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TECHNICAL MANUAL

OPERATION AND MAINTENANCE INSTRUCTIONS

ORGANIZATIONAL AND INTERMEDIATE

TELETYPEWRITER SET
AN/UGC-129
PART NUMBER 137200-0002

TRACOR, INC.

N00039-77-C-0077

THIS PUBLICATION SUPERSEDES SUPPLEMENTS TO 31W4-2UGC129-1L DATED 15 OCTOBER 1982, TO 31W4-2UGC129-1Q DATED 20 DECEMBER 1983, TO 31W4-2UGC129-1S DATED 17 JANUARY 1984 AND SUPERSEDES TO 31W4-2UGC129-1 DATED 1 FEBRUARY 1979.

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CHAPTER 1

GENERAL INFORMATION

1-1. DESCRIPTION AND PURPOSE. The Teletypewriter Set, AN/UGC-129 (figure 1-1), permits operator interface in a communication system and provides the mode and submode operational capabilities listed in table 1-1. It is a self-contained, solid-state microprocessor controlled, full duplex set. The Teletypewriter Set, AN/UGC-129, hereinafter referred to as AN/UGC-129, consists of a Teletypewriter Keyboard Assembly, part number 137210-0002, and a Page Printer Assembly, part number 137300-0002.

Table 1-1. AN/UGC-129 Operational Modes/Submodes

Types of Operation	BAUD RATES								
	BAUDOT			ACSII					
	45.5	50	75	75	150	300	600	1200	2400
I. STANDARD OPERATION*									
A. Asynchronous									
(1) Low level transmit	X	X	X	X	X	X	X	X	X
(2) Low level receive	X	X	X	X	X	X	X	X	X
(3) 60 mA transmit	X	X	X	X	X				
(4) 60 mA receive	X	X	X	X	X				
(5) 20 mA transmit	X	X	X	X	X				
(6) 20 mA receive	X	X	X	X	X				
(7) 2 mA receive only	X	X	X	X	X				
(8) TD STEP	X	X	X	X	X				
(9) KW-7	X	X	X	X	X				
(10) ARC-96 (TD STEP enabled)		X							
B. Isosynchronous									
(1) KG-30				X	X	X	X	X	X
II. AFSATCOM OPERATION*									
A. Synchronous only				X					

*AN/UGC-129 can only be connected and active in one operational mode at a time.

PHD
CONNECTOR

FAN

INTERNAL
CONTROL
PANEL

KBD
CONNECTOR

POWER
SUPPLY
CONNECTOR

POWER
SUPPLY

WIRE
HARNESS
CONNECTORS

A1	MOTOR DRVR
A2	PHD I/O
A3	LVL CONV
A4	EXT I/O
	RESERVED
A6	ROM
A7	EA MUX
A8	AC ALU
A9	RAM TG
A10	RAM
A11	RAM (OPTION)
A12	KBD I/O
A13	BITE

PRINTHEAD
(PHD)

KEYBOARD
(KBD)

PRIMARY POWER →

PERIPHERAL →

ASYNC DATA →

AFSAT DATA →

EXTERNAL
INTERFACE
CONNECTORS

PCB
HOUSING

PAGE
PRINTER
ASSEMBLY

TELETYPEWRITER
KEYBOARD
ASSEMBLY

Figure 1-2. AN/UGC-129 Assembly/Subassembly Layout

1-2. TELETYPEWRITER KEYBOARD ASSEMBLY. The teletypewriter keyboard assembly (figure 1-2) has the character keys, control keys and indicators required by an operator to prepare messages and to select either of the compose-edit, transmit, or receive message handling modes.

1-3. PAGE PRINTER ASSEMBLY. The page printer assembly (figure 1-2) consists of a power supply, a printhead, a microprocessor, an 8K (or 16K optional) test memory, and signal conditioning, gating, and driver circuits. The test memory, provides message storage for operator use in editing, retransmitting, appending, and other control functions. Serial synchronous (AFSATCOM) data in ASCII code or serial asynchronous data in ASCII or ITA No. 2 (BAUDOT) code can be received, transmitted, and printed. Additionally, serial isosynchronous (KG-30) data in ASCII code can be received, transmitted, and printed. The page printer assembly prints either the ASCII 64-character subset, plus selected acronyms, or BAUDOT text according to the selected mode. The page printer assembly can be operated separately from the keyboard assembly as a receive only device.

1-4. POWER SUPPLY. This unit accepts 115 Vac ±10% single phase (47 to 440 Hz) /and provides the following voltages:

a. +26 V for the hammer solenoid and the printhead stepper motors.

b. +12 V printhead holding (idle) stepper motor voltage and indicator lamp voltage.

c. +12 V and -12 V for line drivers and line receivers.

d. +5 V logic and memory voltagee.

1-5. PRINTHEAD. The basic printhead parts are the type font, font positioning motors, hammer, hammer positioning motor, line feed motor, heater, and printer ribbon assembly. Printing is accomplished by positioning the character font behind the paper and the hammer

in front of the ribbon and paper. The hammer then impacts the ribbon, paper and character font to print the selected character.

1-6. PCB HOUSING ASSEMBLY. This assembly houses the digital logic printed circuit board (PCB) electronics required for AN/UGC-129 operation. Each PCB can be easily removed and is uniquely keyed to prevent interchange. A motherboard located at the bottom of the assembly provides mating connectors.

1-7. MICROPROCESSOR. The microprocessor serves in all operating modes as the coordinating device controller for the keyboard and page printer assembly. It also serves as the sole link between the keyboard assembly, printhead, text memory, and the external data interface.

1-8. LEADING PARTICULARS. Table 1-2 presents the leading particulars of the AN/UGC-129.

1-9. EQUIPMENT SUPPLIED. Major assemblies, assemblies, and subassemblies supplied as components of the AN/UGC-129 are listed in table 1-3.

1-10. RELATED TECHNICAL MANUALS. Table 1-4 lists other technical manuals related to AN/UGC-129.

1-11. SPECIAL TOOLS AND TEST EQUIPMENT.

1-12. SPECIAL TOOLS. Table 1-5 lists the special tools required to perform AN/UGC-129 maintenance. The special tools are illustrated in figure 1-3.

1-13. TEST EQUIPMENT. Table 1-6 lists the test equipment required to test and troubleshoot the AN/UGC-129. The test equipment is illustrated in figure 1-4.

1-14. EQUIPMENT REQUIRED BUT NOT SUPPLIED. Table1 1-7 lists the equipment that is required to maintain the AN/UGC-129, but is not supplied.

Table 1-2. Leading Particulars

Characteristic	Particulars
PRIMARY POWER REQUIREMENTS	
AC Voltage	115 V ac ±10%, 1-phase, 47-440 Hz
Maximum Input Power:	
Standby Mode	125 Watts
Print Mode	200 Watts
Additional Heater Power	150 Watts
Operating Voltage	103.5 - 126.5 V ac
Power Factor	0.8 lagging to 0.95 leading
OPTIONAL POWER REQUIREMENTS	
DC Voltage (Memory Protection)	+28 Vdc ± 10%, −20%
DC Power	65 Watts
EQUIPMENT DIMENSIONS AND WEIGHT:	
Dimensions	15.25 inches wide by 9.5 inches high by 19 inches deep.
Weight	50 pounds
TRANSPORTABILITY/STORAGE CONDITIONS: During transport or storage the AN/UGC-129 withstands, without damage or deterioration, the following conditions:	
Temperature Range:	-62° C to +71° C
Temperature Shock:	Sudden changes from -57° C to +71° C.
Humidity	Ambient relative humidity from 0 to 95 percent
Altitude	Sea level to 50,000 feet
Mechanical Shock	As specified in MIL-STD-810, Method 516.2 Procedure I
Cargo Bounce	As specified in MIL-STD-810, Method 514.2, Procedure XI
Vibration	As specified in MIL-STD-810, Method 514.2 Procedure X, table 514.2-VII, figure 514.2-7, Curve AW with AN/UGC-129 in shipping container

Table 1-2. Leading Particulars - Continued

Characteristic	Particulars
Orientation	Any orientation
Fungus	No evidence or growth of fungi as noted in MIL-STD-810, Method 508.1 Procedure I.
TRANSMIT/RECEIVE DATA RATES (see table 1-1 for details) Synchronous ASCII (AFSATCOM)	75 bits-per-second
Asynchronous and Isosyn- chronous ASCII	75, 150, 300, 600, 1200 or 2400 bits-per-second
Asynchronous BAUDOT	45.5, 50, or 75 bits-per-second.
OPERATIONAL ENVIRONMENTS Temperature*	-40° C (-40° F) to +55° C (+131° F)
Humidity	Relative humidity from 0 to 95 percent, non-condensing
Altitude	Sea level to 35,000 feet
Solar loading	52° C (125° F) with full impact solar radiation of 360 BTU/SQ FT/HR
Orientation	Inclination from normal operating position up to a maximum of 45 degrees from normal
Temperature/Altitude	As specified in MIL-E-5400, Class IA, figure 3, Curve A only
Shock	As specified in MIL-STD-810, Method 516.2, Procedures I and V
Vibration	As specified in MIL-STD-810, Method 514.2, Procedure VIII, table 514.2 - VI, figure 514.2-6, Curve V and MIL-E-5400, figure 2, Curve IIIA
Explosive Atmosphere	As specified in MIL-STD-810, Method 511.1, Procedure I.
Acceleration	10G in all three axes

* 20-minute warm-up time recommended below 0°C.

Table 1-3. Equipment Supplied

Ref Des	Nomenclature	Major Assembly Description
Unit 1	Page Printer	This assembly provides all microprocessor-controlled printing operations and includes the control panels, printhead, printhead motors, power supply and the test, message processing, and microprocessor printed circuit board (PCB) electronics.
1A1	Motor Driver PCB	
1A2	Printhead I/O PCB	
1A3	Level Converter PCB	
1A4	External I/O PCB	
1A6	ROM PCB	
1A7	EA MUX PCB	
1A8	ALU and AC PCB	
1A9	RAM, TG, and I/O Select PCB	
1A10	8K RAM PCB	
1A11	8K RAM PCB (Optional)	
1A12	Keyboard I/O PCB	
1A13	BITE PCB	
1A14	Power Supply Assy	
1A14A1	Power Supply PCB	
1A15	Printhead	
1A15B1-B4	Printhead Motors (4)	
Unit 2	Keyboard Assembly	This assembly provides the character/control keys and mode indicators and includes the keyboard/control PCB electronics.
2A1	Keyboard/Control PCB	

Table 1-4. Related Technical Manuals

Title	Publication Number
Operation and Maintenance Instructions for Teletypewriter Set AN/UGC-129 with Magnetic Tape Memory Unit MU-688/UGC	TO 31W4-2UGC129-1-1
Maintenance and Overhaul Instructions (Depot) AN/UGC-129	TO 31W4-2UGC129-3
IPB, Teletypewriter Set AN/UGC-129	TO 31W4-2UGC129-4
Depot Teletypewriter Test Set	TO 33D7-26-11-1
Depot Printhead Alignment Set	TO 33D7-26-12-1
Depot Power Supply Test Set	TO 33D7-26-13-1
Operation and Maintenance Instructions with IPB, Oscilloscope AN/USM-425	TO 33A1-13-496-1
Digital Logic Tester HC-192	TO 33AA39-10-1
Multimeter AN/PSM-37	TO 33A1-12-933-1
Programming Panel HC-192/A-1	TO 33AA2-12-1
Digital Multimeter 8300A	TO 33A1-12-964-1

Table 1-5. Special Tools

Part Number	Mfr Code	Figure Number	Nomenclature	Use
131775-0002	19397	1-3	Gauge, Push-Pull	Permits measurement of drive belt tensions.
562883-0001		1-3	Tool, Motor Adjustment	Permits adjustment of font rotation, font translation, and hammer translation belts, through posi- ining of motor housing.
138701-0001	19397	1-3	Plug, Self-Test	Provides async trans- mit/receive feedback loop.
107-1011	81312		Tool, Connector pin Installing	Install Connector pins
107-1012	81312		Tool, Connector Pin Extractor	Remove connector pins

GAUGE, PUSH-PULL
131775-0002
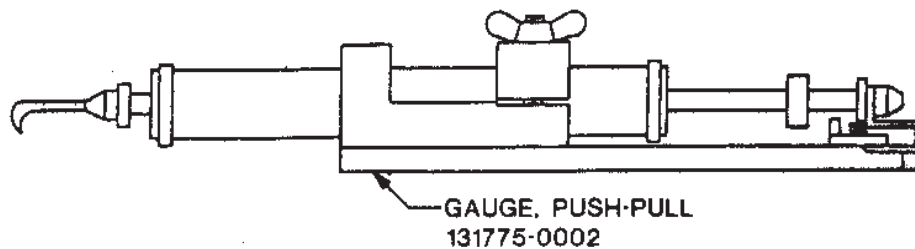
NOTE: ORIGINAL PROCURED TOOL

PLUG, SELF TEST MS27484T14F35PB
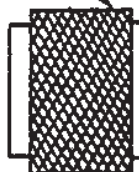
NOTE

Technician will need to obtain approximately two inches of 22 AWG wire with insulation. Take the two inch piece of wire and cut it in half. On both ends of both wires strip away approximately one quarter inch of insulation and tin them. Take four pins from the signal plug kit and solder one pin on each end of the two wires. Take the wires with soldered-on pins and insert them into the signal plug with the pin insert/extractor tool that is provided in the signal plug kit as follows:

PIN TO PIN
3 to 13
4 to 14

CHAPTER 2

INSTALLATION

2-1. INSTALLATION LOGISTICS. The AN/UGC-129 is shipped as a complete system in one container. No special unpacking procedures are required.

2-2. INSTALLATION PROCEDURES. An installation control drawing of the AN/UGC-129 is shown in figure 2-1. This drawing is intended for use as a guide when installing the AN/UGC-129.

2-3. ELECTRICAL CONNECTIONS. Electrical connections are made at the rear connectors of the AN/UGC-129 (sheet 4, figure 2-1). The power and signal assignments of each connector pin, and the respective active power and signal levels are defined in sheets 6 and 7 of figure 2-1. Refer to paragraph 4-3, Chapter 4 OPERATION, to verify correct connections for the type of operation.

CONNECTOR TABLE				
CONN	DESCRIPTION	RCPT PART NO.	MATING CONN	CLAMP, STRAIN RELIEF
J100	PRIME POWER	MS27508E12F98P	MS27484T12F98S	MS27506F12-2
J101	PERIPHERAL	MS27508E14F35SA	MS27484T14F35PA	MS27506F14-2
J102	DATA INTERFACE	MS27508E14F35SB	MS27484T14F35PB	MS27506F14-2
J103	AFSAT	MS27508E12F35S	MS27484T12F35P	MS27506F12-2

VIEW C-C
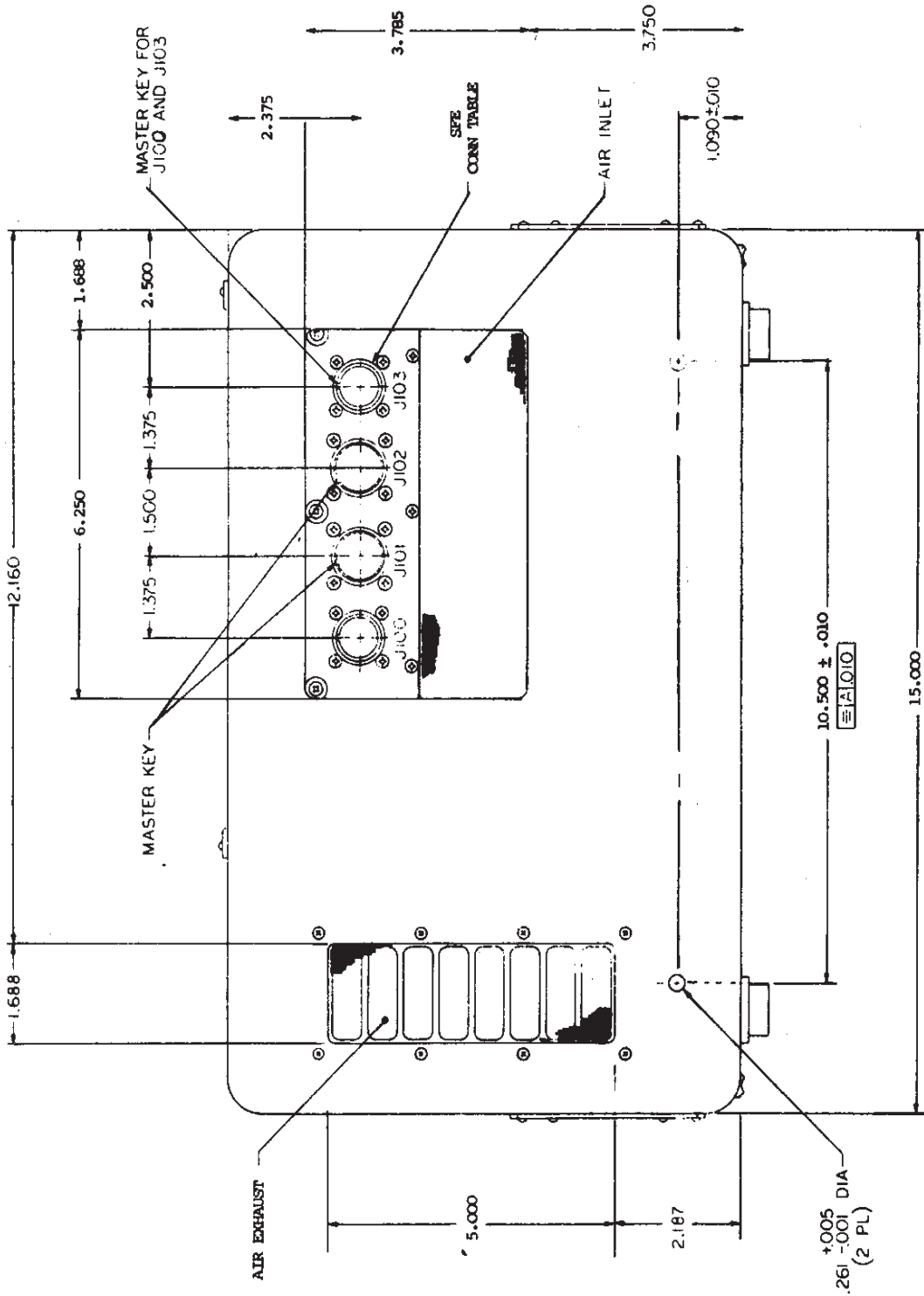
Figure 2-1. AN/UGC-129 Installation Control Drawing (Sheet 4 of 7)

PERIPHERAL CONNECTOR		
J101 CONNECTOR TYPE: MS27508E14F35SA		
PIN	FUNCTION	SIGNAL CHARACTERISTICS
1	$\overline{PRD\ DATA}$	TTL LEVELS
2	PRD DATA	TTL LEVELS
3	PRD CLK	TTL LEVELS
4	$\overline{PRD\ CLK}$	TTL LEVELS
5	$\overline{PEA0}$	TTL LEVELS
6	PEA0	TTL LEVELS
7	PWDB	TTL LEVELS
8	$\overline{PWDB}$	TTL LEVELS
9	$\overline{PEA2 \cdot X4}$	TTL LEVELS
10	PEA2·X4	TTL LEVELS
11	SPARE	0 VDC
12	SPARE	0 VDC
13	$\overline{PSDI}$	TTL LEVELS
14	PSDI	TTL LEVELS
15	$\overline{PRSI}$	TTL LEVELS
16	PRSI	TTL LEVELS
17	$\overline{PD3}$	TTL LEVELS
18	PD3	TTL LEVELS
19	SPARE	0 VDC
20	SPARE	0 VDC
21	$\overline{PD0}$	TTL LEVELS
22	PD0	TTL LEVELS
23	$\overline{PEA1}$	TTL LEVELS
24	PEA1	TTL LEVELS
25	$\overline{PD4}$	TTL LEVELS
26	PD4	TTL LEVELS
27	$\overline{PD2}$	TTL LEVELS
28	PD2	TTL LEVELS
29	$\overline{PD5}$	TTL LEVELS
30	PD5	TTL LEVELS
31	$\overline{PDEP}$	TTL LEVELS
32	PDEP	TTL LEVELS
33	$\overline{PD1}$	TTL LEVELS
34	PD1	TTL LEVELS
35	AN/UGC-129 GND	0 VDC
36	AN/UGC-129 GND	0 VDC
37	SPARE	0 VDC

PRIME POWER CONNECTOR		
J100 CONNECTOR TYPE MS27508E12F98P		
PIN	FUNCTION	SIGNAL CHARACTERISTICS
A	AC POWER	115VAC 1Ø 47-440 HZ 350 W MAX
B	AC POWER	115VAC 1Ø 47-440 HZ NEUT
C	(NOT USED)	-
D	(NOT USED)	-
E	GROUND	0VDC
F	(NOT USED)	-
G	+28V RETURN	0VDC
H	+28V MEMORY SAVE	+28VDC
J	(NOT USED)	-
K	(NOT USED)	-

*TTL LEVELS DEFINED AS:
LOW = 0 TO 0.8 VOLT
HIGH = 2.4 TO 5.0 VOLTS

Figure 2-1. AN/UGC-129 Installation Control Drawing (Sheet 6 of 7)

DATA CONNECTOR J102 CONNECTOR TYPE: MS27508E14F35SB		
PIN	FUNCTION	SIGNAL CHARACTERISTICS
1	TRANSMIT LOOP +	MIL-STD-188C, HIGH LEVEL
2	TRANSMIT LOOP -	MIL-STD-188C, HIGH LEVEL
3	RECEIVE LOW LEVEL	MIL-STD-188C, LOW LEVEL
4	RECEIVE LOW LEVEL RETURN	0 VDC
5	TD STEP	MIL-STD-188C, LOW LEVEL
6	TD STEP RETURN	0 VDC
7	RECEIVE GATED CLOCK	MIL-STD-188C, LOW LEVEL
8	RECEIVE GATED CLOCK RETURN	0 VDC
9	TRANSMIT GATED CLOCK	MIL-STD-188C, LOW LEVEL
10	TRANSMIT GATED CLOCK RETURN	0 VDC
11	RECEIVE LOOP +	MIL-STD-188C, HIGH LEVEL
12	RECEIVE LOOP -	MIL-STD-188C, HIGH LEVEL
13	TRANSMIT LOW LEVEL	MIL-STD-188C, LOW LEVEL
14	TRANSMIT LOW LEVEL RETURN	0 VDC
15	(NOT USED)	-
16	(NOT USED)	-
17	(NOT USED)	-
18	(NOT USED)	-
19	(NOT USED)	-
20	(NOT USED)	-
21	(NOT USED)	-
22	(NOT USED)	-
23	(NOT USED)	-
24	(NOT USED)	-
25	(NOT USED)	-
26	(NOT USED)	-
27	(NOT USED)	-
28	(NOT USED)	-
29	(NOT USED)	-
30	(NOT USED)	-
31	(NOT USED)	-
32	(NOT USED)	-
33	(NOT USED)	-
34	(NOT USED)	-
35	(NOT USED)	-
36	(NOT USED)	-
37	(NOT USED)	

AFSATCOM CONNECTOR J103 CONNECTOR TYPE: MS27508E12F35S		
PIN	FUNCTION	SIGNAL CHARACTERISTICS
1	RECEIVE BIT CLOCK	MIL-STD-188C, LOW LEVEL
2	RECEIVE BIT CLOCK RETURN	0 VDC
3	RECEIVE DATA	MIL-STD-188C, LOW LEVEL
4	RECEIVE DATA RETURN	0 VDC
5	CHARACTER CLOCK	MIL-STD-188C, LOW LEVEL
6	CHARACTER CLOCK RETURN	0 VDC
7	SECURE	MIL-STD-188C, LOW LEVEL
8	SECURE RETURN	0 VDC
9	TRANSMIT CLOCK	MIL-STD-188C, LOW LEVEL
10	TRANSMIT CLOCK RETURN	0 VDC
11	TRANSMIT DATA	MIL-STD-188C, LOW LEVEL
12	TRANSMIT DATA RETURN	0 VDC
13	TRANSMIT ENABLE	MIL STD-188C, LOW LEVEL
14	TRANSMIT ENABLE RETURN	0 VDC
15	PREAMBLE DISABLE	MIL-STD-188C, LOW LEVEL
16	PREAMBLE DISABLE RETURN	0 VDC
17	(NOT USED)	-
18	(NOT USED)	-
19	(NOT USED)	-
20	(NOT USED)	-
21	(NOT USED)	-
22	(NOT USED)	-

*MIL-STD-188C LEVELS DEFINED AS:
1. HIGH LEVEL (SELECTABLE):
   TRANSMIT
   LOW = 0 mA
   HIGH = 20 mA OR 60 mA
   RECEIVE
   LOW = 0 mA
   HIGH = 2 mA, 20 mA OR 60 mA
2. LOW LEVEL:
   LOW = –6 VOLTS
   HIGH = +6 VOLTS
(AN/UGC-129 HAS STRAPPING OPTION TO ALSO SENSE MARK LOW/SPACE HIGH.)

Figure 2-1.   AN/UGC-129 Installation Control Drawing (Sheet 7 of 7)

CHAPTER 4

OPERATION

Section I. CONTROLS AND INDICATORS

4-1. KEYBOARD ASSEMBLY CONTROLS AND INDICATORS. The keyboard controls and indicators are illustrated in figure 4-1. The following paragraphs describe keyboard assembly controls and indicators in detail.

a. Mode Controls. Table 4-1 lists and describes the functions of the mode/edit select and memory contents mode controls located in the uppermost row of the keyboard. These controls allow the operator to enter the compose, edit, transmit, print, reset, or memory control modes.

NOTE A

Some AN/UGC-129 controls and indicators are unique to the AFSATCOM operation (table 1-1). These controls and indicators are described separately and listed separately at the end of each tabular listing. When only one item in a listing is unique to AFSATCOM, the item is flagged accordingly.

NOTE B

Certain AN/UGC-129 Operational Modes or Submodes are selectable only through strapping or parity switch selection on PCB 1A3 or 1A4.
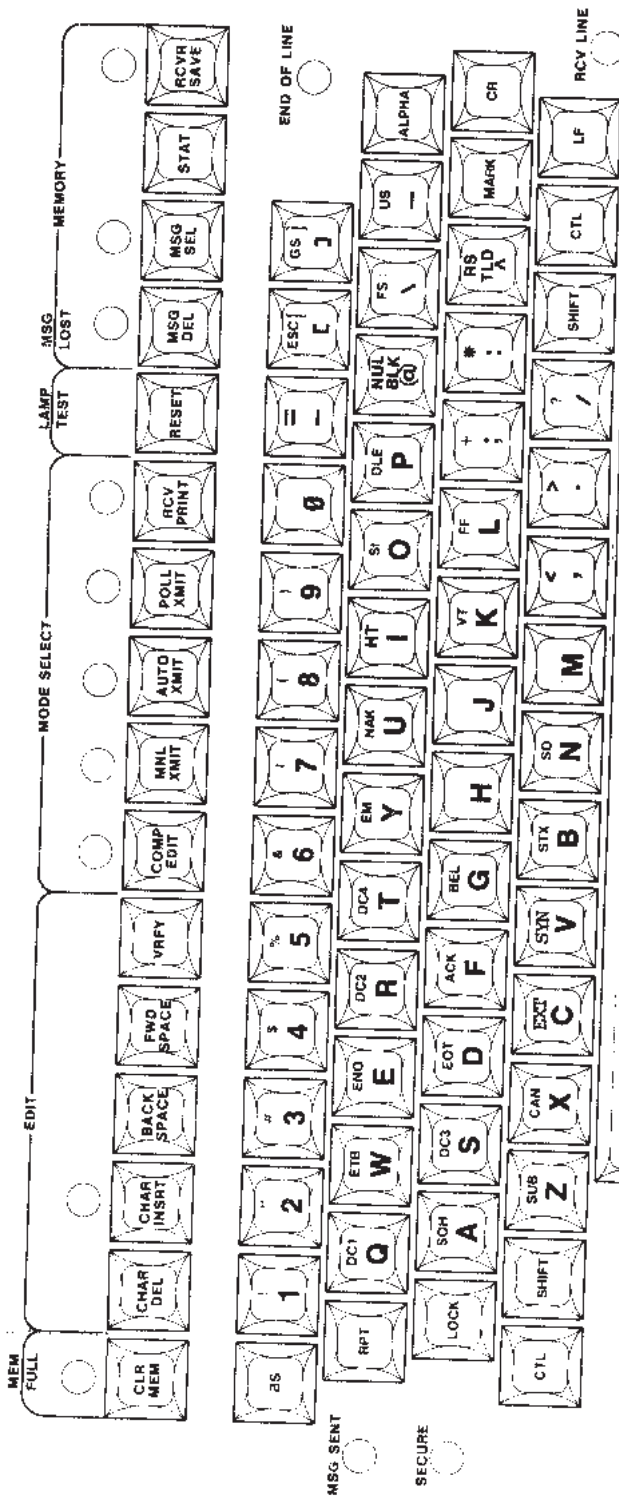
NOTE: KEYS F AND J HAVE TINY BUMPS TO INDICATE OPERATOR HOME POSITION

COLOR	KEYS/CONTROLS	LAMPS
WHITE	—	MSG SENT AND RCV LINE.
YELLOW	CTL, CLR MEM AND MSG DEL CONTROLS (AND MARK KEY LETTERING)	SECURE, MEM FULL, MSG LOST, AND END OF LINE.
GREEN	RESET CONTROL	CHAR INSRT, COMP EDIT, MNL XMIT, AUTO XMIT, POLL XMIT, RCV PRINT, MSG SEL, AND RCVR SAVE.
GRAY	ALL CHARACTER, BS, RPT, LOCK, SHIFT, MARK, ALPHA, CR, AND LF KEYS.	
BLACK	CHAR DEL, CHAR INSRT, BACK SPACE, FWD SPACE, VRFY, COMP EDIT, MNL XMIT, AUTO XMIT, POLL XMIT, RCV PRINT, MSG SEL, STAT, AND RCVR SAVE CONTROLS.	

Figure 4-1. Keyboard Assembly Character/Control Keys and Indicators

Table 4-1.   Keyboard Assembly Mode Controls

Nomenclature	Functions
COMP EDIT	Selects mode used to compose and store messages into text memory from the keyboard assembly or to verify and edit messages stored in memory. CHAR DEL, CHAR INSRT, BACK SPACE, FWD SPACE, and VRFY controls can only be active when COMP EDIT mode is selected.
VRFY	Used in COMP EDIT mode to view the contents of the selected message for verification or correction. Initial depression of VRFY control starts printing of selected message. Printing can be stopped for editing at any point by depressing the control a second time. After editing, printing can be continued by depressing the control once more. Printing can then continue to completion or can be stopped by again depressing the control.
CHAR DEL	Used in COMP EDIT Mode to delete characters from stored text. Character deletion is initiated during verification printing by depressing the VRFY key to stop printing at line where character is to be deleted. BACK SPACE and FWD SPACE are then used to reference exact location of the character to be deleted. CHAR DEL key is then depressed to delete the character. Adjacent characters in the forward direction can be deleted by repeatedly depressing the CHAR DEL key. Deleted characters are printed in a rightmost direction each time the CHAR DEL key is depressed.
CHAR INSRT	Used in COMP EDIT Mode to insert additional characters in stored text. Character insertion is initiated during verification printing by depressing the VRFY key to stop printing at line where character is to be inserted. BACK SPACE and FWD SPACE keys are then used to reference exact location where character or characters are to be inserted. CHAR INSRT key is then depressed to allow insertion of characters by depressing applicable character keys. A lamp located above CHAR INSRT key is turned on while CHAR INSRT Mode is active. Previously entered characters stored past the point of insertion are moved forward in memory as each new character is inserted. Exit from this mode is accomplished by depressing CHAR INSRT key again at desired point of text.
BACK SPACE	Used in COMP EDIT Mode to decrement the position of the memory pointer for referencing characters in text memory during character insertion or deletion operations. The character to which the memory pointer is pointing is printed each time BACK SPACE key is depressed. Printing proceeds in a rightmost direction.

Table 4-1. Keyboard Assembly Mode Controls - Continued

Nomenclature	Functions
FWD SPACE	Used in COMP EDIT Mode to increment the position of the memory pointer for referencing characters in text memory during character insertion or deletion operations. The character to which the memory pointer was pointing is printed each time FWD SPACE key is depressed. FWD SPACE function is auto-repeating if FWD SPACE key is held depressed.
MNL XMIT	Selects mode used to transmit data directly from the keyboard assembly.
AUTO XMIT	Selects mode used to automatically transmit a message stored in text memory. This control can be used to generate an RY series test message pattern. COMP EDIT is depressed first then CTL is depressed and held while AUTO XMIT is depressed. RY pattern is transmitted if AN/UGC-129 is connected into communication system. See also AFSATCOM AUTO XMIT at end of this table.
RCV PRINT	Selects mode used to disable printhead for all modes of operation except printing receive messages or for verification of stored messages.
RESET	Used to disable any previously selected modes except for RCVR SAVE mode. Illuminates all keyboard lamps while held depressed for lamp test. Activation of RESET control does not affect the contents of memory.
CLR MEM	Used to erase entire contents of text memory when depressed in conjunction with CTL key. CTL key must be depressed and held prior to depressing the CLR MEM key.
MSG DEL	Used to erase the selected message from memory. MSG DEL must be depressed after CTL is depressed and held.
MSG SEL	Used to assign message numbers to the contents of memory or to select messages for transmission, verification, or editing. After MSG SEL is depressed, legal two message number digits Ø1 through 64 are entered. Printing line length is changed from 8Ø characters by first depressing MSG SEL and entering digits ØØ, followed by a 6 (69 characters) or 7X (where X = Ø through 9). An 8 changes line length back to 80 characters per line. 8Ø-character line length is automatic at power up. See also AFSATCOM at end of table.
STAT	Used to review memory status. When depressed, the printer responds with a list of message numbers assigned, message segment locations, message origin, and remaining number of segments available.

Table 4-1. Keyboard Assembly Mode Controls - Continued

Nomenclature	Functions
RCVR SAVE	Used to route incoming messages to memory. Message numbers are automatically assigned in this mode. This mode is entered automatically at power up.
AFSATCOM ONLY	
POLL XMIT	Selects mode used to automatically transmit a message stored in text memory in response to a poll inquiry.
MSG SEL (mesage length select)	AFSATCOM message length requirement is met by depressing MSG SEL key, then depressing CTL key and holding while message length digits (2∅ to 16∅) are entered. Message length entry may range from 2∅ to 16∅ characters in increments of 2∅ characters.
AUTO XMIT	RY pattern test message generation is possible in AFSATCOM operation only if AN/UGC-129 is connected into operational AFSATCOM system because of external clock requirement. RY pattern cannot be generated when internal control panel BAUD RATE switch is in SYN position without external clock pulses.

b. Text Characters and Controls.
Table 4-2 lists and defines the text
character/control keys located on the
bottom four rows of the keyboard. The
special functions of the ALPHA, CTL, and
MARK keys are described following table
4-2.

Table 4-2. Keyboard Assembly Text Characters/Controls

NOTE

The text characters are the upper and lower case alphabet letters, digits Ø
through 9, and the punctuation/control characters listed below. Some charac-
ter entries require that either the SHIFT or CTL key (never both) be depressed
and held while the character key is depressed. This requirement is indicated
with the symbol listing. Text characters are illustrated in figure 4-1.

Symbol		Name
!	(SHIFT)	Exclamation Point
"	(SHIFT)	Quotation Mark
#	(SHIFT)	Number Sign
$	(SHIFT)	Dollar Sign
%	(SHIFT)	Percent
&	(SHIFT)	Ampersand
'	(SHIFT)	Apostrophe
(	(SHIFT)	Opening Parenthesis
)	(SHIFT)	Closing Parenthesis
=	(SHIFT)	Equals
		Underline
{	(SHIFT)	Opening Brace
}	(SHIFT)	Closing Brace
[		Opening Bracket
]		Closing Bracket
@		Commericial At
\		Reverse Slant
-		Hyphen
+	(SHIFT)	Plus
;		Semicolon
*	(SHIFT)	Asterisk
:		Colon
Λ		Circumflex
<	(SHIFT)	Less Than
>	(SHIFT)	Greater Than
?	(SHIFT)	Question Mark
,		Comma
.		Period
/		Slant
ACK	(CTL)	Acknowledge
ALPHA		Alphabet Upper Case
BEL	(CTL)	Bell
BLK	(SHIFT)	Grave Accent
BS		Backspace

Table 4-2. Keyboard Assembly Text Characters/Controls - Continued

Symbol		Name
CAN	(CTL)	Cancel
CR		Carriage Return
CTL		Control
DC1	(CTL)	Device Control 1
DC2	(CTL)	Device Control 2
DC3	(CTL)	Device Control 3
DC4	(CTL)	Device Control 4
DLE	(CTL)	Data Link Escape
EM	(CTL)	End of Medium
ENQ	(CTL)	Inquiry
EOT	(CTL)	End of Transmission
ESC	(CTL)	Escape
ETB	(CTL)	End Transmission Block
ETX	(CTL)	End of Text
FF	(CTL)	Form Feed
FS	(CTL)	File Separator
GS	(CTL)	Group Separator
HT	(CTL)	Horizontal Tabulation
LF		Line Feed
LOCK		Lock Shift
*MARK	(CTL)	Special Transmit Mode
NAK	(CTL)	Negative Acknowledge
NUL	(CTL)	Null
RPT		Repeat
RS	(CTL)	Record Separator
SHIFT		Shift (Lower/Upper Case)
SI	(CTL)	Shift In
SO	(CTL)	Shift Out
SOH	(CTL)	Start of Heading
STX	(CTL)	Start of Text
SUB	(CTL)	Substitute
SYN	(CTL)	Synchronous Idle
TLD	(SHIFT)	Tilde
US	(CTL)	Unit Separator
VT	(CTL)	Vertical Tabulation

*   = AFSATCOM only.

c. ALPHA Key. The ALPHA key allows the operator to type all alphabetic characters in uppercase mode. Non-alphabetic characters remain in lower case mode. The ALPHA key is depressed to lock and depressed to unlock. While the ALPHA key is in the locked position, the SHIFT key remains functional to allow the operator to shift any non-alphabetic keys to upper case mode, as required. The CTL key and associated function keys also remain functional, while ALPHA is in the locked position.

d. CTL Key. Most function control keys require that the CTL key be depressed and held while the function control key is depressed. During BAUDOT code (figure 4-2) mode of operation, the keyboard generates BLANK with CTL and NULL keys, SPACE with SPACE bar, FIGURES with CTL and SO keys, and LETTERS with CTL and SI keys. Uppercase H is generated with the # symbol.

e. MARK Key (AFSATCOM Only). During ASCII code (figure 4-3) mode of operation, the keyboard generates the ASCII subset plus selected ASCII acronyms and the diamond symbol. Certain other characters of the complete ASCII subset can be transmitted and received but are not directly printable. These characters are handled as special characters and include selected lower case letters and acronym symbols. When the ASCII code for any of these characters is detected, acronyms are printed in lieu of the selected lower case letters and symbols. Acronyms are printed in the Normal Print Mode or in the Special Print Mode (12 characters following the depress of the MARK key, with CTL key held down). The acronyms with the related symbol or lower case letters are listed in table 4-3. The associated normal or Special Print mode is also given in the table. Any lower case letter not listed on the table is printed as an upper case letter.

f. Keyboard Assembly Indicators. Table 4-4 lists the keyboard assembly indicators and associated functions.

CHARACTERS — CODE SIGNALS — CCITT NO. 2 UPPER CASE*

LOWER CASE	UPPER CASE COMM	UPPER CASE WEATHER	START	1	2	3	4	5	STOP	CCITT NO. 2 UPPER CASE*
A	—	↑		M	M				M	
B	?	⊕		M			M	M	M	
C	:	○			M	M	M		M	
D	$	↗		M			M		M	WRU
E	3	3		M					M	
F	!	→		M		M	M		M	UNASSIGNED
G	&	↘			M		M	M	M	UNASSIGNED
H	#	↓				M		M	M	UNASSIGNED
I	8	8			M	M			M	
J	'	↗		M	M		M		M	AUDIBLE SIGNAL
K	(	↔		M	M	M	M		M	
L	)	↘			M			M	M	
M	.					M	M	M	M	
N	,	⊕				M	M		M	
O	9	9					M	M	M	
P	0	0			M	M		M	M	
Q	1	1		M	M	M		M	M	
R	4	4			M		M		M	
S	BELL	BELL		M		M			M	'(APOSTROPHE)
T	5	5						M	M	
U	7	7		M	M	M			M	
V	;	①			M	M	M	M	M	=
W	2	2		M	M			M	M	
X	/	/		M		M	M	M	M	
Y	6	6		M		M		M	M	
Z	"	+		M				M	M	+
BLANK	—								M	CTL AND NULL
SPACE						M			M	SPACE
CAR. RET.							M		M	
LINE FEED					M				M	
FIGURES				M	M		M	M	M	CTL AND SO
LETTERS				M	M	M	M	M	M	CTL AND SI

NOTE: UPPER CASE H (COMM) MAY BE STOP OR #

MARKING PULSE ▨

SPACING PULSE ☐

*THIS COLUMN SHOWS ONLY THOSE CHARACTERS WHICH DIFFER FROM THE U.S.A. VARIATION

Figure 4-2. International Telegraph Alphabet No. 2 – American Variation (BAUDOT)

		128-SYMBOL PRINTING SET							
COLUMN→	0	1	2	3	4	5	6	7	
b7 / b6 / b5	0 0 0	0 0 1	0 1 0	0 1 1	1 0 0	1 0 1	1 1 0	1 1 1	R O W ↓
b4 b3 b2 b1	←— NON-PRINTING —→		←— 96-SYMBOL PRINTING SUBSET —→						
0000	NUL ⟍	DLE ⊖	SP	∅	@	P	`	p	0
0001	SOH ⌐	DC1 ⊕	!	1	A	Q	a	q	1
0010	STX ⊥	DC2 ⊖	"	2	B	R	b	r	2
0011	ETX ⌐	DC3 ⊖	#	3	C	S	c	s	3
0100	EOT ⌐	DC4 ⊖	$	4	D	T	d	t	4
0101	ENQ +	NAK ⊗	%	5	E	U	e	u	5
0110	ACK ⊷	SYN ①	8	6	F	V	f	v	6
0111	BEL Δ	ETB ⊕	(APOS)	7	G	W	g	w	
1000	BS ◁	CAN ⊠	(	8	H	X	h	x	8
1001	HT ▷	EM ⊞	)	9	I	Y	i	y	9
1010	LF ≡	SUB Ⅲ	*	:	J	Z	j	z	10
1011	VT ∇	ESC ⊟	+	;	K	[	k	{	11
1100	FF ⩒	FS ⊡	,	<	L	\	l	¦	12
1101	CR ≪	GS ⊟	-	=	M	]	m	}	13
1110	SO ⋀	RS ⊟	.	>	N	▲	n	~	14
1111	SI ⋁	US ⊡	/	?	O	—	o	DEL ⬚	15

Figure 4-3. American Standard Code for Information Interchange (ASCII)

Table 4-3. Special Printable Acronyms (AFSATCOM Only)

NOTE

Receipt of the ASCII code for any of the acronyms listed in this table
cause the printer to print each letter of an acronym in lieu of the
acronym symbol. Acronyms not listed in this table are not printable.
Refer to table 4-2 to determine if acronym entry requires use of CTL
or SHIFT key.

I. ACRONYMS PRINTABLE:

SOH in lieu of the SOH symbol.

ETX in lieu of the ETX symbol.

ACK in lieu of the ACK symbol.

DCI in lieu of the DC1 symbol.

DC2 in lieu of the DC2 symbol.

DC3 in lieu of the DC3 symbol.

DC4 in lieu of the DC4 symbol.

NAK in lieu of the NAK symbol.

ETB in lieu of the ETB symbol.

DLE in lieu of the DLE symbol.

II. ACRONYMS PRINTABLE AFTER CORRECT "MARK" ENTRY.

MRK when MARK is entered from keyboard.

NUL in lieu of the NUL symbol.

LF in lieu of the LF symbol.

RS in lieu of the RS symbol.

BLK in lieu of the grave accent (') symbol.

RL in lieu of the lower case r.

TL in lieu of lower case t.

XL in lieu of lower case x.

JL in lieu of lower case j.

LL in lieu of lower case l.

Table 4-3. Special Printable Acronyms (AFSATCOM Only) - Continued

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TLD in lieu of the tilde (~) symbol.

WL in lieu of lower case w.

UL in lieu of lower case u.

FL in lieu of lower case f.

EL in lieu of lower case e.

CAN in lieu of the CAN symbol.

SYN in lieu of the SYN symbol.

Table 4-4. Keyboard Assembly Indicators

Nomenclature	Functions
MEM FULL	Lamp flashes when last segment of text memory is being accessed. Lamp turns off if one or more segments are cleared or remains on continuously if message terminates in last available segment of memory with no empty segments available.
CHAR INSRT	Lamp on indicates CHAR INSRT mode is active.
COMP EDIT	Lamp on indicates COMP EDIT mode is active.
MNL XMIT	Lamp on indicates MNL XMIT mode is active.
AUTO XMIT	Lamp on indicates AUTO XMIT mode is active.
RCV PRINT	Lamp on indicates RCV PRINT mode is active.
MSG LOST	Lamp on indicates received message has exceeded length of available memory and has overwritten previously stored messages.
MSG SEL	Lamp flashes when MSG SEL control is initially depressed. Flashes until legal message numbers are entered. Remains continuously on after legal entry. Illegal entries are ignored. Lamp is off at power-up and when on is turned off following RESET.
RCVR SAVE	Lamp on indicates RCVR SAVE mode active. Mode is active at power-up.
MSG SENT	Lamp on indicates a message has been automatically transmitted. Lamp remains on until new mode is selected. (See also AFSATCOM at end of table.)
END OF LINE	Lamp turns on 5 characters prior to selected end-of-line and remains on until a carriage return is indicated.
RCV LINE	Lamp off indicates no incoming data. Lamp on indicates receive data on line. Lamp flashing indicates receive line open in current loop interface mode only.
<u>AFSATCOM</u>	
SECURE	Lamp on indicates receipt of a secure signal on the AFSATCOM data connector. Lamp can also be turned on by RESET lamp test.

Table 4-4.   Keyboard Assembly Indicators - Continued

Nomenclature	Functions
POLL XMIT	Lamp on indicates POLL XMIT mode is active. MSG SENT lamp lights for 1∅ +1 seconds after poll transmit message has been sent.
MEM FULL	When a message length has been selected (see table 4-1), lamp flashes to indicate selected message is selected message length. Lamp steady on indicates message length filled.

4-2.   PAGE PRINTER CONTROLS AND INDICATORS. The page printer controls and indicators consist of the front panel and internal panel controls and indicators as described in the following subparagraphs.

   a. Front Panel Controls and Indicators. The page printer front panel controls and indicators are illustrated in figure 4-4 and described in table 4-5.
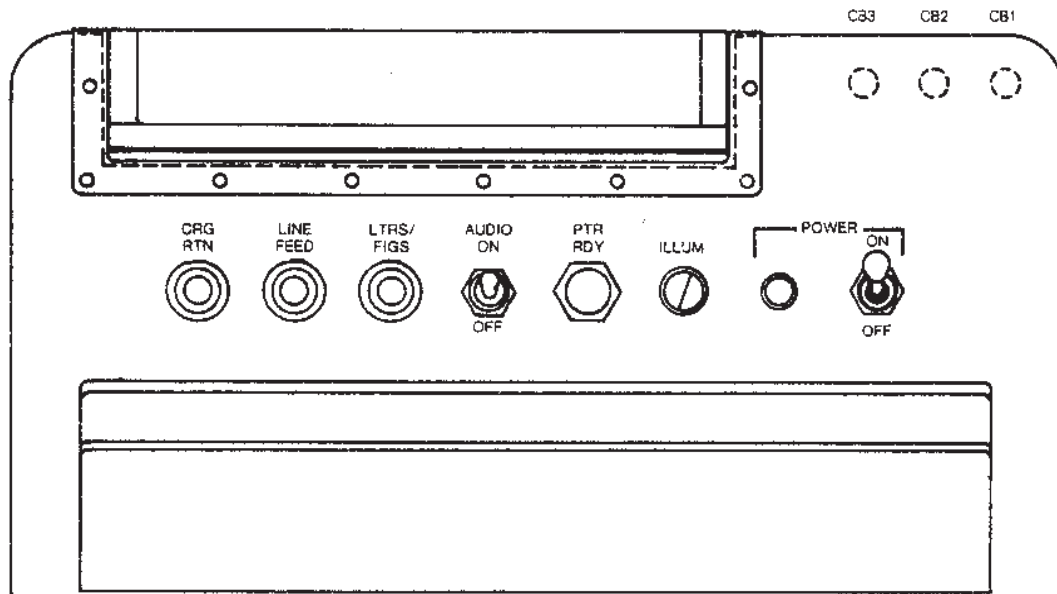
Figure 4-4.   Page Printer Assembly - Front Panel Controls and Indicators

Table 4-5. Page Printer Assembly - Front Panel Controls and Indicators

Designation	Function
CRG RTN	Local pushbutton switch for returning font and hammer to the left margin position.
LINE FEED	Local pushbutton switch for paper advancement.
LTRS/FIG	Local pushbutton switch for shifting from letters to figures or figures to letters during reception of BAUDOT.
AUDIO ON-OFF	Switch enables/disables audio alarm.
PTR RDY	Lamp indicates that printer is ready to print. Lamp remains on until power is removed or equipment malfunctions.
ILLUM	Rheostat for controlling intensity of printhead lamp used to illuminate printing area.
POWER	Lamp indicates that power is on.
POWER ON-OFF	Switch controls input power to power supply.
CB1, CB2, CB3	Protective circuit breakers located on back of front panel used on ac power (CB1, CB2) and dc power (CB3) input lines.

b. Internal Panel Controls and Indicators. The page printer internal panel controls and indicators are illustrated in figure 4-5 and described in table 4-6.
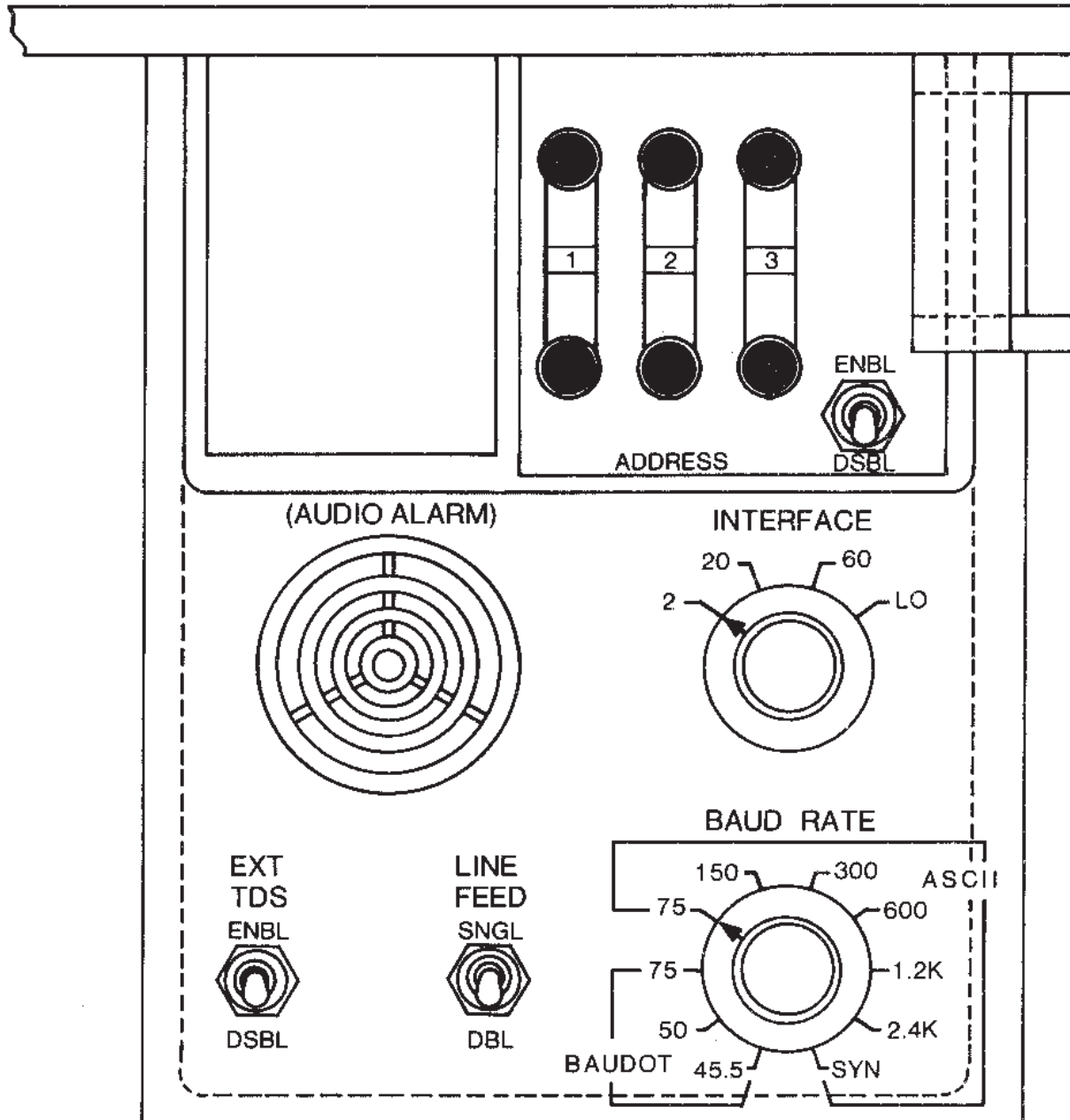
Figure 4-5. Page Printer Assembly - Internal Panel Controls and Indicators

Table 4-6. Page Printer Assembly - Internal Panel Controls and Indicators

Designation	Function
BAUD RATE	Rotary switch used to select the asynchronous ASCII or BAUDOT mode baud rate or the synchronous (SYN) modes of operation.
INTERFACE	Rotary switch used to select the asynchronous low level (LO) or the current loop (2, 2Ø, 6Ø) mode of transmit/receive operation.
AUDIO ALARM	Audio alarm used to alert the operator when any of the following conditions occur:

    a. When text to be printed contains a BEL code, sounds for 2ØØ ±5Ø milliseconds.

    b. When printer is 5 characters from selected end-of-line, sounds for 2ØØ ±5Ø milliseconds.

    c. Upon receipt of a priority message (header = CR, LF, upper case Z or Y, space) sounds for 4 seconds.

CAUTION

    d. When power supply temperature reaches 11Ø° C (23Ø° F) sounds continuously until POWER switch is set to OFF. This condition over..des the AUDIO ON/OFF switch.

Designation	Function
EXT TDS ENBL-DSBL	Toggle switch used to enable/disable TD STEP function to allow remote control of transmit data with TD STEP PULSE input (for example: ARC - 96 operation, refer to table 1-1).
LINE FEED SNGL-DBL	Toggle switch used to set the line feed function to single line or to double line advancement.

AFSATCOM Only

Designation	Function
ADDRESS	Three pushbutton rotary switches of 16 positions each in hexadecimal format (Ø-F). These switches are used to set the assigned page printer address. Pushbuttons located above and below each window facilitate address change.
ADDRESS ENBL-DSBL	Toggle switch used to enable/disable ADDRESS select function.

CHAPTER 4

OPERATION

Section II. OPERATING PROCEDURE

4-3. PRELIMINARY PROCEDURE. Before   perform the prelimary procedure given in
proceeding to the starting procedure,   table 4-7.

Table 4-7. Preliminary Procedure

Step	Action	Reference
1	Verify POWER switch is in OFF position.	fig. 4-4
2	Verify primary power is connected to rear connector J100.	fig. 2-1, sheet 4
3	Verify data input cable is connected to correct rear connector: J102 if standard operation, J103 if AFSATCOM operation.	fig. 2-1, sheet 4, table 1-1
4	Loosen two knob-latches on front panel to release front panel from page printer. Carefully swing front panel and keyboard forward and down. Release chassis latch and slide chassis out until slides lock.	fig. 6-8, fig. 6-6, fig. 6-7
5	Verify circuit breakers on back of front panel are in reset position.	fig. 4-4
6	Verify internal panel controls are set to correct positions for intended mode of operation. BAUD RATE switch must be set to SYN position for synchronous operation.	fig. 4-5; tables 1-1, 4-6
7	Verify BITE PCB ON/OFF switch is set to OFF.	fig. 6-8
8	Verify ribbon is properly installed and ribbon spools are properly seated and secured.	fig. 5-24, para. 6-10
9	Verify paper roll has an ample supply of paper.	para. 6-8
10	Visually inspect motors, motor belts, illumination lamp, PCB housing assembly, and power supply. If an abnormal condition is detected, such as loose wires, broken connectors, obviously loose or torn belts, missing PCB, etc, refer to Chapter 6, MAINTENANCE.	chap. 6

Table 4-7. Preliminary Procedure - Continued

Step	Action	Reference
11	If no abnormal condition is detected, push on chassis slide latches to unlock and push chassis back into case. Fasten chassis latch, close front cover, and secure with two knob-latches.	fig. 6-7, 6-6, 6-8
12	Proceed to NOTE following this table.	

NOTE

If any malfunction is detected during performance of any procedure presented in the remainder of this section, proceed to Chapter 6, MAINTENANCE.

4-4. STARTING PROCEDURE. To initiate operation of the AN/UGC-129, perform the starting procedure given in table 4-8.

Table 4-8. Starting Procedure

Step	Action	Correct Response
1	Set POWER switch to ON.	a. Power lamp on. b. Font and hammer move to left hand margin "home" position. c. PTR RDY lamp on. d. RCVR SAVE lamp on. e. Printout: MEMORY CLEAR.
2	Listen for fan operation.	Sound of fan operating can be heard clearly.
3	Observe printing area and rotate ILLUM control clockwise to stop, then rotate in opposite direction to stop. Adjust to desired setting.	Printing area illumination intensifies as control is rotated in clockwise direction and diminishes as control is rotated in the opposite direction.
4	Observe keyboard lamps and depress RESET key and hold. Release RESET key.	All keyboard lamps on while RESET key is depressed. When key is released, all lamps off, except RCVR SAVE lamp.

Table 4-8.   Starting Procedure - Continued

Step	Action	Correct Response
5	Observe RCVR SAVE lamp and depress RCVR SAVE key. Depress key again.	Lamp off when key depressed first time. L ⊃ on when key is depressed second time.
6	Set AUDIO ON/OFF switch to ON and verify audio alarm operation:	
	a. Depress COMP EDIT key.	COMP EDIT lamp on. Printout: MESSAGE Ø1 ASSIGNED.
	b. Depress CTL key and depress BEL G key.	When BEL key is depressed audio alarm sounds for 2ØØ +5Ø milliseconds. BEL CODE can be transmited to activate audio alarm at receiver set.

NOTE

Step 7 can not be performed if AN/UGC-129 in AFSATCOM or KG-3Ø operation (BAUD RATE switch in SYN position), unless AN/UGC-129 is connected to applicable operational system. Therefore, if in AFSATCOM (or KG-3Ø) operation and AN/UGC-129 is not connected to the applicable operational system, skip to step 8.

7	Verify print quality:	
	a. Depress COMP EDIT key.	COMP EDIT lamp on. Printout: MESSAGE Ø1 ASSIGNED.
	A. Depress CTL key and hold, and depress AUTO XMIT key. Observe RY pattern for continuous legible printout. Allow to run for 4 or 5 lines, then depress RESET key to halt RY pattern at middle of page. Switching to another mode also halts pattern generation.	a. COMP EDIT lamp off; b. AUTO XMIT lamp on. c. Printout: RYRYRYRYRYRYRYRYRYRYRYRYRYRYRYRYRYRYRYRY RYRYRYRYRYRYRYRYRYRYRYRYRYRYRYRYRYRYRYRY RYRYRYRYRYRYRYRYRYRYRYRYRYRYRYRYRYRYRYRY RYRYRYRYRYRYRYRYRYRYRYRYRYRYRYRYRYRYRYRY RY. d. Five characters prior to each end-of line, audio alarm sounds for 2ØØ +5Ø milliseconds and END OF LINE lamp on till carriage return. At halt of RY transmission, AUTO XMIT lamp off.

Table 4-8. Starting Procedure - Continued

Step	Action	Correct Response
5	Observe RCVR SAVE lamp and depress RCVR SAVE key. Depress key again.	Lamp off when key depressed first time. L) on when key is depressed second time.
6	Set AUDIO ON/OFF switch to ON and verify audio alarm operation:	
	a. Depress COMP EDIT key.	COMP EDIT lamp on. Printout: MESSAGE Ø1 ASSIGNED.
	b. Depress CTL key and depress BEL G key.	When BEL key is depressed audio alarm sounds for 2ØØ +5Ø milliseconds. BEL CODE can be transmited to activate audio alarm at receiver set.

NOTE

Step 7 can not be performed if AN/UGC-129 in AFSATCOM or KG-3Ø operation (BAUD RATE switch in SYN position), unless AN/UGC-129 is connected to applicable operational system. Therefore, if in AFSATCOM (or KG-3Ø) operation and AN/UGC-129 is not connected to the applicable operational system, skip to step 8.

7 Verify print quality:

    a. Depress COMP EDIT key.

    COMP EDIT lamp on.
    Printout:
    MESSAGE Ø1 ASSIGNED.

    b. Depress CTL key and hold, and depress AUTO XMIT key. Observe RY pattern for continuous legible printout. Allow to run for 4 or 5 lines, then depress RESET key to halt RY pattern at middle of page. Switching to another mode also halts pattern generation.

    a. COMP EDIT lamp off;

    b. AUTO XMIT lamp on.

    c. Printout:
    RYRYRYRYRYRYRYRYRYRYRYRYRYRYRYRYRYRYRYRY
    RYRYRYRYRYRYRYRYRYRYRYRYRYRYRYRYRYRYRYRY
    RYRYRYRYRYRYRYRYRYRYRYRYRYRYRYRYRYRYRYRY
    RYRYRYRYRYRYRYRYRYRYRYRYRYRYRYRYRYRYRYRY
    RY.

    d. Five characters prior to each end-of line, audio alarm sounds for 2ØØ +5Ø milliseconds and END OF LINE lamp on till carriage return. At halt of RY transmission, AUTO XMIT lamp off.

Step	Action	Correct Response

7.

a. AUTO XMIT lamp on.

b. Printout:
RYRYRYRYRYRYRYRYRYRYRYRYRYRYRYRYRYRY
RYRYRYRYRYRYRYRYRYRYRYRYRYRYRYRYRYRY
RYRYRYRYRYRYRYRYRYRYRYRYRYRYRYRYRYRY
RYRYRYRYRYRYRYRYRYRYRYRYRYRYRYRYRYRY
RY.

c. Five characters prior to each end-of line, audio alarm sounds for 200 ±50 milliseconds and END OF LINE lamp on till carriage return. At halt of RY transmission, AUTO XMIT lamp off.

Table 4-8. Starting Procedure - Continued

Step	Action	Correct Response
7 cont.	Printing of RY pattern can be inhibited by depressing RCV PRINT key. RY pattern does not go into memory.	
	b c. Skip to step 9.	
8	Manually check print quality:	
	a. Depress COMP EDIT key.	COMP EDIT lamp on. Printout: MESSAGE $\emptyset$1 ASSIGNED.
	b. Sequentially key in M and W letters until 2½ lines of clearly legible M W pattern have been printed.	a. Printout: MWMWMWMWMWMWMWMWMWMWMWMWMWMWMWMWMW MWMWMWMWMWMWMWMWMWMWMWMWMWMWMWMWMW MWMWMWMWMWMWMWMWMW b. Five characters before each end of line, audio alarm sounds for 2$\emptyset\emptyset$ +5$\emptyset$ milliseconds and END OF LINE lamp on till carriage return.
	c. Proceed to step 9.	
9	Depress LINE FEED pushbutton on page printer front panel 3 times.	Paper is advanced each time LINE FEED switch is depressed.
10	Depress CRG RTN pushbutton on page printer front panel.	Font and hammer move to left hand margin position.
11	Verify message select function:	
	a. Depress MSG SEL key, then key in $\emptyset$2. (Legal message numbers are $\emptyset$1 through 64.)	MSG SEL lamp flashes on and off then to steady on after $\emptyset$2 entry. Printout: MESSAGE $\emptyset$2 SELECTED.
	b. Depress MSG SEL key, then key in 65.	MSG SEL lamp flashes on and off then to off after 65 entry. Printout: MESSAGE 65 ILLEGAL MESSAGE NUMBER.

Table 4-8. Starting Procedure - Continued

Step	Action	Correct Response
12	Verify line length change of 69 through 8Ø function:	
	a. Depress MSG SEL key, then key in Ø4.	MSG SEL lamp flashes on and off then to steady on after Ø4 entry. Printout: MESSAGE Ø4 SELECTED.
	b. Depress COMP EDIT key, then key in at least two full lines of random characters. Depressing one key does not inhibit activation of another key.	COMP EDIT lamp on, MSG SEL lamp on. Printout: Each line of stored message printout has 8Ø characters.
	c. Depress MSG SEL key then key in ØØ.	MSG SEL lamp flashes on and off then to steady on after ØØ entry. Printout: MESSAGE ØØ SELECTED.
	d. Key in 6 (selects 69 characters per line.)	Printout: 69
	e. Depress MSG SEL key and key in Ø4.	MGS SEL flashes on and off then to steady on after Ø4 entry. Printout: MESSAGE Ø4 SELECTED.
	f. Depress COMP EDIT key, then depress VRFY to obtain stored message Ø4 printout.	COMP EDIT lamp on; MSG SEL lamp on. Printout: Each complete line of stored message printout has 69 characters.
	g. Depress MSG SEL key, then key in ØØ.	COMP EDIT lamp off, MSG SEL lamp flashes on and off, then to steady on after ØØ entry. Printout: MESSAGE ØØ SELECTED.
	h. Key in 7X (where X is any number between Ø and 9).	Printout: 7X
	i. Depress MSG SEL key, then key in Ø4.	MSG SEL lamp flashes on and off then to steady on after Ø4 entry. Printout: MESSAGE Ø4 SELECTED.

Table 4-8. Starting Procedure - Continued

Step	Action	Correct Response
12 cont.	j. Depress COMP EDIT key, then depress VRFY key to obtain stored message 04 printout.	COMP EDIT lamp on; MSG SEL lamp on. Printout: Each complete line of stored message printout has 7X characters.
	k. Depress MSG SEL key then key in 00.	COMP EDIT lamp off; MSG SEL lamp flashes on and off then to steady on after 00 entry. Printout: MESSAGE 00 SELECTED.
	l. Key in 8 to select 80 characters per line printout.	Printout: 80
	m. Depress MSG SEL key, then key in 04	MSG SEL lamp flashes on and off then to steady on after 04 entry. Printout: MESSAGE 04 SELECTED.
	n. Depress COMP EDIT key, then depress VRFY key to obtain stored message 04 printout.	COMP EDIT lamp on; MSG SEL lamp on. Printout: Each complete line of stored message printout has 80 characters.
13	Verify message delete function:	
	a. Depress MSG SEL key, then key in 04.	MSG SEL lamp flashes on and off then to steady on after 04 entry. Printout: MESSAGE 04 SELECTED.
	b. Depress CTL key and hold, and depress MSG DEL key.	Printout: MESSAGE DELETED.
14	Verify memory clear function:	
	a. Depress CTL key and hold, and depress CLR MEM key.	All lamps, except RCVR SAVE, off. Printout: MEMORY CLEAR.
	b. Depress STAT key.	Printout: STATUS: MSG SEL ORIG 64 SEGMENTS AVAILABLE. (32 if 8K memory)

Table 4-8. Starting Procedure – Continued

Step	Action	Correct Response
14 cont.	c. If in AFSATCOM mode of operation, continue to step 15. If in Standard Operation, AN/UGC-129 is ready to enter compose edit, receive, or transmit operations as described beginning with paragraph 4-5.	
15	Verify AFSATCOM message length function:	
	a. Depress MSG SEL key.	MSG SEL lamps flashes on and off.
	b. Depress CTL key and hold, and key in any number from 20 to 160 in increments of 20.	MSG SEL lamp steady on. Printout: MESSAGE LENGTH XXX.
	c. Depress RESET key. AN/UGC-129 ready to enter comp edit, receive, or transmit communications operations as described beginning with paragraph 4-5.	All lamps off except RCVR SAVE lamp.

4-5. MESSAGE PROCESSING. Messages are processed automatically by the AN/UGC-129 in response to operator compose edit, transmit, receive and store keyboard entry commands. Text memory is used for message storage in all modes except manual and RY pattern auto transmit. A description of text memory is presented following the compose edit, transmit and receive mode descriptions. Any operating features unique to AFSATCOM and ARC-96 are flagged out accordingly.

4-6. COMP EDIT MODE. This mode is used to compose and automatically store a message in text memory for subsequent transmission; or to edit a message already stored in text memory. The mode is entered by depressing the COMP EDIT key. In the following description the compose function is presented before the edit function.

NOTE

In the context of this manual, the word "priority" refers to those messages requiring SHIFT Z or SHIFT Y in the header.

a. Compose Message Number. Compose messages can be assigned message numbers automatically:

Depress COMP EDIT key.
Printout: MESSAGE XX ASSIGNED.

or by the operator:

> Depress MSG SEL key, key in
>   message numbers.
> Printout: MESSAGE XX selected
> Depress COMP EDIT key.

b. <u>Compose Printing Priority</u>. Normally when a message is being composed, an incoming receive message preempts the compose message at the printer. After the receive message is printed, the AN/UGC-129 returns the printer to the compose edit mode. However, the operator can assign top priority to the compose edit mode. To assign compose edit printer priority:

> Depress CR, LF, SHIFT Z or Y, SPACE
>   after COMP EDIT mode key is
>   depressed.

This action assigns printer priority to the compose edit mode until the operator selects RESET or another mode. While in priority printing compose edit mode, all incoming messages are routed to text memory. If RCVR SAVE mode is active, the messages are assigned message numbers and stored. If RCVR SAVE mode is not active, the messages are temporarily stored and wait to be printed at the end of the compose edit mode. If an incoming message is a priority message (CR, LF, upper case Z or Y and SPACE), the audio alarm sounds for 4 seconds to alert the operator. The operator may choose to exit the priority compose edit mode immediately to get a printout of the priority receive message.

c. <u>ARC-96 Compose Only</u>. ARC-96 operation requires that the first four characters transmitted by the AN/UGC-129 be KKKK. ARC-96 operation is in the BAUDOT code mode. In BAUDOT code mode, the AN/UGC-129 automatically inserts a letters code prior to a letter (such as K). To inhibit the automatic insertion of a letters code so that the ARC-96 operates properly:

> Depress CTL key and hold, and key
>   in letter K.

Release CTL key and key in letter
K four times.

d. <u>Compose End of Message</u>. There are no restrictions of message content except that a message terminator should be used. The normal JAN-128 (E) terminator consisting of CR, CR, LF (8 times), NNNN, plus 12 letters code for BAUDOT is recognized by the AN/UGC-129.

The actual terminator used by the AN/UGC-129 microprocessor is NNNN. Thus, NNNN can be used to indicate end of message in either ASCII or BAUDOT if the message is to be transmitted to another AN/UGC-129. In ACSII, the ETX character can be substituted for NNNN.

e. <u>AFSATCOM End of Message</u>. In AFSATCOM mode, a requirement exists for a message length entry. After the message is typed in:

> Depress MSG SEL key.
> Depress CTL and hold, and key in
>   message length digits (20
>   through 160, in increments of
>   20).

If the ETX character is used, end of message is at ETX or message length whichever occurs first.

f. <u>Edit Message Access</u>. To access a message to be edited from text memory:

> Depress MSG SEL key and enter
>   message number.
> Printout: MESSAGE XX SELECTED.
> Depress COMP EDIT mode.

To start printout of selected message:

> Depress VRFY key.

To stop printer when printout reaches point on line to be edited:

> Depress VRFY key.

g. <u>CHAR DEL Edit</u>. Character deletion function, e.g. change THROOOW to THROW. Assume printout stopped at:

THROOOW IT AWAY

To move text memory pointer backward to second letter O:

Depress BACK SPACE key repeatedly until second letter O is printed.

Printout now reads:

THROOOW IT AWAYYAWA TI WOO

To delete extra characters:

Depress CHAR DEL key twice.

Deleted characters are printed.

THROOW IT AWAYYAWA TI WOOOO

To complete original printout:

Depress VRFY key and wait till printing stops.

To obtain corrected version printout:

Depress VRFY key.

Corrected line of printout now reads:

THROW IT AWAY.

h. CHAR INSRT Edit. Character insertion function, e.g., change THAT HERE to THAT WHERE. Assume printout was stopped at:

THA

To move text pointer forward to letter H in word HERE:

Depress FWD SPACE two times until space is printed.
Printout reads: THAT

To insert letter W before H:

Depress CHAR INSRT key. Note CHAR INSRT lamp on to indicate mode active.
Key in letter W.

Depress CHAR INSRT key. Note CHAR INSRT lamp off to indicate mode not active.

To complete original printout:

Depress VRFY key and wait until printing stops.

To obtain corrected version printout:

Depress VRFY key

Corrected word of printout now reads:

THAT WHERE

j. Character Overwrite Edit. Character overwrite function, e.g., change WHERE TO THERE.

Assume printout was stopped at:

WHER

To move test memory pointer to letter W:

Depress BACK SPACE key four times to letter W.
Printout reads: WHERREHW.

To overwrite letter T over W:

Key in letter T.
Printout reads: WHERREHWT.

To complete original printout:

Depress VRFY key and wait until printing stops.

To obtain corrected version printout:

Depress VRFY key.

Corrected word of printout now reads:

THERE

4-7. TRANSMIT MODES. These modes are used by the operator to transmit messages automatically or manually. While in any transmit mode manual or automatic, any incoming message preempts the

transmit mode at the printer. If the RCV PRINT mode is active (RCV PRINT lamp on), printing of transmit messages is inhibited. Each transmit mode has an associated lamp to indicate if the mode is active or inactive. Features unique to AFSATCOM and ARC-96 are flagged out in the applicable transmit description.

a. AUTO XMIT Mode. This mode allows the operator to automatically transmit a message just composed, a message selected from test memory, or an RY test pattern. The AUTO XMIT lamp on indicates mode is active. The AUTO XMIT mode automatically goes inactive at end of transmission. The MSG SENT lamp turns on when the automatic transmit message has been sent and remains on until a different mode is selected. To transmit a message that had just been composed and AN/UGC-129 is still in COMP EDIT mode:

    Depress AUTO XMIT key.

To transmit a message selected from text memory:

    Depress MSG SEL key; Key in message
      number.
    Printout: MESSAGE XX SELECTED.
    Depress AUTO XMIT key.

To transmit RY pattern (pattern does not go into memory):

    Depress COMP EDIT key.
    Printout: MESSAGE XX ASSIGNED.
    Depress CTL key and hold, and
      depress AUTO XMIT key.

b. AFSATCOM AUTO XMIT. For automatic transmission in AFSATCOM mode, the AN/UGC-129 requires external clock pulses. In AFSATCOM mode when the AUTO XMIT key is depressed, AN/UGC-129 generates a transmit enable signal. This signal alerts the AFSATCOM interface equipment that the AN/UGC-129 is ready to transmit and requires clock pulses. Thus if the AN/UGC-129 is connected to an AFSATCOM operational system, all AUTO XMIT functions described in the preceding paragraph can be performed. Otherwise the AN/UGC-129 cannot auto transmit in AFSATCOM mode.

c. ARC-96 AUTO XMIT. ARC-96 mode of operation requires that the first four letters transmitted by the AN/AGC-129 must be KKKK. This requirement cannot be met in the RY pattern mode since the AN/UGC-129 starts transmitting RY letters immediately. Therefore, the ARC-96 cannot receive the automatic RY test pattern transmission.

d. AFSATCOM POLL XMIT. This AFSATCOM only mode automatically transmits a selected message from text memory when interrogated by a valid address inquiry. The MSG SENT lamp is turned on after each poll transmission. The address is an address assigned to the AN/UGC-129 and is set by the operator with the ADDRESS switches located on the page printer internal control panel (fig. 4-5). This AFSATCOM function is described in detail under AFSATCOM RECEIVE mode in paragraph 4-8. To enter the POLL XMIT mode:

    Depress MSG SEL key, key in message
      number.
    Printout: MESSAGE XX SELECTED
    Depress POLL XMIT key.

The AN/UGC-129 remains in POLL XMIT mode with POLL XMIT lamp on until operator selects another mode.

e. Manual Transmit. This mode allows the operator to transmit each character as it is entered from the keyboard. The MNL XMIT lamp is on while the mode is active. The idle state between keyboard entries is a continuous mark. To transmit in manual mode:

    Depress MNL XMIT key.
    Type in message.
    Key in NNNN.

f. AFSATCOM Manual Transmit. Same as described in preceeding paragraph except idle ASCII SYN characters are interspersed between keyboard entries. The manual mode is automatically ter-

minated if no keyboard entries are made during a time interval of 5Ø consecutive idle SYN characters. If a 5Ø idle charcacter time out occurs, the AN/UGC-129 automatically transmits two ETX characters to end the message. The operator can disable the automatic termination capablity by entering two consecutive ETB characters from the keyboard. The second ETB is neither printed nor transmitted. The operator should use ETX at end of message.

g. ARC-96 Manual Transmit. The only difference from standard manual transmit is that the operator must enter KKKK as the first letters of the message as follows:

Depress CTL key and hold, key in letter K.
Release CTL key and key in letter K four times.

4-8. RECEIVE MODE. This mode is entered automatically by the AN/UGC-129 when a message is received. The RCV LINE lamp is turned on to ir cate that the receive line is active. llowing a carriage return and four line feeds the receive message is printed. The RCVR SAVE function allows the operator some control over the receive mode. Receive features unique to AFSATCOM are described after the RCVR SAVE and RCV PRINT function description.

a. RCVR SAVE Mode. The mode is active at power up and causes all receive messages to be assigned message numbers and stored in text memory. These messages remain in text memory until deleted and are printed as received unless the AN/UGC-129 is in the priority compose edit mode. If the RCVR SAVE mode has been inactivated by the operator and messages are received while in priority compose edit mode, the messages are temporarily stored in memory. When the operator has terminated priority compose edit mode, the temporarily stored messages are printed and automatically deleted from text memory.

b. RCV PRINT Mode. This mode is se-

lected by depressing the RCV PRINT key. The RCV PRINT mode inhibits transmit and compose edit printing, but not verification printing.

c. AFSATCOM Receive Mode. The AFSATCOM receive operation is similar to that described in the preceding paragraphs except for an address recognition function. When in AFSATCOM operation, the AN/UGC-129 is assigned an address consisting of three hexadecimal code characters (A1, A2, A3). This address is entered at the page printer internal control panel ADDRESS switches (fig. 4-5). The address recognition function is enabled by setting the ENBL/DISABLE switch (fig. 4-5) to the ENBL position. AFSATCOM receive messages may have a message header or no message header. If there is no message header the receive message is considered an ALL CALL. ALL CALL messages bypass the address recognition function and are received in the normal manner by the AN/UGC-129. Message header format can be as follows:

____,____,____,SOH, MODE, A1, A2, A3, or SOH, MODE, A1, A2, A3

where blanks can be any ASCII noncontrol characters, SOH is the start-of-header acronym, MODE is a number from 0 to 3, and A1, A2, A3, are the hexadecimal address codes.

Mode 0 is the poll inquiry header and interrogates all three address codes:

SOH, 0, A1, A2, A3, ETX

The poll transmit message is transmitted after a delay of four character times, following the reception of ETX of the poll inquiry.

Mode 1 is the Super Group Call header and interrogates only address code A3:

SOH, 1, A1, A2, ,A3, TEXT, TERMINATION
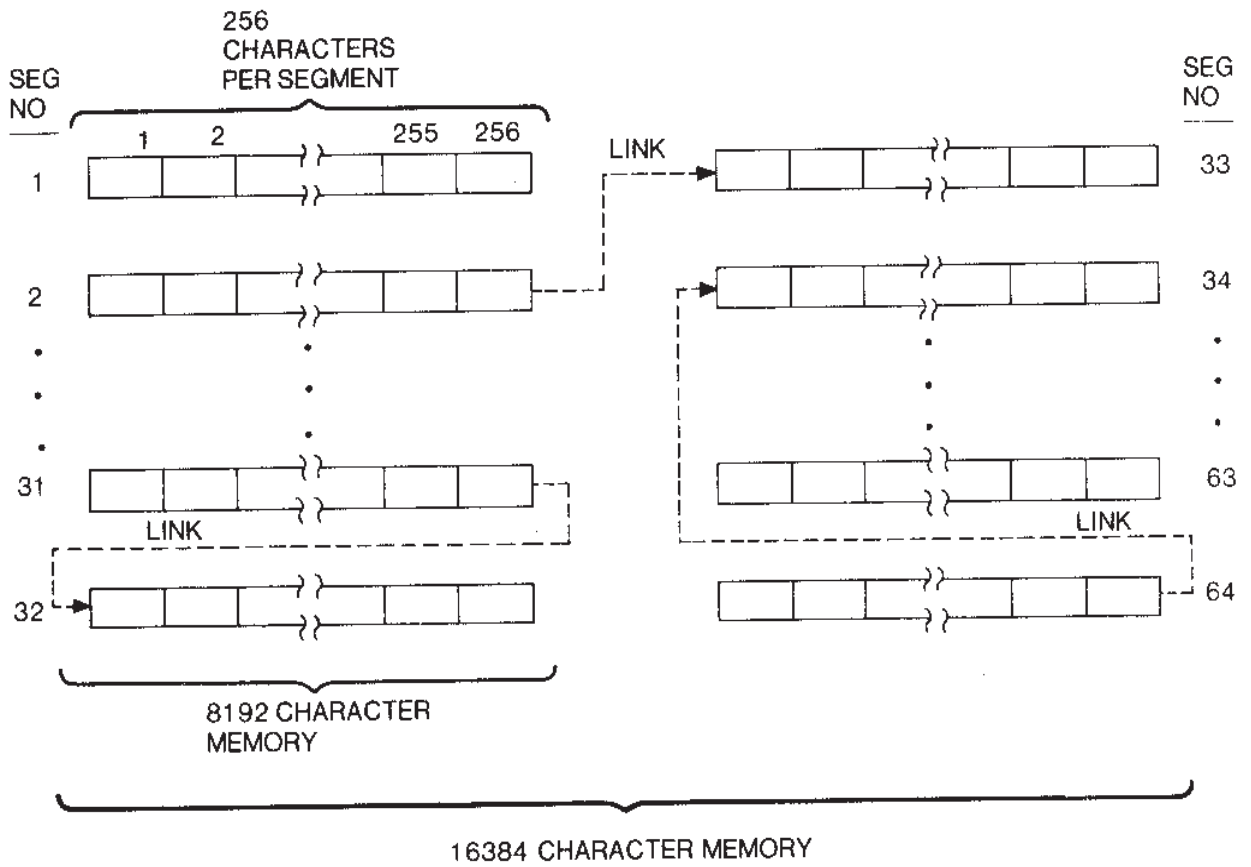
Mode 2 is the Group Call header

Figure 4-6. Text Memory Map

and interrogates only address code A3:

    SOH, 2, A1, A2, A3, TEXT,
    TERMINATION

    Mode 3 is the Individual Call header and interrogates all three address codes:

    SOH, 3, A1, A2, A3, TEXT,
    TERMINATION

    In all cases, priority and routine message designation must be part of the message not the header.

4-9. TEXT MEMORY. Text memory is treated, by the microprocessor, as a storage area of 32 (or 64), 256-character segments. The segments in effect provide a total of 8192 (or 16,384) character storage locations (fig 4-6). Messages routed to memory are either:

    a. Composed messages

    b. Saved received (RCVR SAVE) message

  c. Messages waiting to be printed because priority compose edit mode active or baud rate too fast for printer to follow.

    Segments are automatically assigned to all messages routed to text memory. Message numbers are automatically assigned except those assigned by the operator. Temporarily stored message waiting to be printed are erased as they are printed. The associated segments and message numbers are made available for reuse when the temporarily stored messages are printed. There is no delineation between composed message storage areas and received message storage areas. Linking between segments occurs when a message overflows a segment. Linking can occur forward or backward and as many times as necessary, as one message can occupy the entire memory. During linking, the microprocessor locates and starts loading the first empty segment available. Segment unlinking (available for reuse) occurs when a message is deleted or when character deletion causes a segment to

empty. The microprocessor maintains an updated listing of message numbers (MSG), number of segments occupied by each message (SEG), the message origin (ORIG, R = received, C = composed), and the number of empty segments available. A printout of this listing can be obtained at any time by depressing the STAT key. A typical memory status printout with ten segments occupied might be:

STATUS:

MSG	SEG	ORIG
01	01	C
05	03	R
23	01	R
61	05	C

      54 SEGMENTS AVAILABLE

    If receive message length exceeds text memory capacity at fast baud rates, the time it takes for text memory to overflow becomes important. The baud rates and respective time to overflow for 8K and 16K memory are as follows:

Baud Rates	Overflow Time (in seconds)	
	8K	16K
2400	34	68
1200	68	136
600	136	273
300	273	546
150	546	1092
75 ASCII	1082	2184
75 BAUDOT	769	1529
50	1147	2293
45.5	1260	2520

To clear the entire contents of memory:
    Depress CTL key and hold, and
    depress CLR MEM key.

NOTE

The following shutdown procedure causes loss of memory contents.

4-10. SHUTDOWN PROCEDURE. To shutdown AN/UGC-129 operation, remove power by setting the POWER ON/OFF switch to the OFF position. Note that the POWER switch is the locking type, and the handle must be pulled out.

CHAPTER 5

THEORY OF OPERATION

Section I. FUNCTIONAL SYSTEM OPERATION

5-1. SCOPE. This section describes the AN/UGC-129 system level theory of operation. A simplified block diagram and receive/transmit flow charts support the description. System operations unique to AFSATCOM mode of operation are flagged out accordingly.

5-2. SYSTEM OPERATION. All message data flow is controlled by, and routed via Microprocessor 1A6-1A9 (fig 5-1). Transmit data is routed from the keyboard or from text memory (RAM 1A10, 1A11) to the microprocessor via the input (I) bus. The data is then routed via the microprocessor output (AC) bus to External I/O 1A4 and Level Converter 1A3 for transmission and to the printhead for printing. Receive data is routed from 1A3 and 1A4 to the microprocessor via the I bus and then routed to text memory for storage and to the printhead for printing. The microprocessor uses the I/O select lines to address the assembly used during a receive or transmit data transfer task. BITE 1A13 provides the system built-in-test equipment capability. An operation summary and a detailed description of receive/transmit functions follow.

a. Operation Summary. Table 5-1 provides a summary of AN/UGC-129 on-line and off-line operations.

b. Standard Receive Operation. A flow chart of AN/UGC-129 receive operation sequence is shown in figure 5-2. All receive functions are performed automatically by the microprocessor. When the receive line becomes active, the microprocessor starts processing the message and tests the message header for CR, LF, upper case Z or Y, and SPACE. If these four characters are present, the microprocessor recognizes the message as a priority message and

sounds the audio alarm for four seconds. If the characters are not present, the message is considered a routine message and the audio alarm is not sounded. While processing the message, the microprocessor interrupts any printer operation, except priority compose edit mode, performs a carriage return and four line feeds, and prints the message. After the message is printed, the microprocessor resumes the previous printing operation. If a priority message is being composed; i.e., the operator entered CR, LF, SHIFT Z or Y, SPACE as part of the compose message, the receive message has to be stored while waiting to be printed. If the RCVR SAVE mode is active, the microprocessor assigns a message number to the message and stores the message. When the operator completes and exits the priority compose edit mode, the message is printed; however, the message remains stored in memory. If the RCVR SAVE mode is not active, the message is temporarily stored. When the priority compose edit mode is no longer active, the message is printed but is erased from memory as it is printed. Receive functions unique to AFSATCOM operation are described in the following paragraph.

c. AFSATCOM Receive Operation. The AFSATCOM receive operation is the same as the standard receive operation, except for the message header address recognition capability. A flow chart of the AFSATCOM address recognition function is shown in figure 5-2. When in the AFSATCOM mode, the microprocessor tests any incoming message for the SOH character of the SOH, MODE (0-3), ADDRESS (A1, A2, A3) messages header. If the SOH character is present, the microprocessor tests the header mode character for zero. Mode 0 is the poll transmit inquiry mode used to start
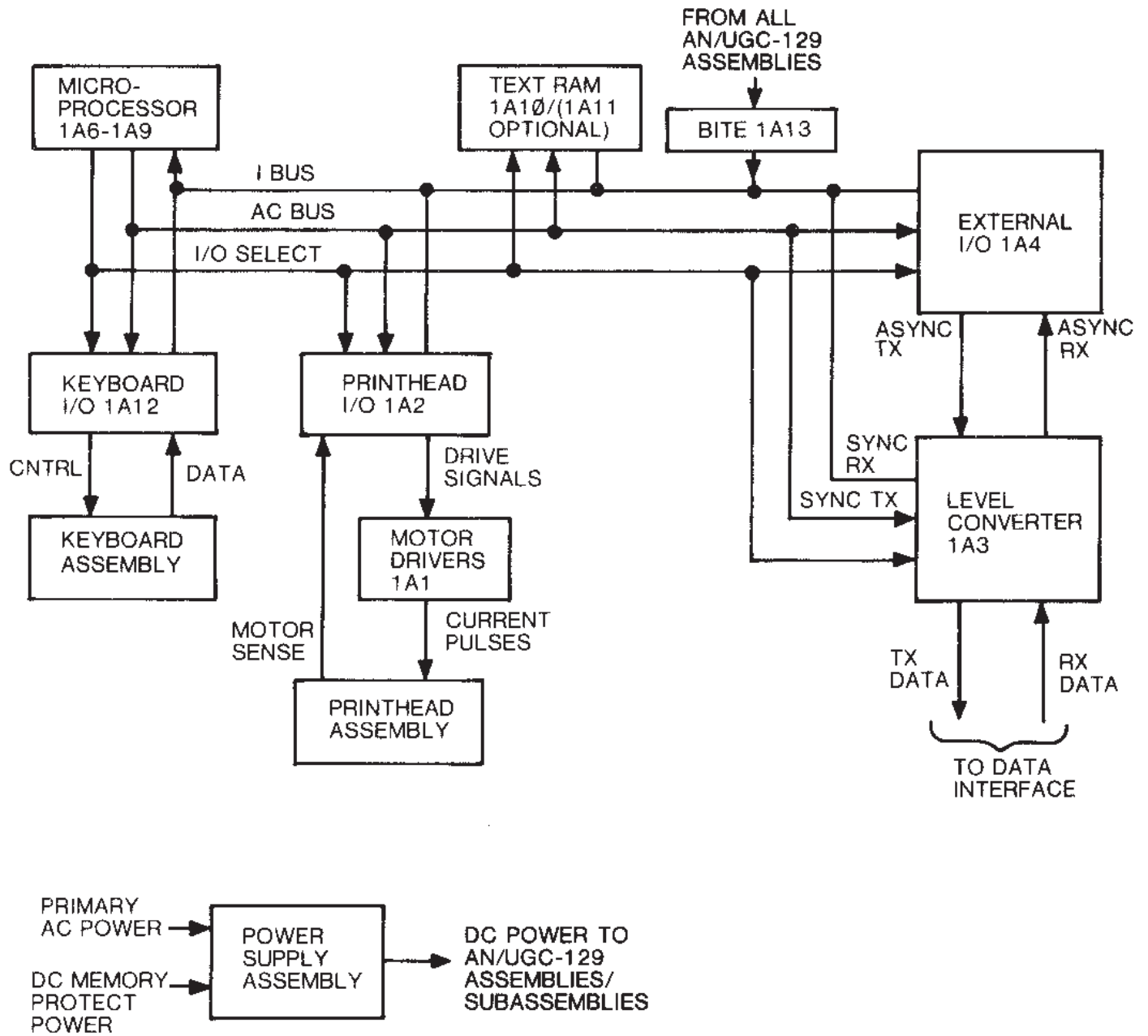
Figure 5-1. AN/UGC-129 Simplified Block Diagram

Table 5-1. AN/UGC-129 On/Off Line Operation

| On/Off Line	System
On Line __Receive__	1. Receive and print only. If receive baud rate is faster than printing rate, temporarily store part of message waiting to be printed, or; 2. Receive and print while transmitting or; 3. Receive and if priority message is being composed or verified, automatically assign message number and store, but not print, message. Illuminate MESSAGE LOST indicator, if message overwrite occurs in memory. Sound audio alarm if receive message is priority message.
Transmit	1. Manual transmit as message is typed on keyboard or; 2. Auto transmit selected stored message or; 3. AFSATCOM ONLY - Poll transmit stored message upon receipt of correct poll inquiry.
Off Line __Compose-edit__	1. Assign message number and compose-edit while message is being stored in memory. 2. Access memory for selected stored message to verify or to edit. Insert or delete message characters. Delete selected message or clear entire memory.
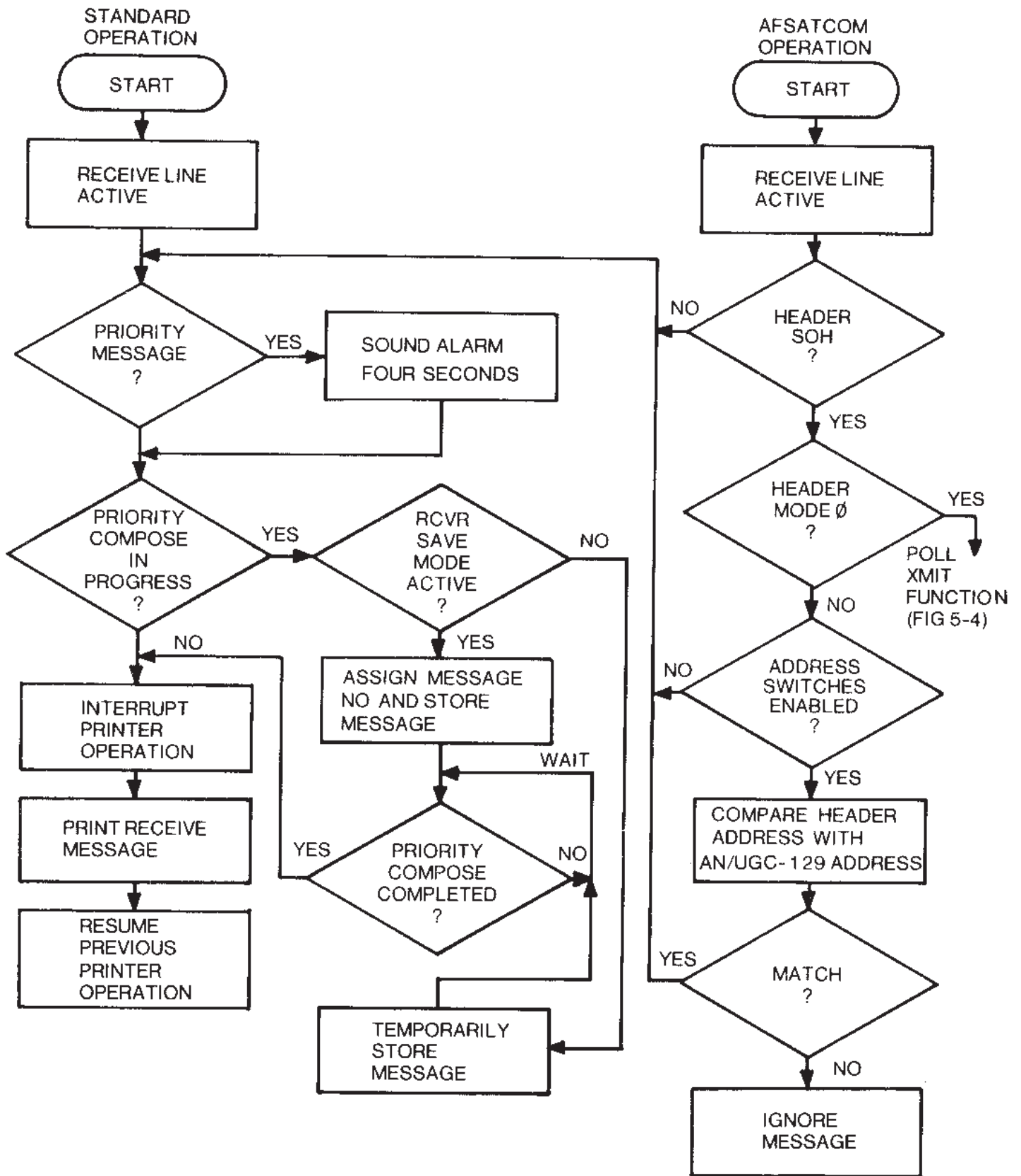
Figure 5-2. AN/UGC-129 Receive Operation

AFSATCOM poll transmit operation as described in AFSATCOM transmit operation in a subsequent paragraph. If the message header mode is not zero, the microprocessor tests the position of the ADDRESS ENBL-DSBL switch (figure 4-5). If the switch is in the ENBL position, the microprocessor compares the message header address with the applicable AN/UGC-129 address code (A1, A2, A3). Header mode 1 must match A3; mode 2 must match A2, A3; and mode 3 must match A1, A2, A3. If the addresses match, the receive message is processed in the same manner as described for standard receive operation. If the addresses do not match, the message is ignored. All messages without a message header are processed the same as standard receive messages. All messages with or without a header are processed if the ADDRESS switches are disabled. The poll address inquiry ignores the ADDRESS ENBL-DSBL switch setting.

d. Standard Transmit Operation. A flow chart of the standard transmit operation sequence is shown in figure 5-3. In the manual mode, the MNL XMIT mode is activated and each character is transmitted as it is entered at the keyboard. In the automatic mode, the AUTO XMIT mode is activated after determining whether the message to be transmitted is already stored in memory. If the message is already in memory, the message number is selected and then the AUTO XMIT mode is activated. If the message is not in memory, the COMP EDIT mode is activated and the message is composed and stored before activating the AUTO XMIT mode. The message is then transmitted automatically. The MSG SENT lamp turns on to indicate end of transmission. In either transmit mode, if the TD STEP function is enabled, the external TD STEP PULSE imput must be

active before transmission can occur. A self repeating routine in the microprocessor program provides an RY test pattern in the AUTO XMIT mode. This mode is entered by selecting COMP EDIT, or a legal message number, then selecting AUTO XMIT, while holding down the CTL key. While in this mode, the microprocessor program simulates continuous keyboard entries of the letters R and Y in the AUTO XMIT mode. Thus, the letters R and Y are continously transmitted and printed until the operator deactivates the mode. The RY test pattern is not stored in memory. Exit from this mode is made by selecting another mode, including the RESET mode. Refer to paragraphs 4-6 and 4-7 for message format and EOM versions allowed.

e. AFSATCOM Transmit Operation. A flow chart of the AFSATCOM transmit operation sequence is shown in figure 5-4. The AFSATCOM transmit operation is the same in the MNL XMIT and AUTO XMIT mode as the standard transmit mode except AFSATCOM does not use the TD STEP function. The POLL XMIT mode is unique to AFSATCOM. The POLL XMIT mode transmits in the same manner as the AUTO XMIT mode except that transmission does not begin immediately after the POLL XMIT mode is activated. Poll transmission begins upon receipt of a poll inquiry valid address:

SOH, 0, A1, A2, A3, ETX

The mode 0 address code A1, A2, A3 must match the AN/UGC-129 address set in the ADDRESS switches (figure 4-5). After the MSG SENT lamp is on to indicate termination of poll message transmission, the POLL XMIT mode remains active until another mode is selected. Thus, the same poll transmit message can be sent any number of times if an inquiry with a valid address is received each time.
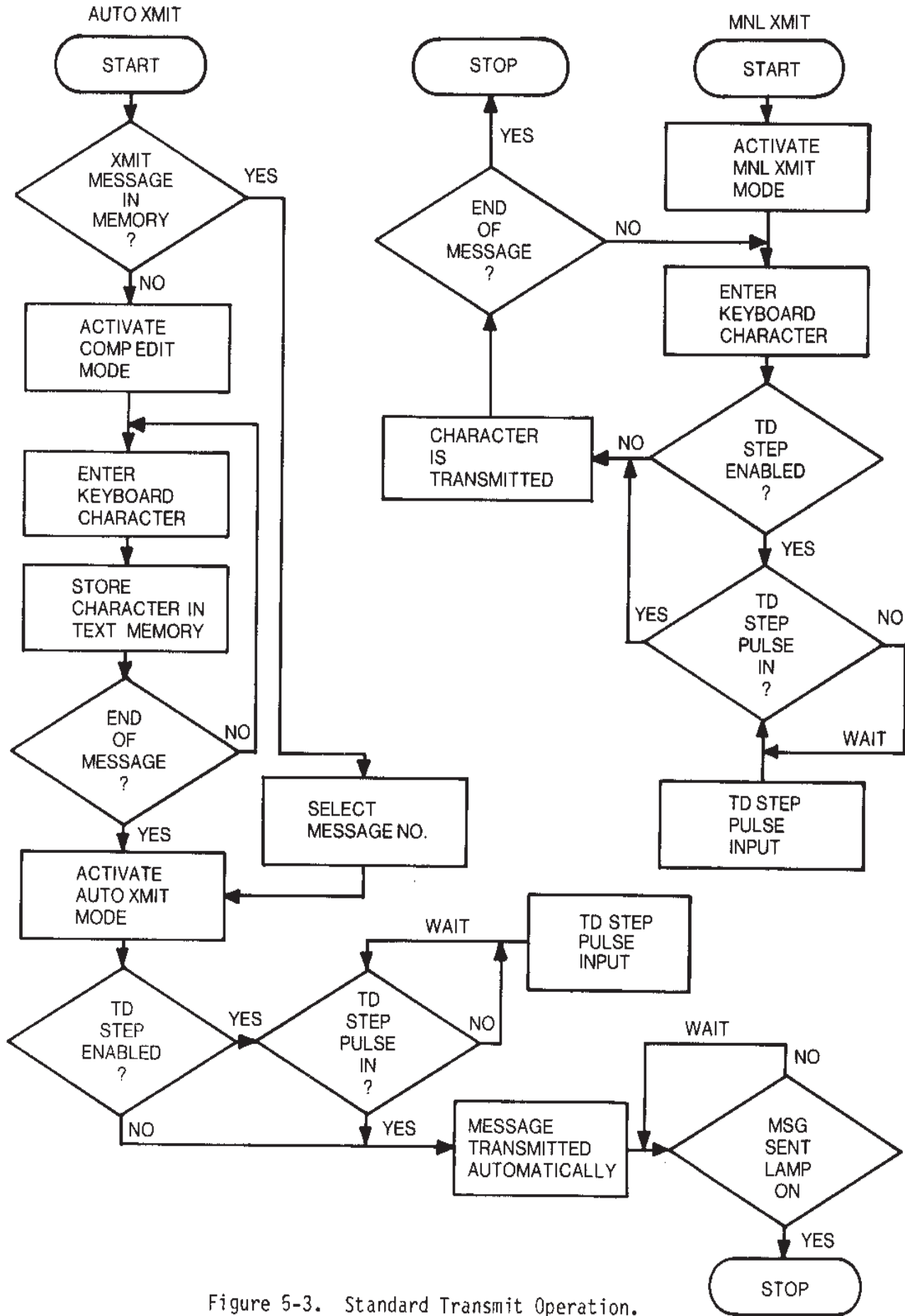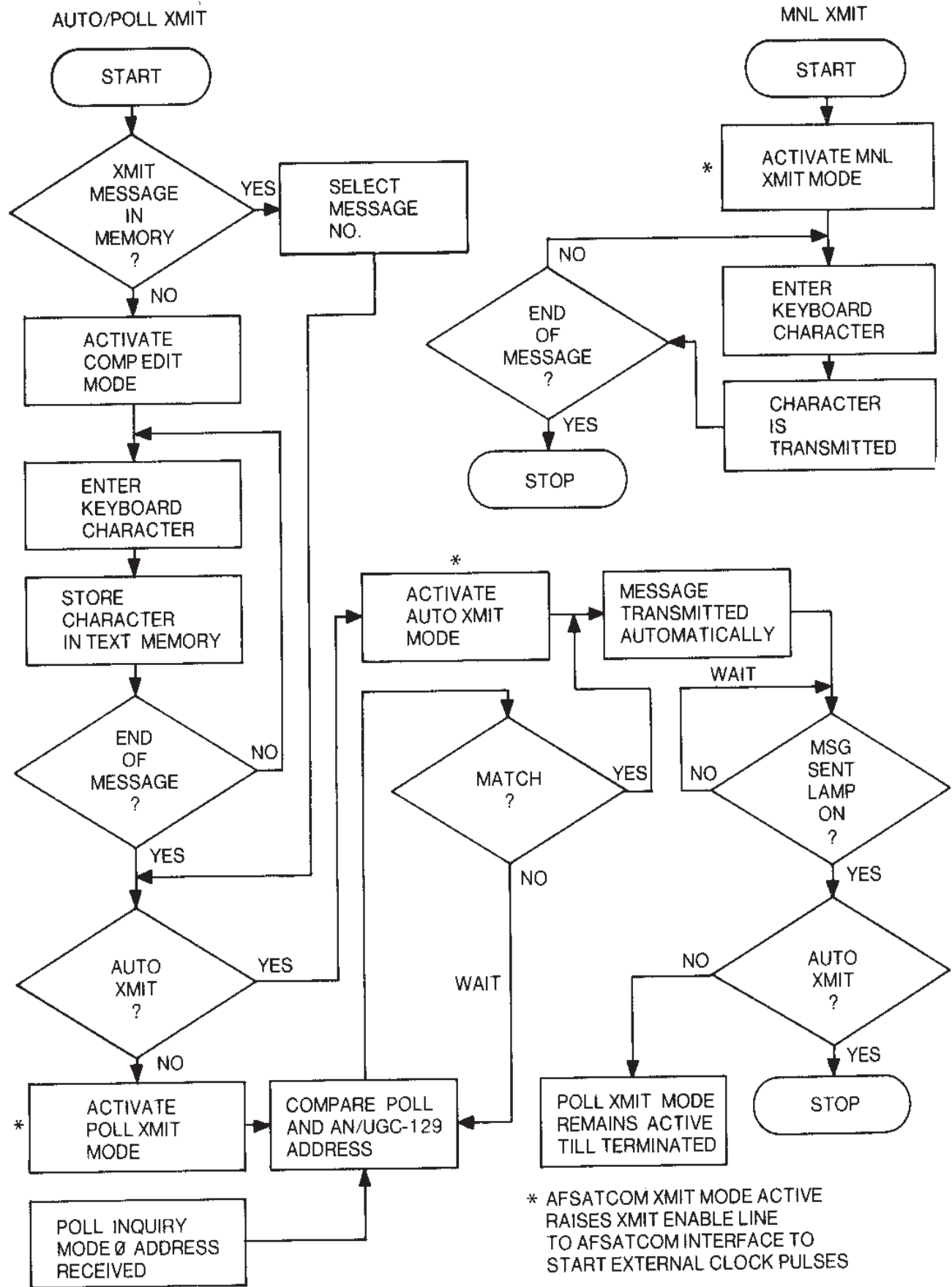
Figure 5-3. Standard Transmit Operation.

AUTO/POLL XMIT

MNL XMIT

Figure 5-4. AFSATCOM Transmit Operation

* AFSATCOM XMIT MODE ACTIVE
  RAISES XMIT ENABLE LINE
  TO AFSATCOM INTERFACE TO
  START EXTERNAL CLOCK PULSES