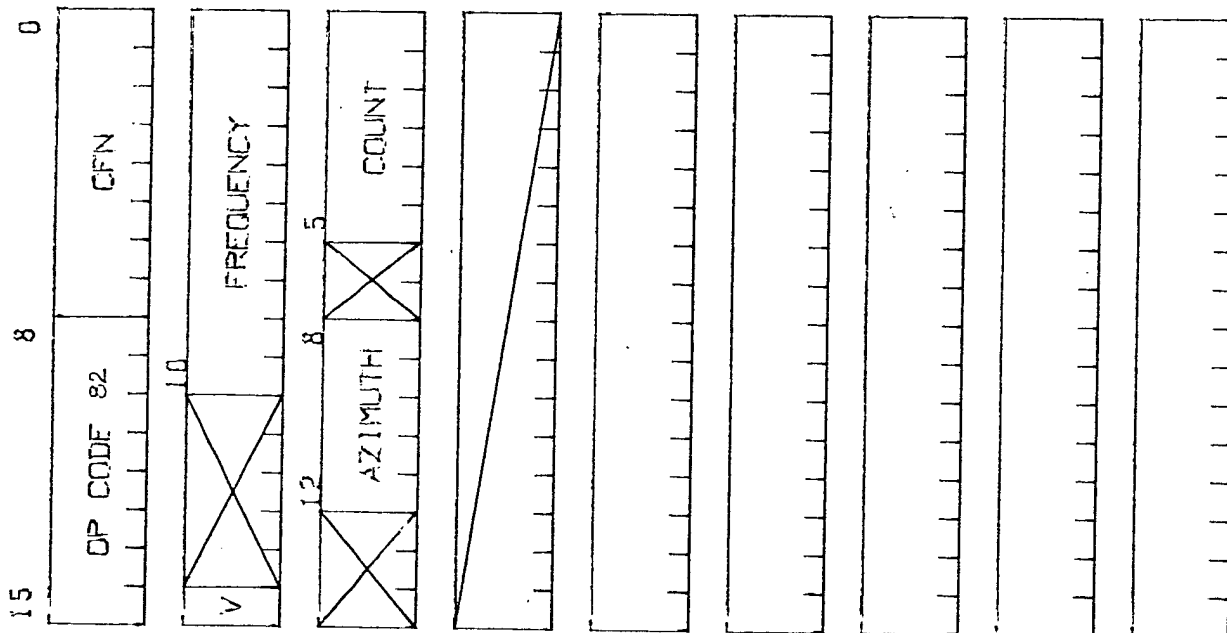
REV 3

MESSAGE NAME - CAM FILE DUMP
OF CODE - 82

FUNCTION INSTRUMENTATION DUMP OF
THE NESU CAM FILE

FIELD	FUNCTION	UNITS	SCALE
CFN	CAM FILE NUMBER		
V	IF SET FILE IS VALID		
FREQ	FILE FREQUENCY (ENCODED)	MHZ	10 MHZ (GRAY)
AZIMUTH	FILE AZIMUTH (ENCODED)	CELLS	2 CELLS (GRAY)
COUNT	NUMBER OF PDWS RECEIVED-PURGED		

BIT POSITION



RAYTHEON

RAYTHEON COMPANY
LEXINGTON, MASS. 02173

CODE IDENT NO.

49956

SPEC NO.

53959-JK-1002

SHEET

19 OF 61

REV 3

MESSAGE NAME- AOA READOUT
OP CODE- 83

FUNCTION- PROVIDES THE SYSTEM CONTROLLER
WITH A COPY OF THE NESU
MULTIPLE MESSAGES REQUIRED
TO SEND COMPLETE FILE

FIELD	FUNCTION	UNITS	SCALE
AOACEL	CELL NUMBER FOR INDICATED AOA COUNT	CELL	LSB=1
AOACNT	NUMBER OF PDWS ACCUMULATED IN CELL	COUNTS	LSB=1

BIT POSITION

15 8 0

OP CODE 83	AOACEL
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AOACNT

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LEXINGTON, MASS. 02173

CODE IDENT NO.

49956

SPEC NO.

53959-JK-1002

SHEET

20 OF 61

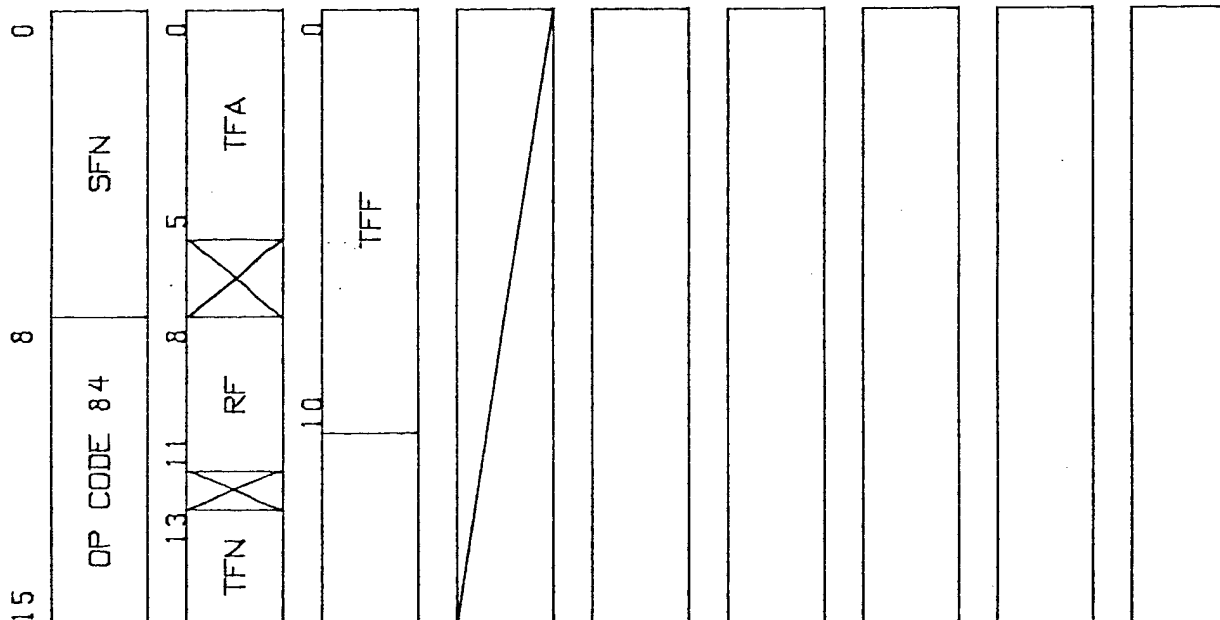
REV 3

MESSAGE NAME- THROTTLE ALERT
OP CODE - 84

FUNCTION- ADVISES THE SYSTEM CONTROLLER
THAT THE SORTER HAS
ESTABLISHED A THROTTLE FILE AND PROVIDES
THE ASSOCIATED TRACK FILE NUMBER
AND RELATED PARAMETERS

FIELD	FUNCTION	UNITS	SCALE
SFN	FILE NUMBER		
RF	REDUCTION FACTOR		LSB=1/16
TFA	THROTTLE FILE AZIMUTH	CELLS	1
TFF	THROTTLE FILE FREQ	MHZ	10 MHZ
TFN	THROTTLE FILE NUMBER		

BIT POSITION



BIT POSITION

15	8	0
OP CODE 85		SFN

MESSAGE NAME - CONFIRM FILE CREATION

OP CODE - 85

FUNCTION - ADVISES SYSTEM CONTROLLER OF THE FILE
NUMBER ASSIGNED TO AN SC CREATED FILE

FIELD	FUNCTION
SFN	FILE NUMBER

SIZE A	CODE IDENT NO. 49956	DRAWING NO. 53959-JK-1002
SCALE	REV 3	SHEET 21 of 61

RAYTHEON

RAYTHEON COMPANY

LEXINGTON, MASS. 02173

CODE IDENT NO.

49956

SPEC NO.

53959-JK-1002

SHEET

22 OF 61

REV 3

MESSAGE NAME - ERROR ALERT

OP CODE - 86

FUNCTION - ADVISE THE SYSTEM CONTROLLER
THAT ONE OF THE FOLLOWING
MESSAGES HAVE OCCURED

ERROR CODE FUNCTION

01 INVALID HI-PRIORITY MESSAGE RECEIVED FROM
SC02 SORTER PURGED NEW EMITTER PDWS BEFORE
REQUEST WAS RECEIVED

03 NOT USED

04 INVALID MESSAGE RECEIVED FROM NESU

05 INVALID LO-PRIORITY MESSAGE RECEIVED
FROM SC06 WATCHDOG TIMER EXPIRED, BUT SUPERVISOR
SOFTWARE INTACT07 "DO NOT UPDATE" BIT SET IN EMITTER TABLE
FOR NEW EMITTER OR HI DATA RATE THREAT
EMITTER81 AGILE: AOA COUNT $\geq$ THRESHOLD BUT AZIMUTH
SEARCH FINDS NO MATCH82 AGILE: AOA COUNT $\geq$ THRESHOLD BUT AZIMUTH
SEARCH FINDS ONLY 1 MATCH

83 ILLEGAL SUP. MESSAGE RECEIVED BY NESU

84 NESU RECEIVED HUNG BUS INTERRUPT

BIT POSITION

15 8 0

OP CODE 86 ERROR CODE

BIT POSITION

15	8	0
OP CODE 87		SFN

MESSAGE NAME - INACTIVE SORTER FILE

OP CODE - 87

FUNCTION - SPECIFIED FILE HAS NOT BEEN RECEIVING
PDWS FOR THE PERIOD OF THE PURGE
INTERVAL

FIELD

FUNCTION

SFN

FILE NUMBER

SIZE A	CODE IDENT NO. 49956	DRAWING NO. 53959-JK-1002
SCALE	REV 3	SHEET 23 of 61

RAYTHEON

RAYTHEON COMPANY
LEXINGTON, MASS. 02173

CODE IDENT NO.

49956

SPEC NO.

53959-JK-1002

SHEET

24 of 61

REV 3

MESSAGE NAME- LONG PULSE PARAMETERS
OP CODE- 88

FUNCTION- PROVIDES SORTER'S ESTIMATE
OF EMITTER'S ACTUAL (NOT SAMPLING
RATE) PARAMETERS

FIELD	FUNCTION	SCALE	UNITS
SFN	FILE NUMBER		
PRIA,PRIB	ESTIMATED PRI		MICROSEC LSB=1
PW COUNT	AVERAGE NUMBER OF PDW'S PER SAMPLE		

MESSAGE NAME - 1/4 FULL
OP CODE - 89
FUNCTION - INPUT BUFFER < 1/4 FULL

MESSAGE NAME - 3/4 FULL
OP CODE - 8A
FUNCTION - INPUT BUFFER > 3/4 FULL

BIT POSITION

15	8	0
OP CODE 88		SFN
13		PRIA
13		PRIB
3		PW COUNT
15	8	0
OP CODE 89		
15	8	0
OP CODE 8A		

RAYTHEON

RAYTHEON COMPANY

LEXINGTON, MASS. 02173

CODE IDENT NO.

49956

SPEC NO.

53959-JK-1002

SHEET

25 OF 61

REV

3

MESSAGE NAME- NEA/TRACK FILE FULL
OPERATION CODE- 8B

FUNCTION ADVISES SYSTEM CONTROLLER
THAT A NEW EMITTER HAS BEEN
DETECTED, PROVIDES EMITTER PARAMETERS,
AND WARNS THAT ALL FILES ARE FULL
EMITTER IS NOT TRACKED

FUNCTION	UNITS	SCALE
TAZ	TRACK AZIMUTH	
SCHR	TRACK HISTORY REQUEST FROM SC	CELL LSB=1
NS	TRACKER IN NEW SCAN MODE	
PP	PRI POINTER 0=A, 1=B	
LTOA	MS 4 BITS OF LAST TIME OF ARRIVAL	MICROSEC 2 ¹⁷
LTOA	LS 16 BITS OF LTOA	MICROSEC 1
PRIA	EST OF PRI SMALLEST IF DUAL MODE	
PRIB	EST OF PRI LARGEST IF DUAL MODE	MICROSEC 1
TF	TRACK FREQUENCY	MHZ 1.25
TT	TEST TRACK FILE FOR BITE	
TCW	IF SET, FILE IS OF CW EMITTER	
TA	IF SET, EMITTER FREQ AGILE	
TV	SET IF FILE CONTAINS VALID DATA	

BIT POSITION

15	8	7	0
OP CODE 8B			
X			
15	12	11	0
LTOA			
4	MSB	S	P
X			
TAZ			
15	LTOA (LS 16 BITS)		
15	14	PRIA	
5	0	PRIB	
15	8	7	4
TCODE			
TTAMP			
TPW			
15	12	7	4
TQPRI			
TQPW			
TQF			
TQAZ			
15	TRACK FREQUENCY		
13	9	4	3
TCOUNT			
TPAMP			
TVA			
TTC			
TTH			

RAYTHEON

RAYTHEON COMPANY

LEXINGTON, MASS. 02173

CODE IDENT NO.

49956

SPEC NO.

53959-JK-1002

SHEET

26 OF 61

REV 3

MESSAGE NAME- NEA/TRACK FILES FULL (CONT)
OPERATION CODE- 8B

BIT POSITION

15	8	7	0
OP CODE 8B			
15	12	11	10
LTOA		N	P
4 MSB		S	P
TAZ			
15	LTOA (LS 16 BITS)		
15	14	PRIA	
15	14	PRIB	
15	8	7	4
TCODE		TTAMP	TPW
15	12	7	4
TPPRI	TPPW	TQF	TQAZ
15	TRACK FREQUENCY		
13	8	4	3
TCOUNT		TPAMP	T
		V	T
		A	C
		W	T

FIELD	FUNCTION	UNITS	SCALE
TCOUNT	NUMBER OF PDWS REQUESTED BY THE SUPERVISOR		
TPAMP	PEAK DETECTED SIGNAL AMPLITUDE. RESET BY PTOW REQ	DB	1.6 DB
TPW	TRACK PULSE WIDTH	CELL	NONLINEAR
TTAMP	MIN AMPL OF PDW TO BE XFERED ON AUX BUS	DB	3.2 DB
TCODE	DATA INSERTED BY SC		
TQAZ	AZIMUTH QUALITY		.5
TQF	FREQUENCY QUALITY		.5
TPPW	PULSE WIDTH QUALITY		.5
TPPRI	PRI QUALITY		.5

RAYTHEON

RAYTHEON COMPANY

LEXINGTON, MASS. 02173

CODE IDENT NO.

49956

SPEC NO.

53959-JK-1002

SHEET
27 OF 61

REV 3

BIT POSITION

15	8	0
THROT. FULL OP CODE 8C		
BUS HUNG OP CODE 8D		
WATCHDOG OP CODE 8E		
ALR-50 OP CODE 8F		SFN

MESSAGE NAME-AS NOTED
OP CODE- AS NOTED

NOTE SFN =FILE NUMBER

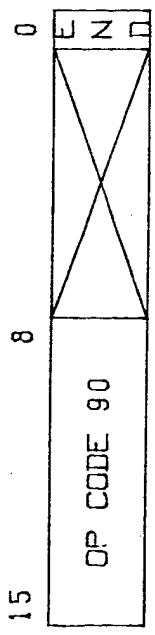
MESSAGE FUNCTION

THR FILES FULL ALL 8 THROTTLE FILES ARE FULL
BUS HUNG SUPERVISOR BUS NOT RESPONDING
WATCHDOG

WATCHDOG TIMER NOT RESET
WITHIN SPECIFIED TIME INTERVAL
ALR-50 BITS ARE SET AT UPDATE
TIME

ALR-50

BIT POSITION



MESSAGE NAME- NPDW MESSAGE
 OP CODE- 90

FUNCTION- LIST OF PDWS USED TO START
 TRACK FILE

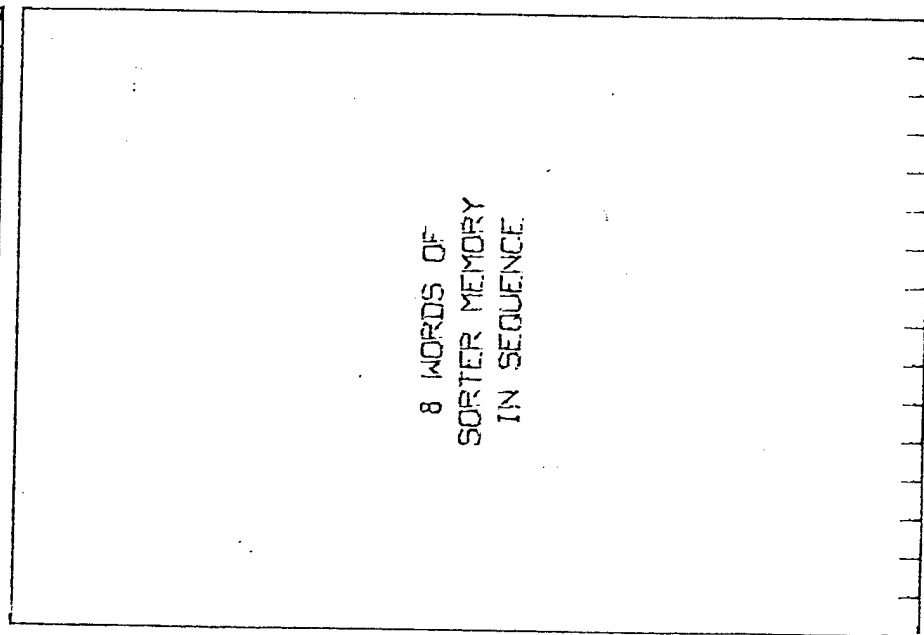
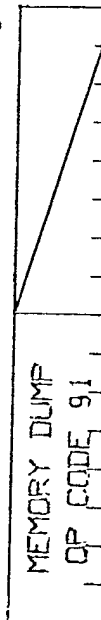
FIELD	FUNCTION
END	WHEN SET, INDICATES LAST NPDW MESSAGE FROM PRESENT REQUEST

STANDARD FORMAT
 FOR
 PDWS
 4 16 BIT
 WORDS

BIT POSITION

15

0



8 WORDS OF
SORTER MEMORY
IN SEQUENCE

MESSAGE NAME - MEMORY DUMP

OP CODE - 91

FUNCTION IN RESPONSE TO SYSTEM CONTROLLER
REQ. TRANSFERS 8 WORDS
OF SORTER MEMORY TO
THE CONTROLLER

RAYTHEON

RAYTHEON COMPANY
LEXINGTON, MASS. 02173

CODE IDENT NO.
49956

SPEC NO.	
53959-JK-1002	
SHEET	
30 OF 61	REV 3

SHEET
30 OF 61

REV 3

MESSAGE NAME- MULTIFREQUENCY FLAGS

OPERATION CODE- 92

FUNCTION- ADVISES SC THAT THE SOFTWARE UPDATE HAS DETECTED N MULTIFREQ FLAGS SET IN THE UPDATE SET OF PDWS

FUNCTION

SORTER FILE NUMBER

FIELD

25

BIT POSITION

51

OP CODE 92

25

RAYTHEON

RAYTHEON COMPANY
LEXINGTON, MASS. 02173

CODE IDENT NO.

49956

SPEC NO.

53959-JK-1002

SHEET

31 OF 61

REV 3

BIT POSITION

15	0	
OP CODE 93		BEC
EFN		
TN		
TTP		
ADTA		
EDTA		
INDX		
LCOM		
CNTRL		
INTR		

MESSAGE NAME - BIT STATUS MESSAGE

OP CODE - 93

FUNCTION- REPORT BIT STATUS IN
RESPONSE TO A REQUEST FROM THE
SYSTEM CONTROLLER

FIELD	FUNCTION
PF1	PASS/FAIL INDICATOR
BEC	BIT ERROR CODE (SEE SPEC.)
EFN	FILE NUMBER IN ERROR
TN	TEST NUMBER
TTP	TEST TABLE POINTER
ADTA	ACTUAL DATA
EDTA	EXPECTED DATA
INDX	INDEX (IF APPLICABLE)
LCOM	LAST COMMAND ISSUED TO UNIT
CNTRL	CONTROL STATUS WORD
INTR	INTERRUPT STATUS WORD

3.3.2 System Controller Outputs

The System Controller shall be capable of transferring the messages listed in Table III to the Sorter. The detailed message formats shall be as given in the following descriptions.

SIZE	CODE IDENT NO.	DRAWING NO.
A	49956	53959-JK-1002
SCALE	REV 3	SHEET 32 of 61

RAYTHEON

RAYTHEON COMPANY
LEXINGTON, MASS. 02173

CODE IDENT NO.

49956

SPEC NO.

53959-JK-1002

SHEET

33 OF 61

REV 3

TABLE III. SC TO SORTER MESSAGES

PRIORITY	OP CODE	NAME	FUNCTION	PRIORITY	OP CODE	NAME	FUNCTION
H	01	SORTER START	SORTER GOES FROM IDLE TO RUN MODE	L	0F	STOP SPDWS	STOP TRANSFER OF SPDWS FOR THE SPEC FILE NUMBER
H	02	PAUSE	GO TO IDLE MODE	L	10	NEPDW REQ	TRANSFER ALL PDWS USED TO START A FILE TO THE SC
H	03	INITIALIZE	INITIALIZE ALL SORTER PARAMETERS	L	11	DELETE FILE	COMMAND SORTER TO DROP A TRACK FILE
H	04	INIT/START NESU	CLEAR NESU BUFFER FILES AND START SEARCH	L	12	FREQ MOD	CHANGE TRACK FREQUENCY
L	05	CAM FILE DUMP	TX NESU CAM FILE DATA TO SC	L	13	PRI MOD	" " PRI S
L	06	AOA READOUT REQUEST	REQUESTS THAT NESU AOA FILE BE TX TO SC	L	14	THROTTLE FILE MOD	MODIFY EXISTING THROTTLE FILE DATA
L	07	FILE DUMP	DUMP ALL TRACK FILES TO THE SC	L	15	AOA THRESHOLD MOD.	CHANGE NUMBER OF PDWS REQUIRED TO TRIGGER AN AGILE EMITTER SEARCH
L	08	UPDW REQUEST	SEND ALL UPDWS TO THE SC VIA THE AUX BUS	L	16	CREATE FILE	ALLOWS THE SC TO GENERATE A SYNTHETIC FILE
L	09	SYNTHETIC PDW	INJECT SYNTHETIC PDW INTO THE INPUT BUFFER	L	17	STOP UPDWS	STOP TRANSFER OF UPDWS ON THE AUX BUS
L	0A	NESU THRESHOLD	CHANGE NUMBER OF PDWS REQUIRED TO START A NEW EMITTER	L	18	PW MOD	CHANGE TRACK PW
L	0B	QUAL BIT MODIF.	CHANGE THE QUALITY BITS ON ALL PARAMETERS	L	19	TRANSFER TABLE	REQUESTS SORTER SUPERVISOR TO SEND MEMORY CONTENTS TO SC
L	0C	TRACK PRIORITY MODIFY	CHANGE PURGE, UPDATE TIME, AND PRIORITY	L	1A	MODIFY ADDRESS	ALLOWS SC TO CHANGE SORTER MEMORY CONTENTS
L	0D	PTDM REQ.	REQUEST PTDM ON SPECIFIED FILE	H	1B	PAUSE NESU	PUT THE NESU IN IDLE MODE
L	0E	SPDW REQ	REQUEST TRANSFER OF SPDWS ON THE AUX BUS	L	1C	BIT REQ	REQUESTS EXEC OF BIT TESTING OFF-LINE

RAYTHEON

RAYTHEON COMPANY

LEXINGTON, MASS. 02173

CODE IDENT NO.

49956

SPEC NO.

53959-JK-1002

SHEET

34 OF 61

REV

3

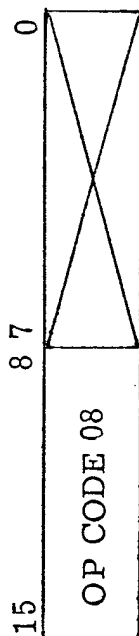
MESSAGE NAME - COMMAND MESSAGES	OP CODES - AS NOTED	FUNCTION
START	TRANSFER SORTER FROM PAUSE TO SORT MODE	
PAUSE	PLACES SORTER IN AN IDLE LOOP, SORTER RESP. ONLY TO SC LOW PRIORITY MESSAGES	
INITIALIZE	SET INIT PARAMS ENTER IDLE LOOP	
INIT/START NESU	CLEAR CAM FILES, START SEARCH FOR NEW EMITTERS	
CAM FILE DUMP	DUMP NESU CAM FILES TO SC	
AOA READOUT REQUEST	DUMP AOA FREQ AGILE TRAP TO THE SC	
FILE DUMP REQUEST	DUMP ALL TRACK FILES TO SC	

BIT POSITION

15 8 7 0

SORTER START OP CODE 01				
PAUSE OP CODE 02				
INITIALIZE OP CODE 03				
1/S NESU OP CODE 04				
CAM DUMP OP CODE 05				
AOA READOUT OP CODE 06				
FILE DUMP OP CODE 07				

BIT POSITION



MESSAGE NAME - UPDW REQ
OP CODE - 08

FUNCTION - REQ ALL UNASSOCIATED PDWS BE SENT TO
TO THE SC VIA THE AUX BUS

SIZE A	CODE IDENT NO. 49956	DRAWING NO. 53959-JK-1002
SCALE	REV 3	SHEET 35 of 61

RAYTHEON

RAYTHEON COMPANY
LEXINGTON, MASS. 02173

CODE IDENT NO.

49956

SPEC NO.

53959-JK-1002

SHEET

36 OF 61

REV

3

MESSAGE NAME - SYNTHETIC PDW

OP CODE - 09

FUNCTION - INJECTS SYNTHETIC PDWS
AS SPECIFIED BY STD. PDW
INTO THE INPUT BUFFER

BIT POSITION

15 8 0

OP CODE 09

STANDARD PDW TEXT



RAYTHEON COMPANY
LEXINGTON, MASS. 02173

CODE IDENT NO.

49956

SPEC NO.

53959-JK-1002

SHEET

37 OF 61

REV

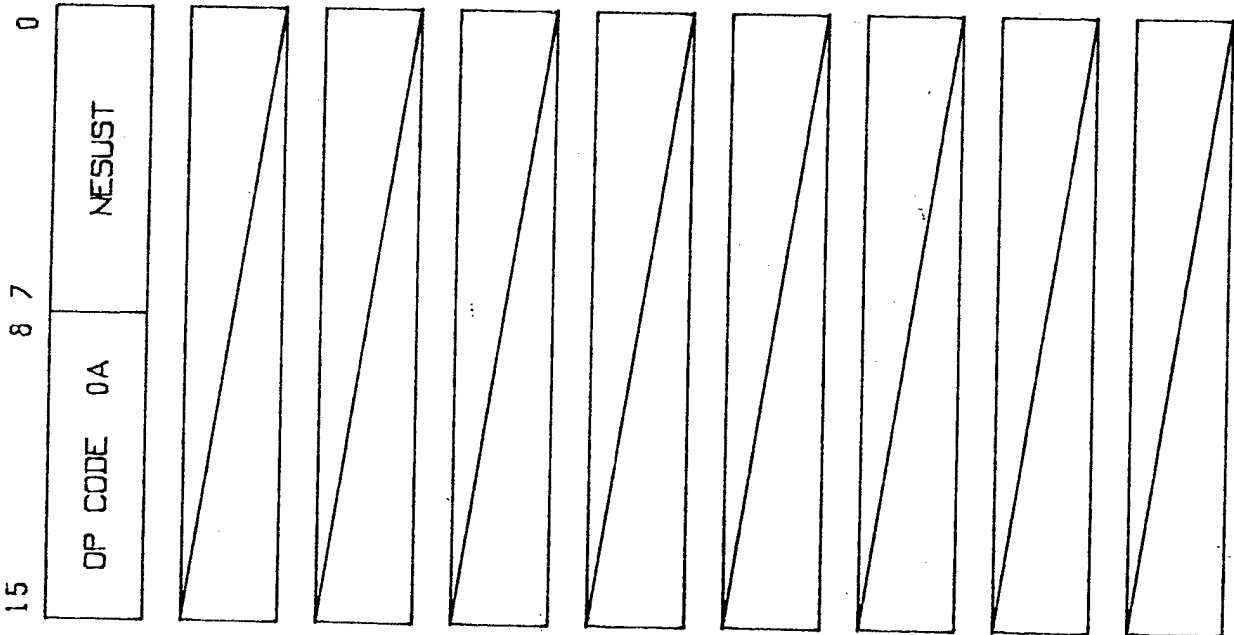
3

MESSAGE NAME - NESU TRACK THRESHOLD
OP CODE - 0A

FUNCTION - CHANGE NUMBER OF PDWS
THAT MUST BE RECEIVED
TO START A NON-FREQ AGILE
TRACK FILE

FIELD FUNCTION UNITS SCALE
NESUST DEFINES NR OF PDWS
REQD TO START TRACK

BIT POSITION



RAYTHEON

RAYTHEON COMPANY
LEXINGTON, MASS. 02173

CODE IDENT NO.

49956

SPEC NO.

53959-JK-1002

SHEET

38 OF 61

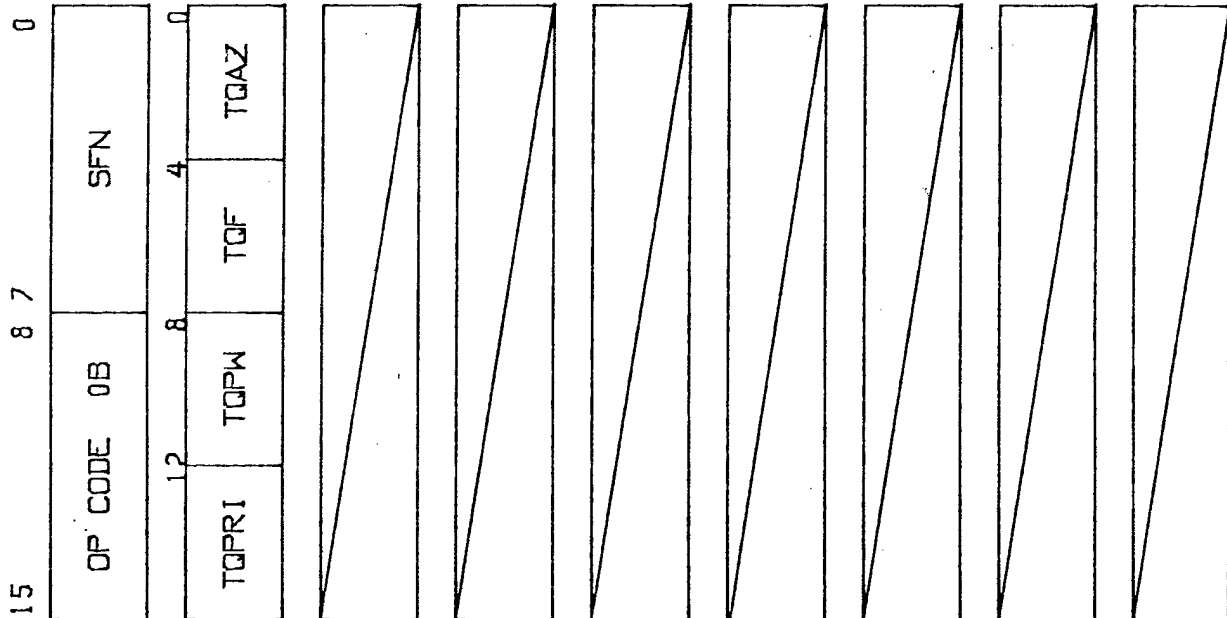
REV 3

MESSAGE NAME - QUALITY BIT MODIFICATION
OP CODE - 0B

FUNCTION - CHANGE THE PARAMETER QUALITY
BITS FOR A GIVEN
TRACK. ALL QUAL
BITS ARE CHANGED TO
THOSE INDICATED

FIELD	FUNCTION	UNITS	SCALE
SFN	FILE NUMBER		
TQAZ	AZIMUTH WEIGHT		LSB=1/2
TQF	FREQ WEIGHT		LSB=1/2
TQPW	PW WEIGHT		LSB=1/2
TQPRI	PRI WEIGHT		LSB=1/2

BIT POSITION



BIT POSITION

15 0

OP CODE 0C		SFN
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15 14131211 0		
1	J	P
PURGE		

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MESSAGE NAME - TRACK PRIORITY MODIFY

OP CODE - 0C

FUNCTION -MODIFIES EMITTER PURGE TIME,UPDATE
CYCLE TIME, AND SETS OR
CLEARS THE FILES INACTIVE BIT
ALL UPDATES OF VALID FILES
MUST HAVE MSB OF WORD 1 SET

FIELD	FUNCTION	UNITS	SCALE
SFN	FILE NUMBER (DON'T CARE)		
J	INDICATES TOP PRIORITY		
	1 SEC UPDATE		
P	IF=1, UPDATE EVERY		
	2 SEC		
	IF=0, UPDATE EVERY		
	4 SEC		
I*	IF=1, FILE HAS PASSED		
	PURGE TIME WITHOUT		
	ANY NEW PDWS		
PURGE	MAX TIME INTERVAL	SECONDS	50 MSEC
	DURING WHICH NEW		
	DATA MUST		
	BE RECEIVED OR		
	INACTIVE FILE MSG		
	IS TRANSMITTED		
	AFFECTS ALL		
	TRACK FILES		

* NOT LOOKED AT BY SORTER

RAYTHEON

RAYTHEON COMPANY
LEXINGTON, MASS. 02173

CODE IDENT NO.

49956

SPEC NO.

53959-JK-1002

SHEET

39 OF 61

REV 3

RAYTHEON

RAYTHEON COMPANY
LEXINGTON, MASS. 02173

CODE IDENT NO.

49956

SPEC NO.

53959-JK-1002

SHEET

40 OF 61

REV 3

MESSAGE NAME - PTDW REQUEST

OP-CODE - 0D

FUNCTION - REQUEST BY THE SC THAT
THE SPECIFIED TRACK
FILE BE TRANSMITTED TO
THE SC.

FIELD	FUNCTION	UNITS	SCALE
SFN	TRACK FILE NUMBER		

BIT POSITION

15

0

OP CODE 0D	SFN

RAYTHEON

RAYTHEON COMPANY
LEXINGTON, MASS. 02173

CODE IDENT NO.

49956

SPEC NO.

53959-JK-1002

SHEET

41 OF 61

REV 3

MESSAGE NAME -SPDW REQUEST

OP CODE -- 0E

FUNCTION - REQUESTS SORTER TO TRANSFER
SPDWS OF IND. FILE
ON THE AUX BUS

FIELD	FUNCTION	UNITS	SCALE
SFN	FILE NUMBER		
TTAMP	DEFINES AMPL. LEVEL ABOVE WHICH PDWS WILL BE XFERED ON THE AUX BUS	DBM	3.2
TCODE	SC GENERATED CODE FOR USE BY THE ATOA AND TG UNITS		

BIT POSITION

15

0

OP CODE 0E	SFN
TTAMP	TCODE

MESSAGE NAME - SPDW STOP

OP CODE - 0F

FUNCTION - STOP XFER OF SPDWS
FROM THE SPECIFIED FILE

FIELD	FUNCTION	UNITS	SCALE
SFN	FILE NUMBER		

BIT POSITION

15	0	OP CODE 0F	SFN														
				/													

RAYTHEON

RAYTHEON COMPANY
LEXINGTON, MASS. 02173

CODE IDENT NO.

49956

SPEC NO.

53959-JK-1002

SHEET

43 OF 61

REV

3

MESSAGE NAME - NEPDW REQUEST

OP CODE - 10

FUNCTION - REQ THAT PDWS USED TO
START SPEC. FILE
BE XFERED TO THE
SC. (INSTRUMENTATION)

FIELD	FUNCTION	UNITS	SCALE
SFN	FILE NUMBER		

BIT POSITION

15

0

OP CODE 10	SFN

MESSAGE NAME - DELETE TRACK FILE

OP CODE - 11

FUNCTION - COMMANDS SORTER TO DELETE
THE SPEC TRACK FILE

FIELD	FUNCTION	UNITS	SCALE
SFN	FILE NUMBER		

BIT POSITION

15	OPCODE 11	SFN															
			0														

RAYTHEON

RAYTHEON COMPANY
LEXINGTON, MASS. 02173

CODE IDENT NO.

49956

SPEC NO.

53959-JK-1002

SHEET

45 of 61

REV 3

MESSAGE NAME - FREQUENCY MODIFICATION

OP CODE - 12

FUNCTION - CHANGE SORTER ESTIMATE
OF THE EMITTER FREQUENCY

FIELD	FUNCTION	UNITS	SCALE
SFN	FILE NUMBER		
MODF	VALUE TO REPLACE SORTER FREQ EST	MHZ	1.25

BIT POSITION

15	OPCODE 12	SFN	0
	MODF		
	/		

RAYTHEON

RAYTHEON COMPANY

LEXINGTON, MASS. 02173

CODE IDENT NO.

49956

SPEC NO.

53959-JK-1002

SHEET

46 OF 61

REV

3

MESSAGE NAME - PRI MODIFICATION

OP CODE - 13

FUNCTION - CHANGES THE VALUES OF PRIA
AND PRIB IN THE
SPECIFIED TRACK FILE

SCALE

UNITS

FUNCTION

FIELD

FILE NUMBER

SFN

NEW PRI VALUE

MODPRIA

NEW PRI VALUE

MODPRIB

1 MICROSEC

SECONDS

1 MICROSEC

SECONDS

BIT POSITION

15

0

OPCODE 13

SFN

MODPRIA

MODPRIB

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RAYTHEON COMPANY
LEXINGTON, MASS. 02173

CODE IDENT NO.

49956

SPEC NO.

53959-JK-1002

SHEET

47 OF 61

REV 3

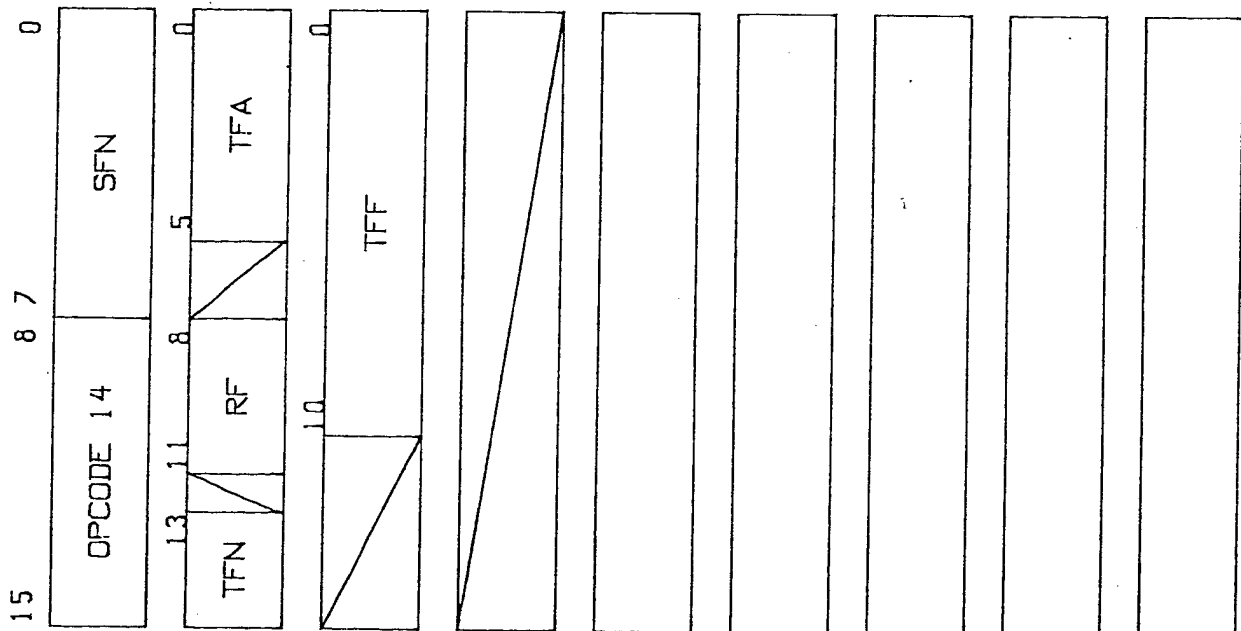
MESSAGE NAME - THROTTLE FILE MODIFICATION

OP CODE - 14

FUNCTION - REPLACE EXISTING THROTTLE FILE DATA
WITH THAT IN MESSAGE

FIELD	FUNCTION	UNITS	SCALE
SFN	FILE ASSOCIATED WITH THROTTLE FILE		
RF	THROTTLE REDUCTION FACTOR		LSB=16
TFA	THROTTLE FILE AZIMUTH	CELLS	1
TFF	THROTTLE FILE FREQUENCY	MHZ	10
TFN	NUMBER OF THROTTLE FILE TO BE MODIFIED		

BIT POSITION



RAYTHEON

RAYTHEON COMPANY
LEXINGTON, MASS. 02173

CODE IDENT NO.

49956

SPEC NO.

53959-JK-1002

SHEET

48 of 61

REV 3

MESSAGE NAME - AOA THRESHOLD MODIFICATION

OP CODE - 15

FUNCTION - CHANGE NUMBER OF PDWS REQUIRED
TO START AN AGILE FILE

FIELD	FUNCTION	UNITS	SCALE
AZCNT	NUMBER OF PDWS REQUIRED TO START NEW EMITTER ANALYSIS PROCESS		

BIT POSITION

15	8	7	0
OPCODE 15		AZCNT	

RAYTHEON

RAYTHEON COMPANY

LEXINGTON, MASS. 02173

CODE IDENT NO.

49956

SPEC NO.

53959-JK-1002

SHEET

49 OF 61

REV

3

MESSAGE NAME- CREATE TRACK FILE
OPERATION CODE- 16FUNCTION PROVIDES SORTER WITH
FORMATTED TRACK FILE
GENERATED BY SC

BIT POSITION

15	8	7	0
OP CODE			
X			
15	12	11	10
LTOA	N	P	7
4	MSB	S	P
X			
TAZ			
15	LTOA (LS 16 BITS)		
15	14	0	0
SCHR			
15	PRIA		
15	00	PRIB	
15	8	7	4
TCODE		TTAMP	TPW
15	12	7	4
TQPRI	TQPW	TQF	TQAZ
15	TRACK FREQUENCY		
13	9	4	3
TCOUNT		TPAMP	1
X		T	T
X		V	A
X		T	C
X		W	T

TAZ	SCHR	NS	PP	LTOA	LTOA	PRIA	PRIB	TF	TT	TCW	TA	TV
TRACK AZIMUTH	TRACK HISTORY REQUEST	FROM SC	TRACKER IN NEW SCAN MODE	PRI POINTER 0=A, 1=B	MS 4 BITS OF LAST TIME	OF ARRIVAL	LS 16 BITS OF LTOA	EST OF PRI SMALLEST IF	DUAL MODE	EST OF PRI LARGEST IF	DUAL MODE	TRACK FREQUENCY
CELL							MICROSEC	MICROSEC	MICROSEC	MICROSEC	MICROSEC	MICROSEC
LSB=1							1	1	1	1	1	1.25
TEST TRACK FILE FOR BITE												
IF SET, FILE IS OF CW EMITTER												
IF SET, EMITTER FREQ AGILE												
SET IF FILE CONTAINS VALID												
DATA												

RAYTHEON

RAYTHEON COMPANY

LEXINGTON, MASS. 02173

CODE IDENT NO.

49956

SPEC NO.

53959-JK-1002

SHEET
50 OF 61

REV 3

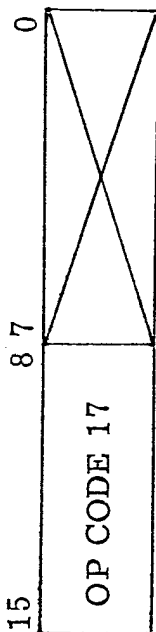
MESSAGE NAME- CREATE TRACK FILE (CONT)
OPERATION CODE- 16

BIT POSITION

15	8	7	0
OP CODE			
15	12	11	10
LTOA		N	P
4	MSB	S	P
TAZ			
15	LTOA (LS 16 BITS)		
15	14	0	
PRIA			
15	0		
PRIB			
15	8	7	4
TCODE		TTAMP	TPW
15	12	7	4
TPPRI	TPPW	TQF	TQAZ
15	0		
TRACK FREQUENCY			
13	9	4	3
TCOUNT		TPAMP	T
		V	A
		C	N
		T	T

FIELD	FUNCTION	UNITS	SCALE
TCOUNT	NUMBER OF PDWS REQUESTED BY THE SUPERVISOR		
TPAMP	PEAK DETECTED SIGNAL AMPLITUDE. RESET BY PTDW REQ	DB	1.6 DB
TPW	TRACK PULSE WIDTH	CELL	NONLINEAR
TTAMP	MIN AMPL OF PDW TO BE XFERED ON AUX BUS	DB	3.2 DB
TCODE	DATA INSERTED BY SC		.5
TQAZ	AZIMUTH QUALITY		.5
TQF	FREQUENCY QUALITY		.5
TPPW	PULSE WIDTH QUALITY		.5
TPPRI	PRI QUALITY		.5

BIT POSITION



MESSAGE NAME - UPDW STOP
OP CODE - 17

FUNCTION - STOP TRANSFER OF UPDWS FROM THE
SORTER TO SC

SIZE A	CODE IDENT NO. 49956	DRAWING NO. 53959-JK-1002
SCALE	REV 3	SHEET 51 of 61

RAYTHEON

RAYTHEON COMPANY
LEXINGTON, MASS. 02173

CODE IDENT NO.

49956

SPEC NO.

53959-JK-1002

SHEET
52 OF 61

REV 3

MESSAGE NAME - PULSE WIDTH MODIFICATION

OP CODE - 18

FUNCTION - REPLACE EXISTING ESTIMATE OF
PULSE WIDTH WITH VALUE SPEC.

FIELD	FUNCTION	UNITS	SCALE
SFN	FILE NUMBER		
MODPW	MODIFIED PULSE WIDTH VALUE	CELLS	1

BIT POSITION

15	8	7	0
OPCODE 18		SFN	
MODPW		MODPW	



RAYTHEON COMPANY

LEXINGTON, MASS. 02173

CODE IDENT NO.

49956

SPEC NO.

53959-JK-1002

SHEET

SHEET
53 OF 61

REV 3

BIT POSITION 19

51

OF CODE 19

START ADDRESS

IN SORTER SPECTRUM

RAYTHEON

RAYTHEON COMPANY
LEXINGTON, MASS. 02173

CODE IDENT NO.

49956

SPEC NO.

53959-JK-1002

SHEET

54 OF 61

REV 3

BIT POSITION

15 0

OP CODE 1A

ADDRESS OF WORD
TO BE MODIFIED

DATA TO REPLACE OLD WORD

MESSAGE NAME- MODIFY MEMORY ADDRESS

OP CODE- 1A

FUNCTION- ALLOWS THE SYSTEM MANAGER TO
CHANGE INSTRUCTIONS OR DATA
IN THE SORTER MEMORY

RAYTHEON

RAYTHEON COMPANY
LEXINGTON, MASS. 02173

CODE IDENT NO.

49956

SPEC NO.

53959-JK-1002

SHEET

55 OF 61

REV 3

BIT POSITION

15 8 7 0

MESSAGE NAME - AS NOTED
OPERATION CODES - AS NOTED

COMMAND FUNCTION

PAUSE NESU PLACE NESU IN IDLE LOOP

BIT REQ REQUEST INITIATION OF THE
BIT TEST
(THIS IS AN OFF
LINE FUNCTION)

PAUSE NESU OP CODE 1B	BIT REQ OP CODE 1C							
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3.3.3 Program Load
(TBD)

3.4 DESIGN REQUIREMENTS

3.4.1 Line Drivers/Line Receivers

All line drivers and line receivers shall incorporate SN75110 and SN75107A type devices respectively. The CP bus shall be terminated on both ends with the termination network specified in Figure 5.

3.4.2 Interconnecting Transmission Lines

All interconnecting cables used for this interface shall utilize twisted pair. The characteristic impedance shall be $110\Omega \pm 5\%$. Twisted pair within the signal sorter shall have characteristic impedance of $107\Omega \pm 10\Omega$ with a maximum stub length of 18 inches. A termination shall be provided which has a matched pair ($\pm 1\%$) of 56 ohm resistors for each signal and its return as shown in Figure 5. The optional biasing network shall be used to bias interface lines in the absence of drivers.

3.4.3 Interface Signal Definition

Figure 6 gives the interface signals between the System Controller and the Sorter. Signals SCD00 + and SCD00 - are the signal and return respectively for the least significant data bit. SCD15 is the most significant bit. SCA00 through SCA15 are the least significant through most significant address bits respectively. The remaining signals are:

<u>Signal</u>	<u>Definition</u>
SCWRT	Write/Read
SCRQS	Request
SCACK	Acknowledge
SCSKP	Skip
SCMCL	Master Clear

SIZE	CODE IDENT NO.	DRAWING NO.
A	49956	53959-JK-1002
SCALE	REV	SHEET
	3	56 of 61

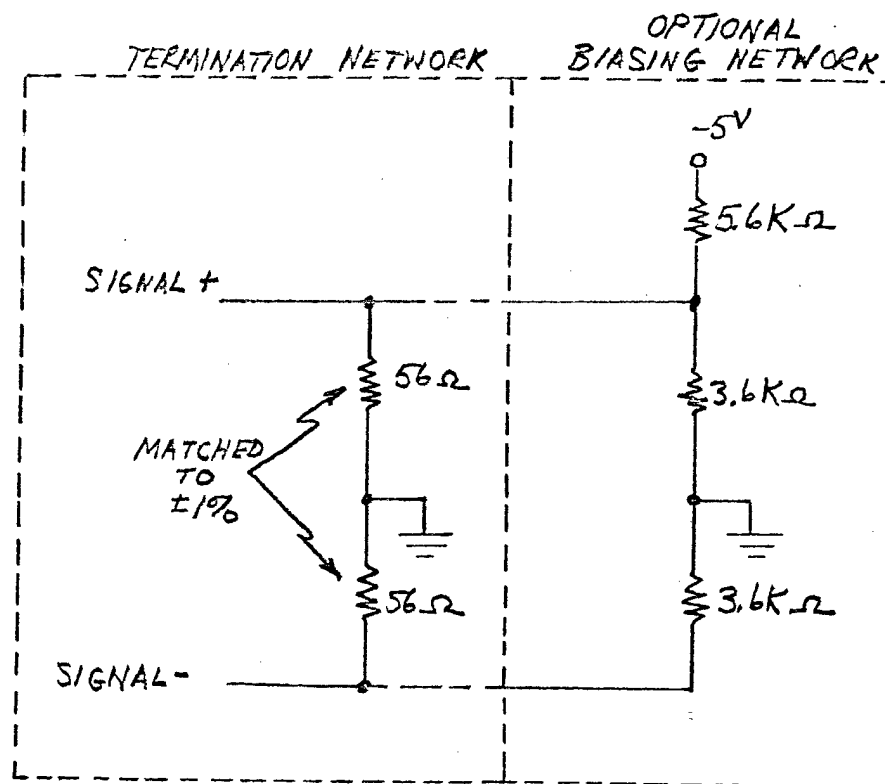


FIGURE 5. SYSTEM CONTROLLER & SPECIAL
TEST EQUIPMENT TERMINATION
& OPTIONAL BIASING
NETWORKS

SIZE A	CODE IDENT NO 49956	DRAWING NO. 53959-JK-1002
SCALE	REV 3	SHEET 57 of 61

J1 IN SYSTEM CONTROLLER

PIN #'s

PIN #'s

J4 & J5 IN SIGNAL SORTER

1	SCD00+	1
2	SCD00-	2
13	SCD01+	13
14	SCD01-	14
35	SCD02+	35
36	SCD02-	36
37	SCD03+	37
38	SCD03-	38
11	SCD04+	11
12	SCD04-	12
5	SCD05+	5
6	SCD05-	6
33	SCD06+	33
34	SCD06-	34
7	SCD07+	7
15	SCD07-	15
31	SCD08+	31
32	SCD08-	32
17	SCD09+	17
18	SCD09-	18
8	SCD10+	8
16	SCD10-	16
29	SCD11+	29
30	SCD11-	30
69	SCD12+	69
70	SCD12-	70
71	SCD13+	71
72	SCD13-	72
94	SCD14+	94
95	SCD14-	95
86	SCD15+	86
87	SCD15-	87

LSB

DATA

MSB

(CONTINUED ON NEXT PAGE)

FIGURE 6. INTERFACE SIGNAL LIST

SIZE A	CODE IDENT NO 49956	DRAWING NO. 53959-JK-1002
SCALE	REV 3	SHEET 58 of 61

J1 IN SYSTEM CONTROLLER	PIN #'s	(CONTINUED FROM PRECEDING PAGE)	PIN #'s	J4 & J5 IN SIGNAL SORTER
	67	SCA00 +	67	LSB
	68	SCA00 -	68	
	62	SCA01 +	62	
	63	SCA01 -	63	
	81	SCA02 +	81	
	82	SCA02 -	82	
	60	SCA03 +	60	
	61	SCA03 -	61	
	75	SCA04 +	75	
	76	SCA04 -	76	
	77	SCA05 +	77	
	78	SCA05 -	78	
	48	SCA06 +	48	
	49	SCA06 -	49	
	46	SCA07 +	46	
	47	SCA07 -	47	
	92	SCA08 +	92	
	100	SCA08 -	100	
	88	SCA09 +	88	
	89	SCA09 -	89	
	79	SCA10 +	79	
	80	SCA10 -	80	
	90	SCA11 +	90	
	91	SCA11 -	91	
	23	SCA12 +	23	
	24	SCA12 -	24	
	52	SCA13 +	52	
	53	SCA13 -	53	
	45	SCA14 +	45	
	66	SCA14 -	66	
	41	SCA15 +	41	
	42	SCA15 -	42	
	(CONTINUED ON NEXT PAGE)			MSB

FIGURE 6 (CONT.) INTERFACE SIGNAL LIST

SIZE A	CODE IDENT NO 49956	DRAWING NO. 53959-JK-1002	
SCALE	REV 3	SHEET 59 of 61	

J1 IN SYSTEM CONTROLLER PIN (CONTINUED FROM PRECEDING PAGE) PIN J4 & J5 IN SIGNAL SORTER

58	SCWRT +	58
59	SCWRT -	59
85	SCROS +	85
93	SCROS -	93
83	SCACK +	83
84	SCACK -	84
64	SCSKP +	64
65	SCSKP -	65
43	SCPFL +	43
44	SCPFL -	44
50	SCMCL +	50
51	SCMCL -	51
39	SCRPI +	39
40	SCRPI -	40
54	PANIC +	54
55	PANIC -	55
9	SPARE	9
10	SPARE	10
19	SPARE	19
20	SPARE	20
21	SPARE	21
22	SPARE	22
27	SPARE	27
28	SPARE	28
56	SPARE	56
57	SPARE	57
73	SPARE	73
74	SPARE	74
96	SPARE	96
97	SPARE	97
98	SPARE	98
99	SPARE	99
3	SPARE	3
4	SPARE	4
(No Conn)	SC5VR (Used in sorter only)	25
(No Conn)	SC5VR (Used in Sorter only)	26

FIGURE 6 (CONTINUED).
INTERFACE SIGNAL LIST

SIZE A	CODE IDENT NO 49956	DRAWING NO. 53959-JK-1002
SCALE	REV 3	SHEET 60 of 61

SCPFL

Power Fail

SCRPI

Interrupt In

Pin connections for J4 and J5 on the Signal Sorter, J1 of the System Controller and J5 on the Special Test Equipment shall be identical.

SIZE	CODE IDENT NO.	DRAWING NO.
A	49956	53959-JK-1002
SCALE	REV 3	SHEET 61 of 61