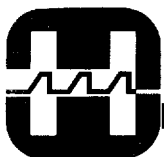
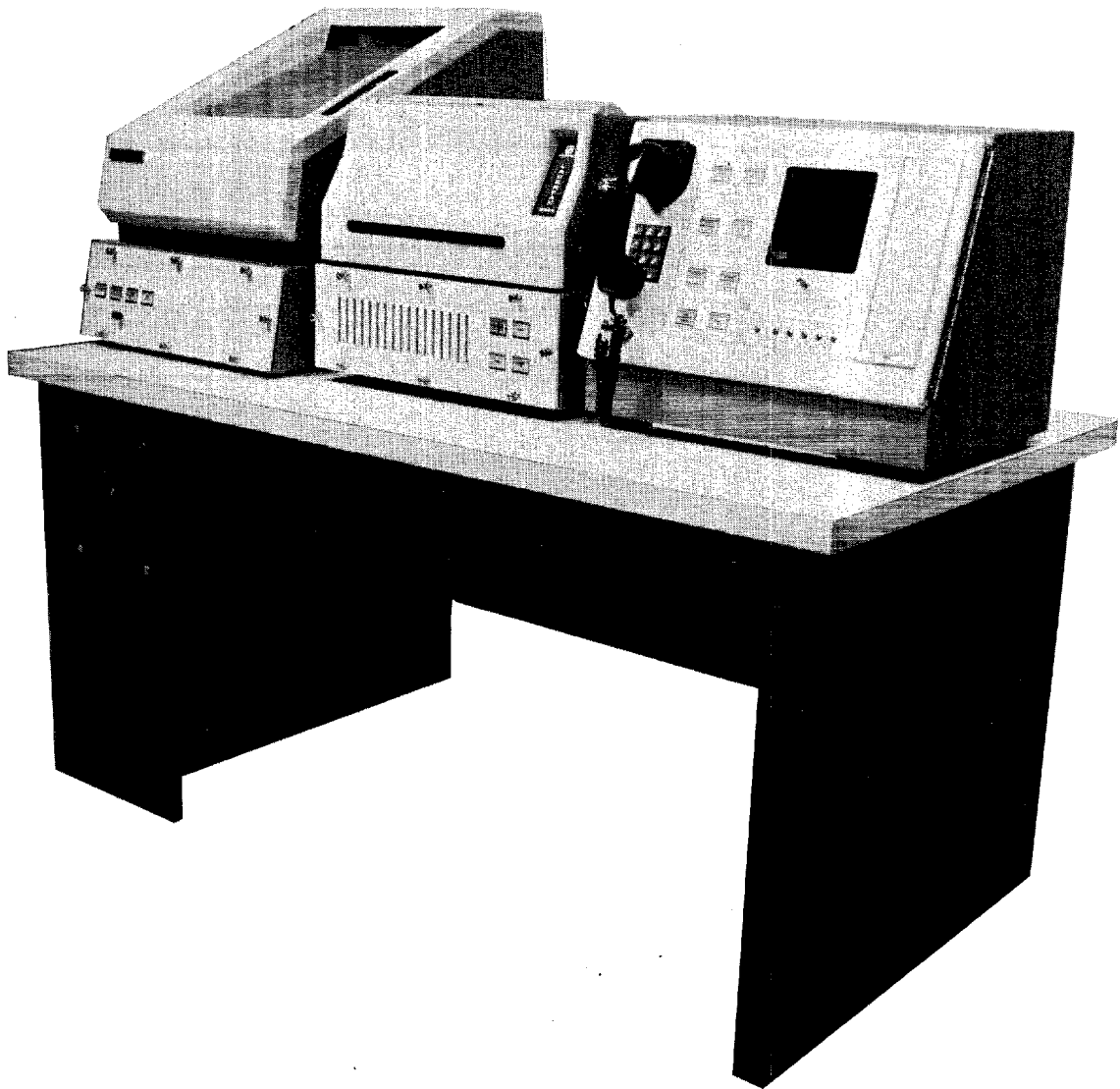


ITS-W

WASHINGTON AREA IMAGE TRANSMISSION SYSTEM

REMOTE TERMINAL

OPERATORS MANUAL



HARRIS

HARRIS CORPORATION Electronic Systems Division

ITS-W

WASHINGTON AREA IMAGE TRANSMISSION SYSTEM

REMOTE TERMINAL

OPERATOR'S MANUAL

JANUARY 1978

HARRIS ELECTRONIC SYSTEMS DIVISION
MELBOURNE, FLORIDA

CAUTIONARY NOTICE

While the Manufacturer has attempted to detail in this manual all areas of possible danger to personnel in connection with the use of this equipment, personnel should use caution when installing, checking out, operating and servicing this equipment, especially when power is on. Like all electronic equipment, care should be taken to avoid electrical shock in all circuits where substantial currents or voltages may be present, either through design or short circuit. Caution should be observed also in lifting and hoisting equipment especially regarding large structures during installation.

The Manufacturer is specifically not liable for any damage or injury arising out of a worker's failure to follow the instructions contained in this manual, or his failure to exercise due care and caution in the installation, operation, checkout and service of this equipment.

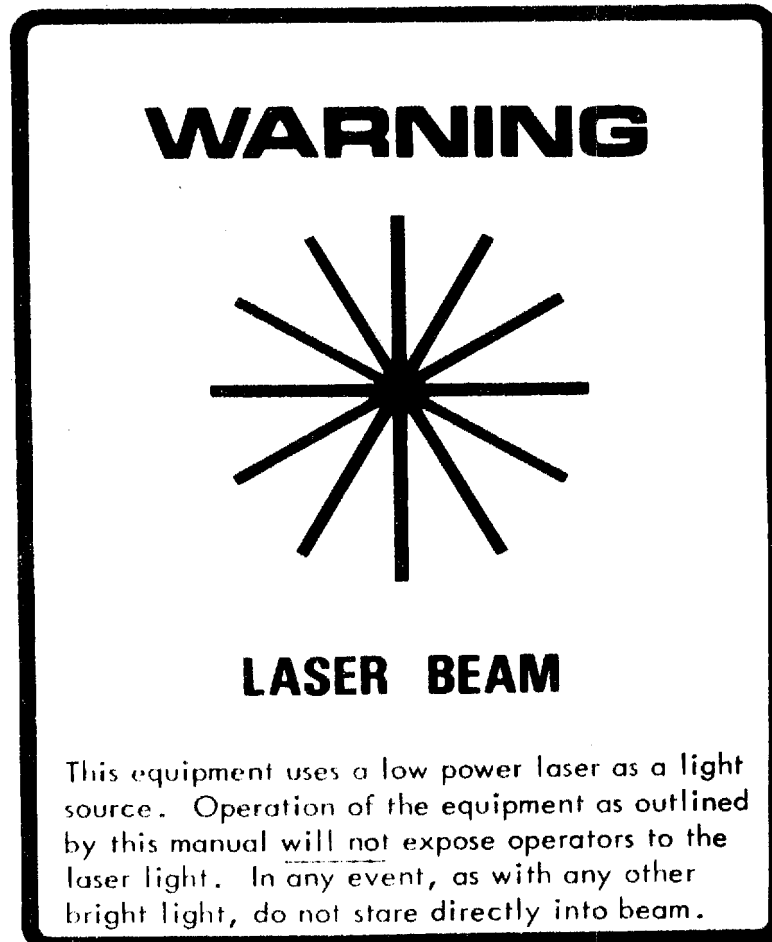


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INTRODUCTION

This operators manual contains a physical, functional and operational description of the Washington Area Image Transmission Remote Terminal Subsystem. The subsystem hardware described in this manual was designed and manufactured by Harris Electronic Systems Division, Melbourne, Florida.

a. This operator's manual includes sections describing the purpose, use, function, operation and operator maintenance of the Remote Terminal Subsystem.

b. Section I describes the configuration, physical characteristics, and functional operation of the equipment.

c. Section II describes each operator control and indicator, modes of equipment operation and operational sequences, equipment turn-on and operational checkout, and a step-by-step operating procedure with indicated results for each operating mode.

d. Section III includes preventative maintenance and troubleshooting procedures pertinent to operator maintenance. Fuse and lamp lists are provided for repair action.

Section I. GENERAL INFORMATION

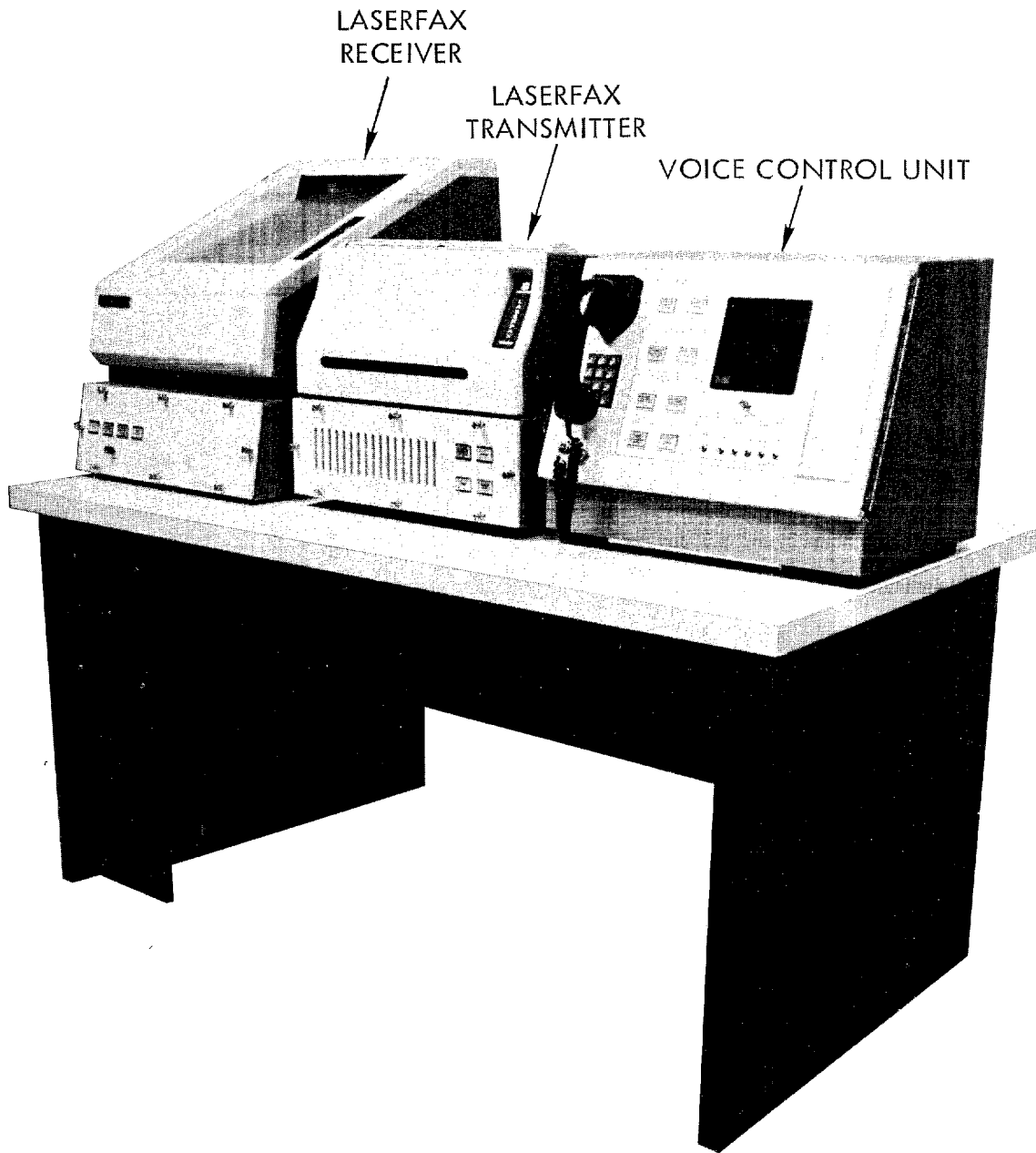
1-1. Scope.

This manual describes the Remote Terminal Subsystem (RTS) (figure 1-1), which is part of the Washington Area Image Transmission System (ITS-W). This manual is directed to personnel who will operate the RTS equipment at remote and centrally located sites of the ITS-W network. To familiarize the operator with the various modes of operation and operating procedures discussed in the following sections of this manual, the overall ITS-W network is discussed briefly.

1-2. Description.

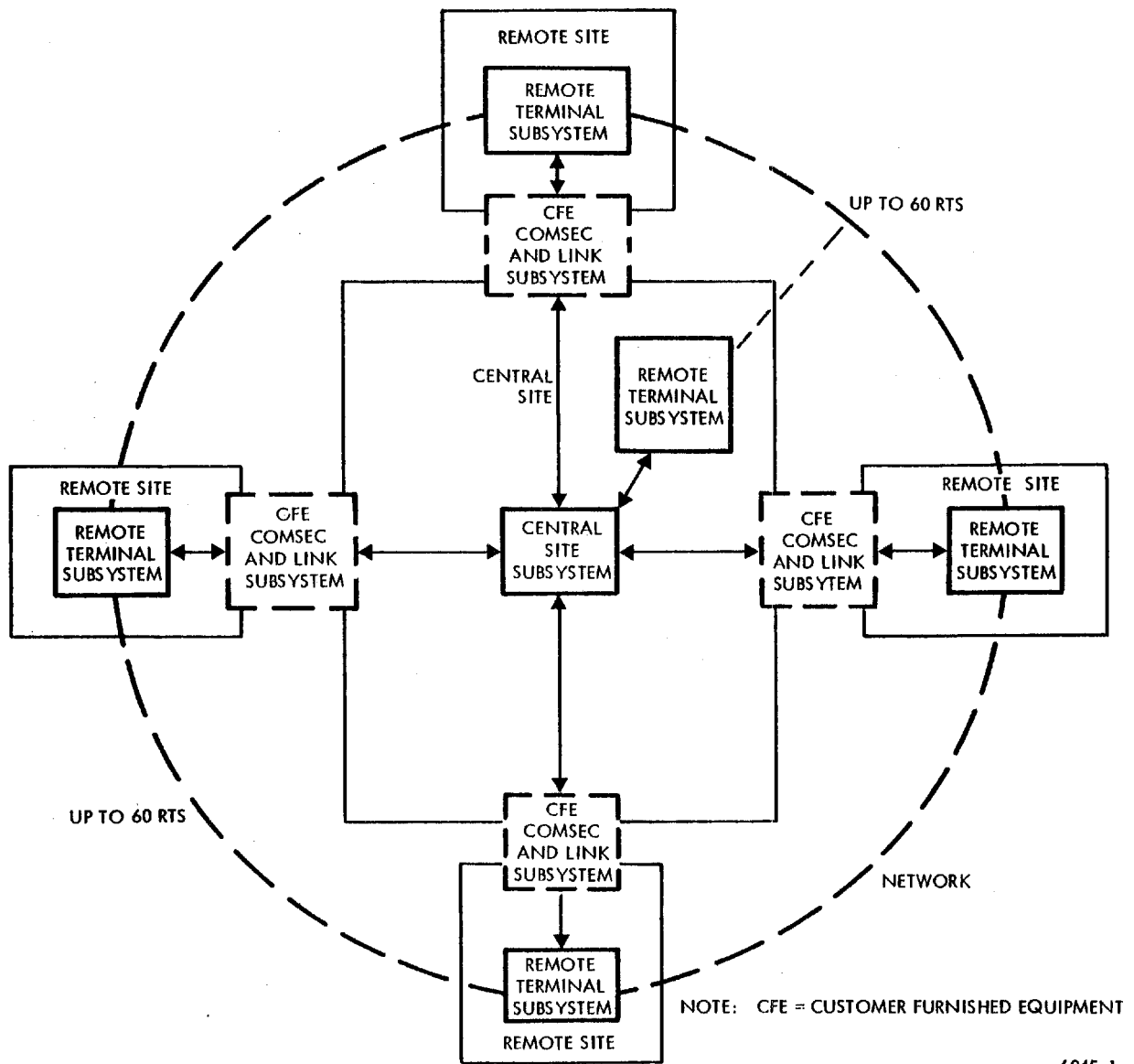
a. Purpose and Use. The purpose of the RTS is to securely transmit documents such as photographs and printed matter and receive transmitted documents from other RTS's in the ITS-W network. The transmitted document is recorded and processed at an image size ratio of 1:1. Each RTS has the capability for secure telephone communication in the network which is used to establish initial connection between RTS's for facsimile transmission and voice communication.

b. ITS-W Network. The ITS-W network is a secure multisubscriber high-resolution, photo facsimile transmission system. The ITS-W (figure 1-2) is organized as a star network of up to 60 remote subscribers (RTS's) with the Central Site Subsystem (CSS) as the hub. The CSS is an automatic distribution and switching network the prime function of which is to interconnect serial 1.544 Mb/s data lines from and to the remote terminals to create feedthrough data channels between terminals. All data that enters or exits the remote sites and the central site is via COMSEC (communication security) and link subsystem equipment. Multiple RTS's may be located at a remote site and at the central site .



77-2638

Figure 1-1. ITS Remote Terminal Subsystem



6045-1

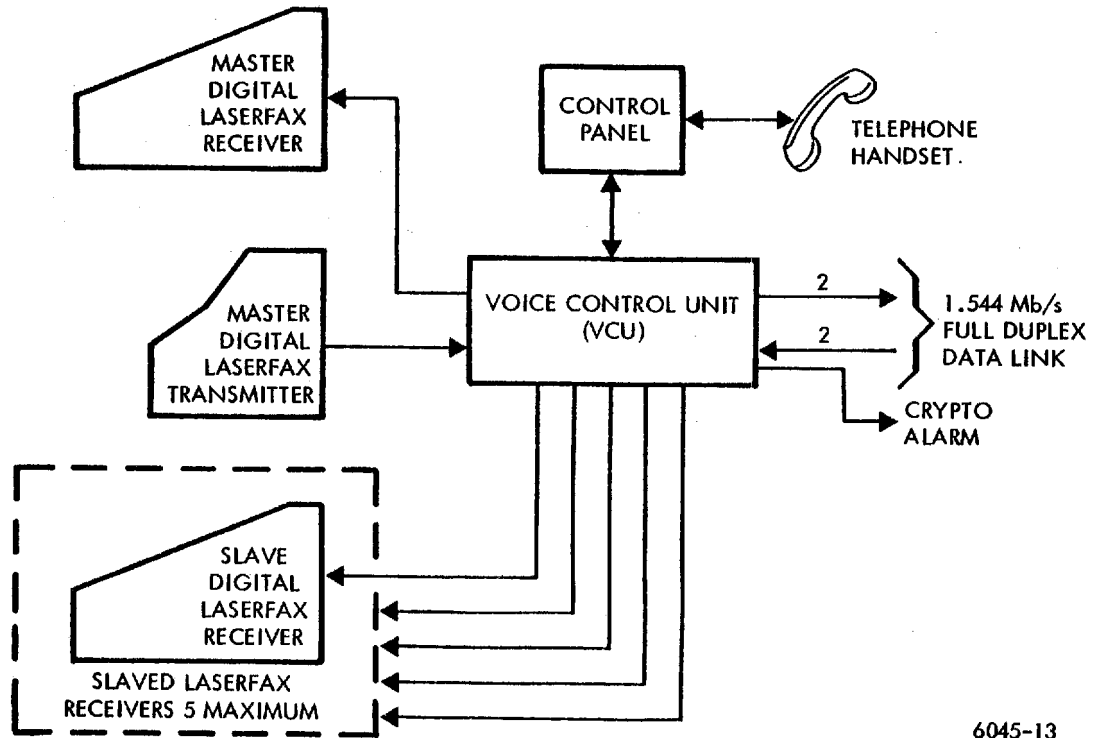
Figure 1-2. Image Transmission System Block Diagram

(1) The CSS provides two types of connection service between RTS's, full duplex and broadcast. The connection setup, similar to a standard telephone network, is initiated by a telephone handset and keypad located on the RTS control panel. The RTS operator desiring to initiate data transmission, removes the handset from the cradle and receives a dialtone signal from the CSS indicating that the CSS is ready to provide service. The calling party then enters the connection request (terminal identity) by pushbutton on the telephone keypad. The CSS then determines if the requested or called party is a valid connection (in-service and of a proper class mark) in the non-busy or on-hook condition. If valid, the CSS will simultaneously ring the called party while providing ringback to the calling party. If an invalid connection is requested (invalid number, busy, or out-of-service) the CSS signals the calling party so that he may hang up his handset. If a valid connection is requested and the called party answers his telephone, the CSS stops the ring and ringback at both ends and interconnects both parties for full duplex communication. The connected parties can then communicate via voice over the handset and either the calling or called party can transmit facsimile data simultaneously with or without voice data.

(2) The CSS broadcast service allows a single two-digit number to be dialed at an RTS authorized for broadcast operation, and if the call is valid, the calling party is connected to up to 59 RTS's for simplex transmission of data. Voice and facsimile transmission is then one way, from the broadcasting RTS to the receiving RTS's.

(3) The CSS also provides individual RTS class marking which allows only the higher class marked RTS's to initiate a connection with equivalent or lower classed marked RTS's.

c. RTS Functions. The RTS (figure 1-3) consists of a digital LASERFAX transmitter, a digital LASERFAX receiver and a Voice Control Unit (VCU) with control panel. The facsimile transmitter and facsimile receiver are the terminal devices that convert from hardcopy to digital data and digital data to hardcopy, respectively. The VCU is the data processor and controller for the RTS and interfaces with the transmitter, receiver, control panel, and the 1.544 Mb/s full duplex data link.



6045-13

Figure 1-3. Remote Terminal Subsystem Block Diagram

(1) The transmitter accepts either opaque copy or positive transparency documents up to 11-inches by 14-inches, scans the document with a laser beam, digitizes the detected information, and routes the information to the VCU. Voice information from a telephone handset is also routed to the VCU and digitized. The VCU adds control information and formats the facsimile and voice information into a suitable format for data transmission over the 1.544 Mb/s data link.

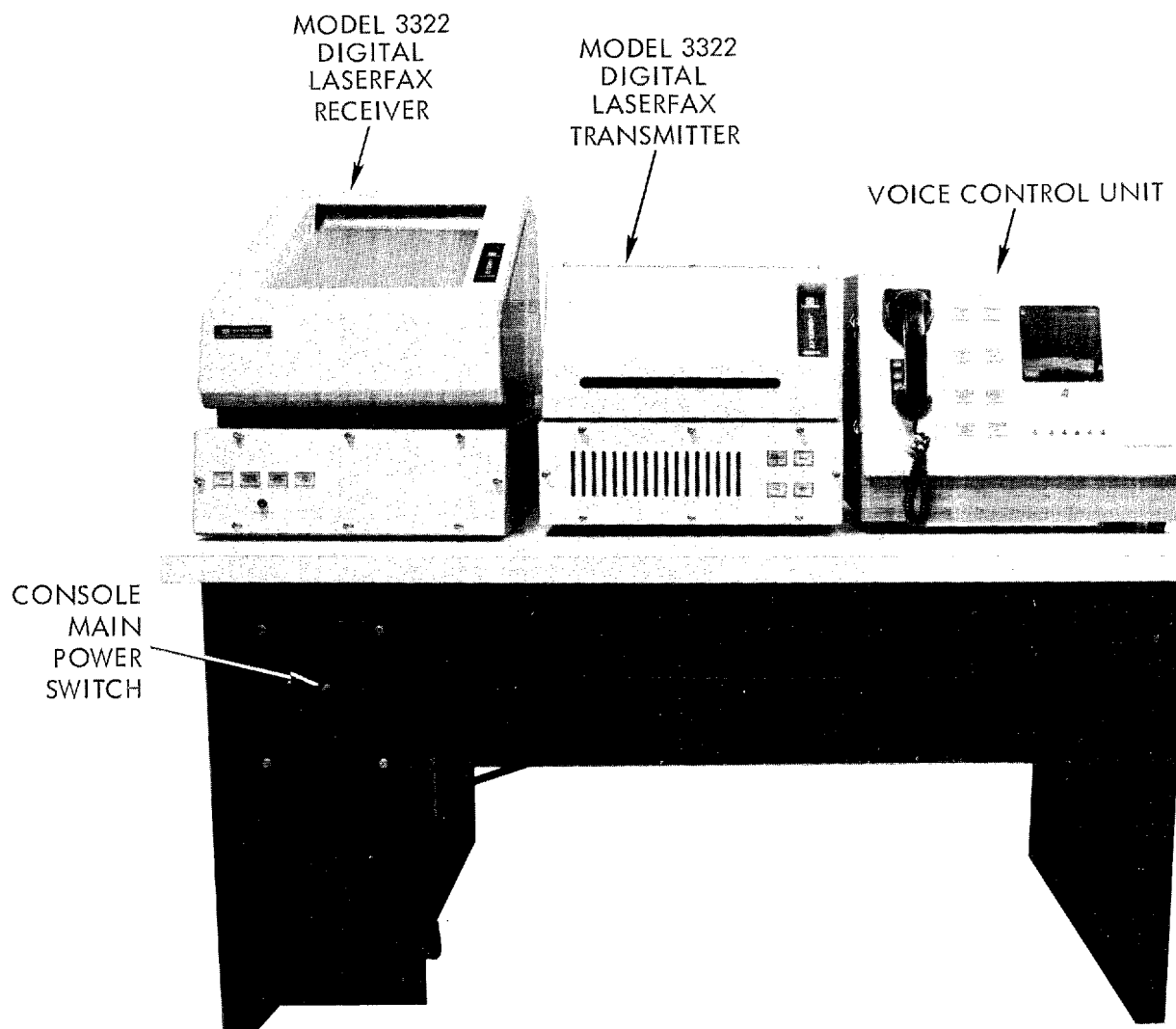
(2) In a like manner, the VCU accepts formatted information from the 1.544 Mb/s data link and deformats the control, facsimile and voice information. The digital facsimile data is routed to the receiver where it modulates a laser beam which is focussed on light-sensitive paper to reproduce the transmitted image. The digital voice data is converted to an analog voice signal by the VCU and routed to the telephone handset.

(3) The RTS has the capability of routing network data via the VCU to slave digital LASERFAX receivers. Slave receivers are individually selected on the VCU control panel. All slave receivers receive the same data when "ON".

1-3. Physical Configuration.

a. The RTS configuration shown in figure 1-4 consists of a Model 3322 Digital LASERFAX Transmitter, a Model 3322 Digital LASERFAX Receiver (recorder) and a Voice Control Unit, part number 616964. All three units are free standing and placed on a console desk top. The bottom portion of the console houses a dc power supply for the VCU. Ac power is routed from an external source through conduit to a junction box containing the main circuit breaker located on the front of the console below the desk top. From the circuit breaker, power is routed through a filter and then fed as RED AC power to the dc power supply, the receiver and the transmitter.

b. The Model 3322 Digital LASERFAX Transmitter shown in figure 1-5 is designed to accept either a transparent film or opaque paper. Four levels of object enhancement are selectable on the front panel. Documents are inserted in the top of the unit using an alignment mark on the input guide of the slot cover. Document transmission is manually started and can be manually stopped by controls on the front panel. The document exits the unit through a slot on the front of the unit stopping transmission automatically. Transmission time for a normal 11-inch length copy is approximately one minute from start to stop. The unit has a latching cover hinged on the rear panel for maintenance access. When the cover is up, an interlock switch prevents ac power from being applied to the unit power supplies. All signal input and output cables and fuses are located on the rear panel.



77-2633

Figure 1-4. Remote Terminal Subsystem Configuration

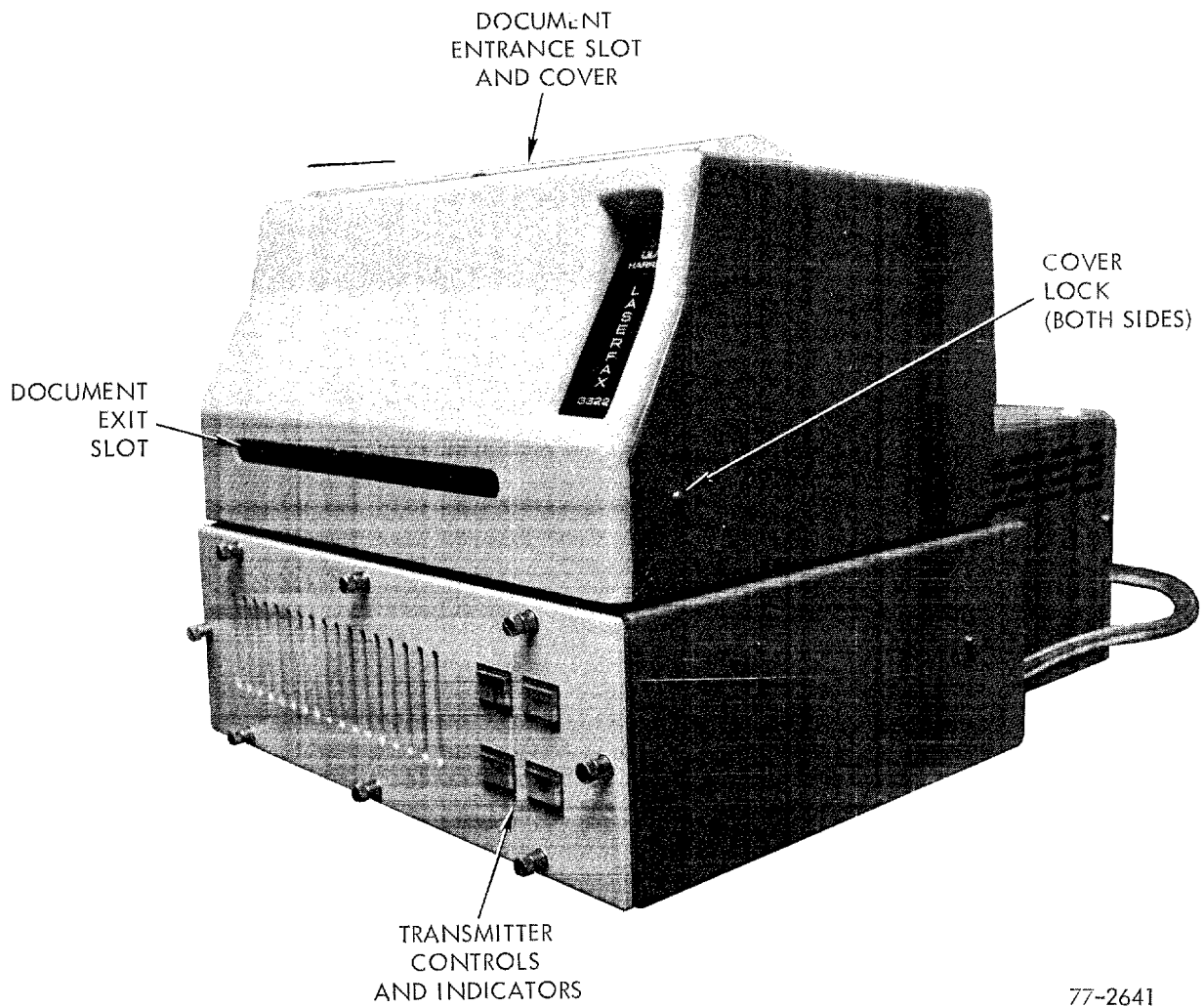


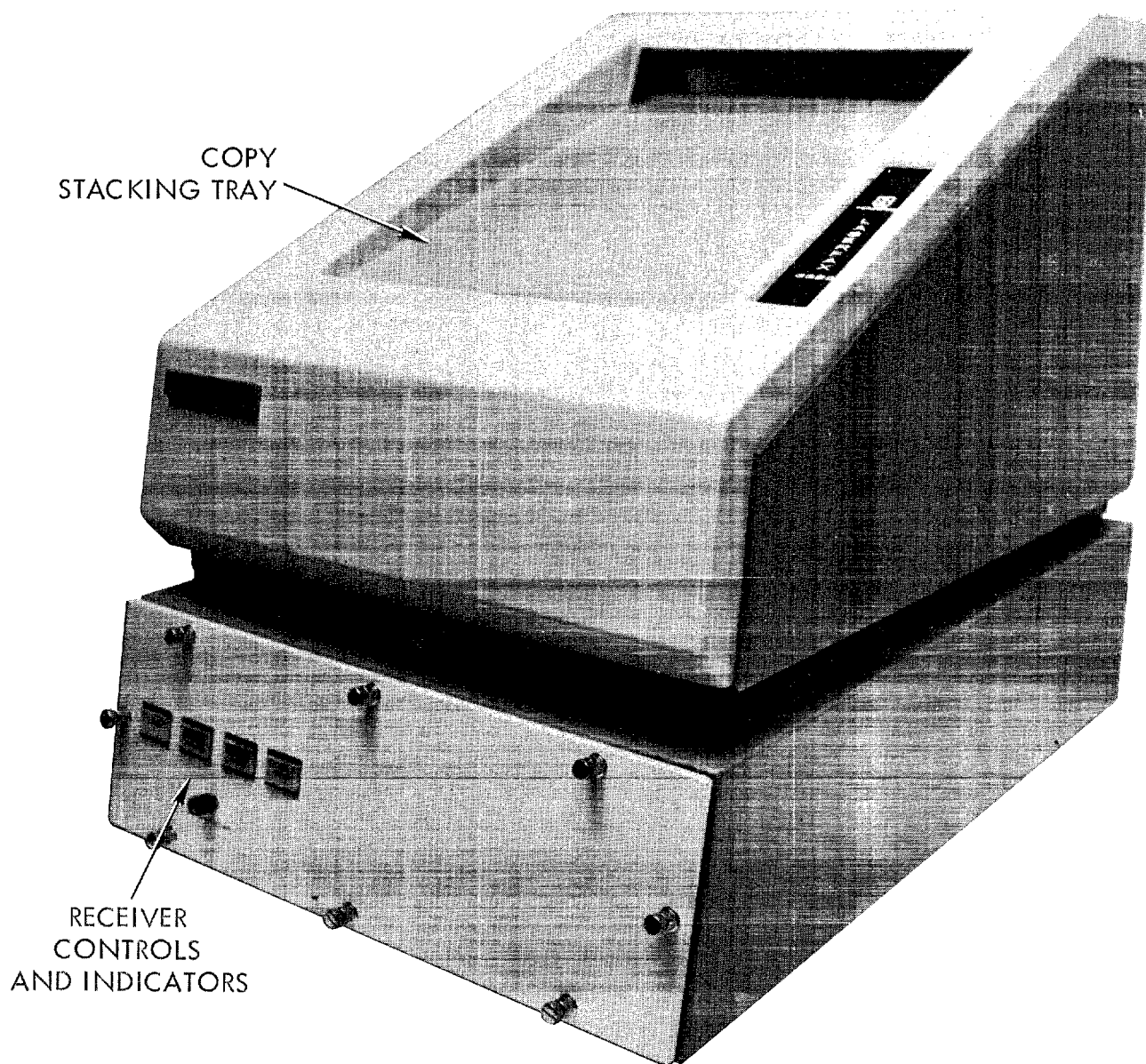
Figure 1-5. Model 3322 Digital LASERFAX Transmitter

c. The Model 3322 Digital LASERFAX Receiver shown in figure 1-6 contains all of the equipment required to automatically reproduce and process transmitted images. The receiver enclosure includes a copy stacking tray for up to 25 copies. The control panel of the unit provides power on and rapid advance controls, record and process indicators, an indication when the paper supply is low and, an indication if the receiver is inoperable. Total processing time for a maximum length copy (14 inches) is approximately 1.5 minutes. The unit has a latching cover hinged on the rear panel for maintenance access and to load a reusable paper cassette. The cover has an interlock switch which prevents power from being applied to the unit when the cover is up. All signal input and output cables and fuses are located on the rear panel.

d. The Voice Control Unit shown in figure 1-7 contains a latched front panel that is hinged on one end to enable maintenance access. The front panel contains all operator controls required for selecting receiver and transmitter local or network operation. Network indications are provided for connection status, and receiver status of each remote terminal in the network. Alarm indications are provided for loss of crypto synchronization and for excessive non-facsimile use of the terminal. A standard telephone handset with keypad is provided for voice communication and dialing. Additional switches enable selection of up to five slave facsimile receivers (optional equipment). The rear panel contains connectors for the master and slave receivers, transmitters, and the data link.

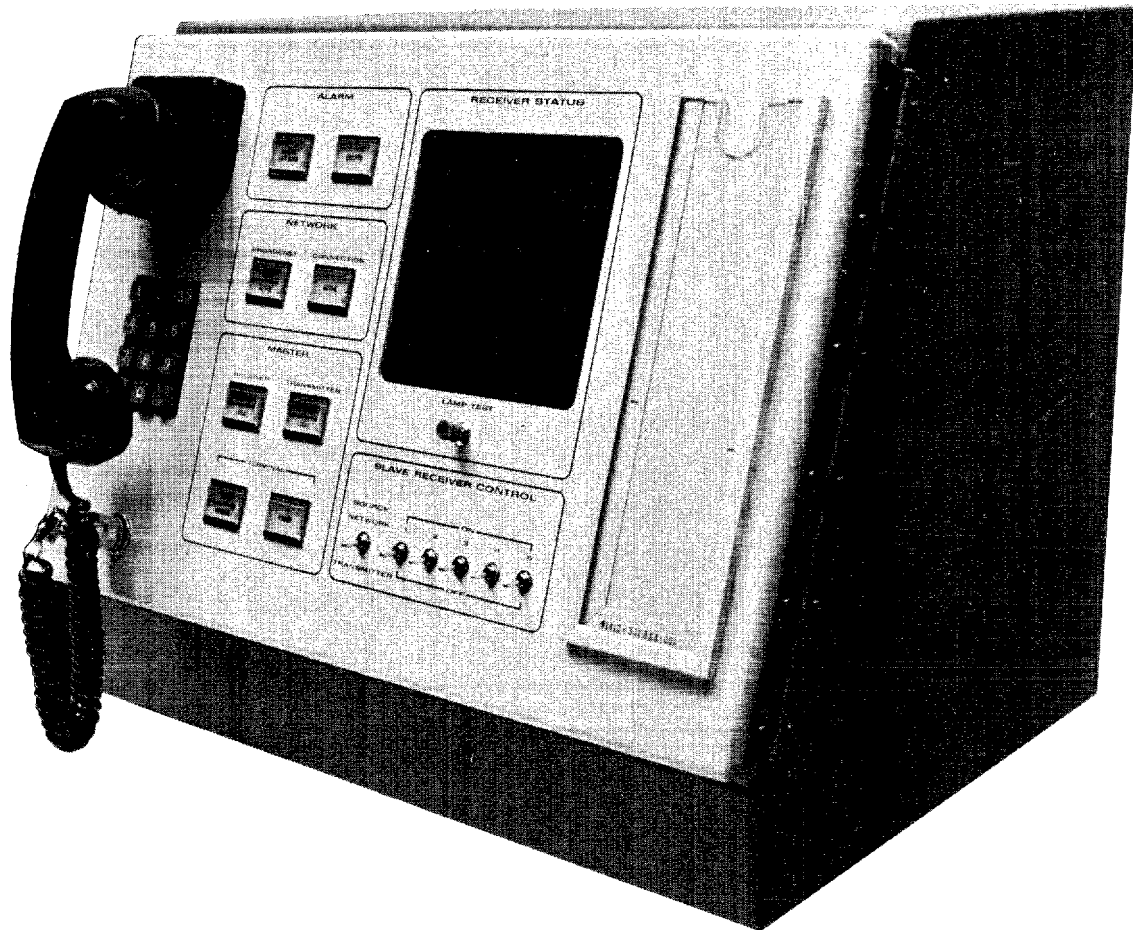
1-4. Capabilities and Limitations.

The Remote Terminal Subsystem characteristics and limitations are listed in table 1-1. Input document format and output copy format are shown in figure 1-8 and 1-9, respectively.



77-2629

Figure 1-6. Model 3322 Digital LASERFAX Receiver



77-2627

Figure 1-7. Voice Control Unit and Control Panel

Table 1-1. Remote Terminal Subsystem Characteristics

Parameter	Characteristics
<u>Remote Terminal Subsystem</u>	
Power Requirements (Console)	(BLACK ac) 115 +10 V ac, single phase, 60 +0.5 Hz, 13 amperes maximum.
Modes of Operation	
Full Duplex	Simultaneous voice and facsimile transmission and reception.
Broadcast	Simultaneous voice and facsimile simplex transmission to as many as 59 RTS's.
Local Simplex	Local facsimile simplex transmission to local receiver or slave receivers.
Automatic Reception	Automatic acquisition of facsimile transmissions.
Hold Connection and Automatic Link Termination	RTS to RTS link connection held with telephone handset on-hook during transmissions and automatic link termination after transmission.
Remote Call	Manual ring during Full Duplex and Broadcast connections.
Loop Back (Maintenance)	Back-to-back operation in lieu of link data.
Operator Interface	
Master Transmitter Selections	Local or Network.
Master Receiver Selections	Local or Network.
Slave Receiver Selections	Network Receive or Master Transmitter.
Terminal Operation Selections	Automatic or Manual.
Network Receiver Status	Real-time display of up to 60 RTS's.
Network Link Status Indications	Connection Active, Broadcast Alert and Broadcast Active.

Table 1-1. Remote Terminal Subsystem Characteristics (Continued)

Parameter	Characteristics
Alarm Indications	Loss of crypto sync, and handset off-hook.
Slave Receiver Status Indications	Status indications of up to five slave receivers.
Address Display	Two digit display of address connection.
Lamp Testing	Lamp testing of Network Receiver Status, Slave Receiver Status Indicators and Address Display.
Terminal Interface	1.544 Mb/s data link
Dimensions (Console with Receiver, Transmitter, and Voice Control Unit)	
Width	30 inches
Height	53 inches
Depth	32 inches
Environment	
Operating Temperature Range	+50°F (+10°C) to +110°F (+43.3°C)
Storage Temperature Range	0°F (-17.8°C) to +140°F (+60°C)
Relative Humidity	20% to 90%
<u>Model 3322 Digital LASERFAX Transmitter</u>	
Power Requirements	(RED ac) 115 \pm 10 V ac, single phase, 60 \pm 0.5 Hz, 2 amperes maximum.
Scan Density	285 scan lines/inch
Density Range	0.15 to 1.7 D typical
Gray scale	Quantized to 64 discrete steps

Table 1-1. Remote Terminal Subsystem Characteristics (Continued)

Parameter	Characteristics
Transport Velocity	11 inches/minute
Scan Rate	52.6 scans/second
Horizontal Scan Length	8.125 \pm 0.125 inches
Input Document	Positive transparency or opaque copy (per figure 1-8).
Operator Interface	Power on, transmit, transmit stop and object enhancement controls.
Dimensions (without Document Guide or Catch Tray)	
Width	18.5 inches
Height	17 inches
Depth	25 inches
Environment	
Operating Temperature Range	+50 ^o F (+10 ^o C) to +110 ^o F (+43.3 ^o C)
Storage Temperature Range	0 ^o F (-17.8 ^o C) to +140 ^o F (+60 ^o C)
Relative Humidity	20% to 90%
<u>Model 3322 Digital LASERFAX Receiver</u>	
Power Requirements	(RED ac) 115 \pm 10 V ac, single phase, 60 \pm 0.5 Hz, 8 amperes maximum
Scan Density	285 scan lines/inch
Exposure Capability	250 mW static beam power
Gray Scale	64 levels of quantization

Table 1-1. Remote Terminal Subsystem Characteristics (Continued)

Parameter	Characteristics
Transport Velocity	11 inches/minute
Scan Rate	52.6 scans/second
Processing Time	91 seconds for maximum length copy
Minimum period between sequential transmissions	15 seconds
Stacking of received copy	Up to 25 copies
Output Copy	3M Company No. 7771, or No. 7773 drysilver photopaper, 8.5 inches or 11 inches wide (per figure 1-9).
Photopaper Storage/Mounting	Removable, reusable cassette capable of handling 500 feet of No. 7771 photopaper or 350 feet of No. 7773 photopaper.
Operator Interface	Power on and paper advance controls; recording, processing, paper low and receiver inoperative indications.
Dimensions	
Width	18.5 inches
Height	22.75 inches
Depth	28 inches
Environment*	
Operating Temperature Range	+50 ⁰ F (+10 ⁰ C) to +110 ⁰ F (+43.3 ⁰ C)
Storage Temperature Range	0 ⁰ F (-17.8 ⁰ C) to +140 ⁰ F (+60 ⁰ C)
Relative Humidity	20% to 90%

*This environment does not include long term storage of dry silver photopaper. For proper storage of photopaper see paper manufacturer's recommendations.

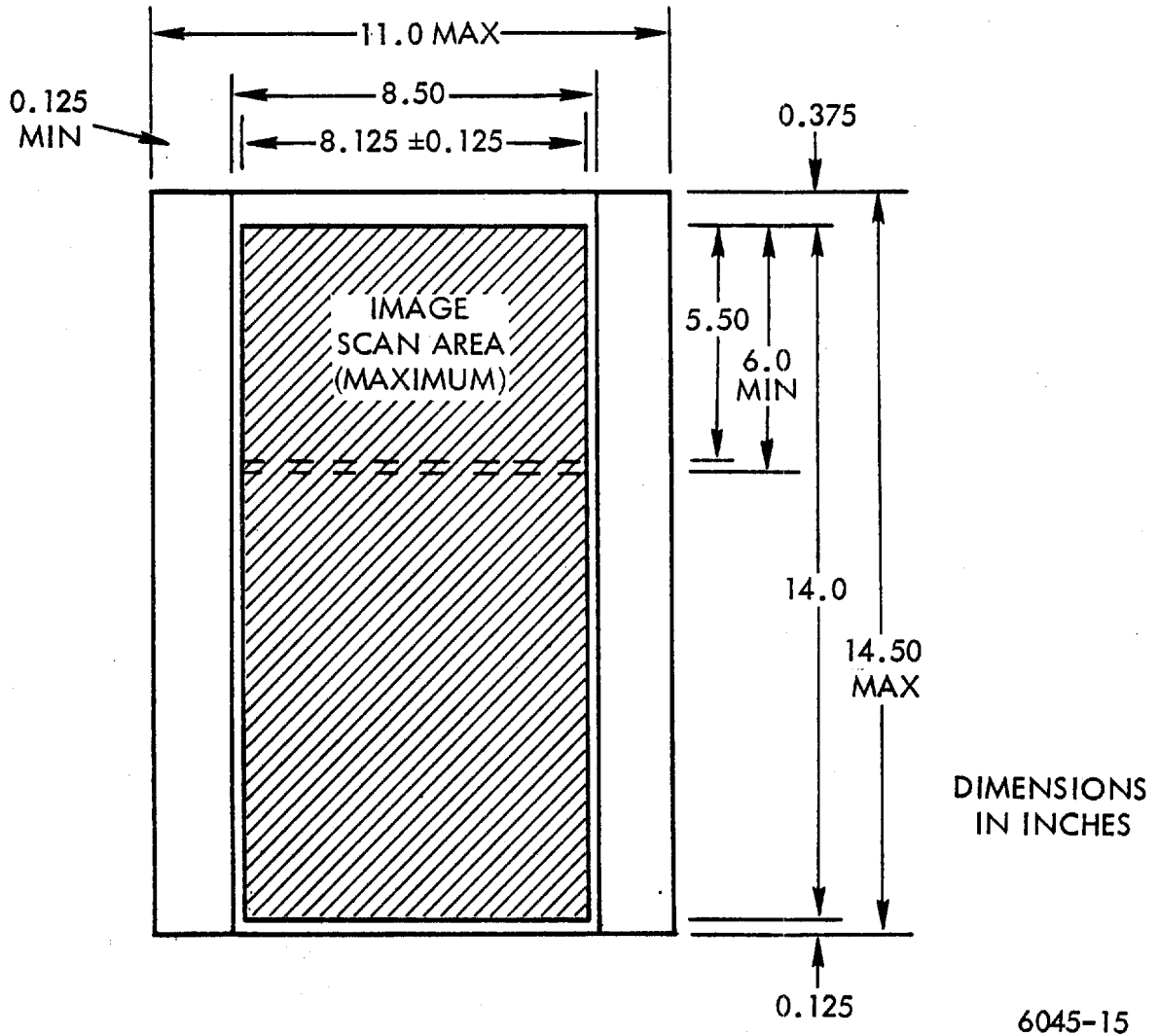
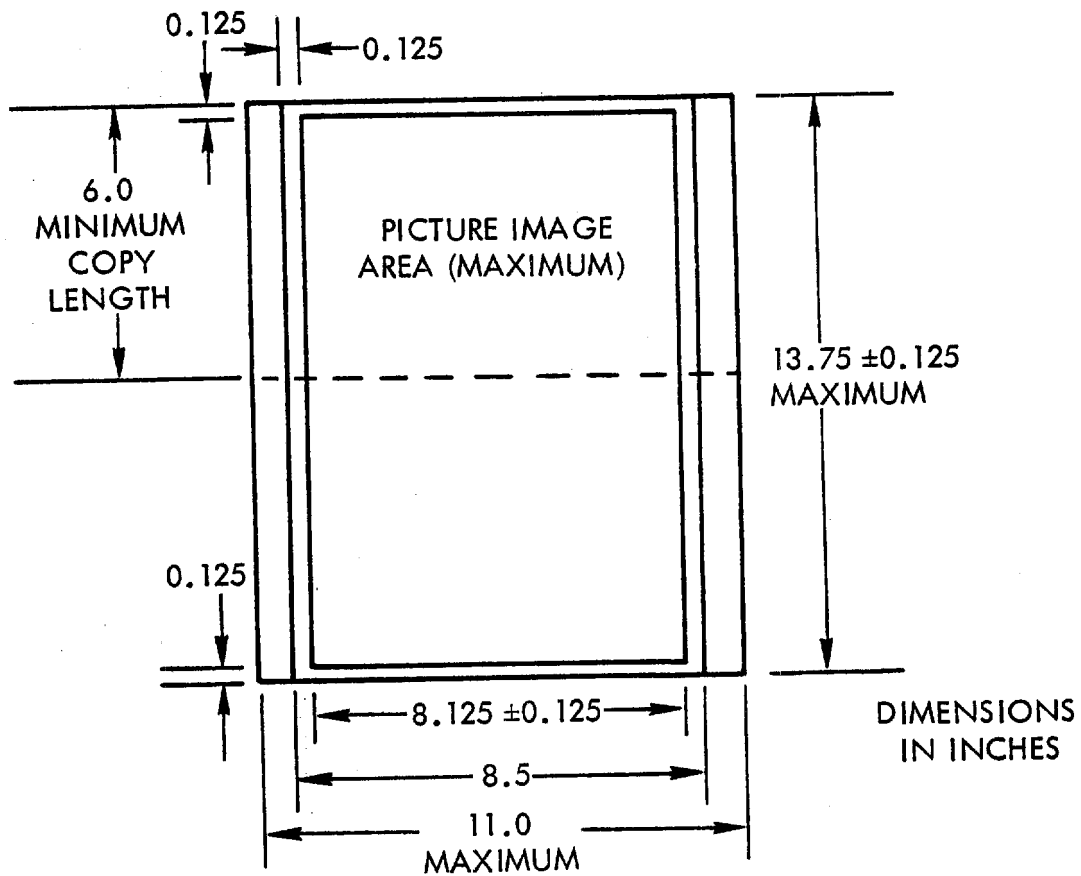


Figure 1-8. Input Document Format Characteristics



6045-16

Figure 1-9. Output Copy Format Characteristics

Section II. OPERATION

2-1. General.

This section provides procedures for operation of the Remote Terminal Subsystem. An initial turn-on and checkout procedure is given that can be used in conjunction with troubleshooting charts in the maintenance section of this manual. Procedures are also given for loading paper in the receiver cassette and inserting documents in the transmitter. Prior to any operation of the terminal it is recommended that the operator become familiar with the controls and indicators (paragraph 2-2), operator general information (paragraph 2-5), terminal operating modes and operational sequences (paragraph 2-6), and switch setup configurations (paragraph 2-7). Step-by-step procedures are given in this section for the both calling and called operators.

2-2. Controls and Indicators.

Functions of the controls and indicators are given in tables 2-1 (VCU), 2-2 (transmitter) and 2-3 (receiver), and illustrated in figures 2-1, 2-2 and 2-3, respectively.

Table 2-1. Voice Control Unit Front Panel Controls and Indicators

Item Fig. 2-1	Nomenclature	Description	Function
1.	Telephone handset	Standard model 500-type	
2.	Telephone keyboard	Standard 12 pushbutton keypad with 10 numbered keys and a CALL key.	Used to activate a call. Addresses are selected on the numbered keys. The CALL key is used to signal the connected party (remote call).
3.	Handset cradle switch	Standard hand-weight activated on/off hook switch.	
4.	<u>Network Broadcast</u> ALERT/ACTIVE	Dual section indicator (amber)	ALERT illuminates when a broadcast connection is requested. ACTIVE illuminates when the broadcast connection is established.
5.	<u>Network Connection</u> ACTIVE	Indicator (green)	When illuminated, indicates a connection is established with another RTS in the network (during both duplex and broadcast modes).
6.	Alarm HANDSET OFF HOOK	Indicator (red)	Illuminates to notify operator that he is violating standard operational procedures and that he should hang up the handset.
7.	Alarm CRYPTO	Indicator (red)	Illuminates to notify operator of a loss of crypto synchronization. Restoration of crypto sync extinguishes the alarm indicator.

Table 2-1. Voice Control Unit Front Panel Controls and Indicators (Continued)

Item Fig. 2-1	Nomenclature	Description	Function
8.	<u>Receiver Status</u> I0 thru 69	LED indicators (red)	<p>Indicates the status of all network subscribers (RTS's) as follows:</p> <p>Illuminated - out of-service or out-of-sync.</p> <p>Extinguished - ready for service.</p> <p>Flashing - busy</p> <p>Indicates for an authorized broadcaster:</p> <p><u>At Broadcast Alert</u></p> <p>Illuminated - requested broadcast list.</p> <p><u>At Broadcast Active</u></p> <p>Flashing - connected broadcast party is receiving.</p> <p>Extinguished - non-broadcast party or out-of-service.</p> <p>Illuminated - out-of-sync.</p>
9.	<u>Slave Receiver Status</u> I thru 5	LED indicators (red)	<p>Indicates the colocated slave receiver status as follows:</p> <p>Extinguished - ready for service.</p> <p>Illuminated - out of service.</p> <p>Flashing - presently busy.</p>

Table 2-1. Voice Control Unit Front Panel Controls and Indicators (Continued)

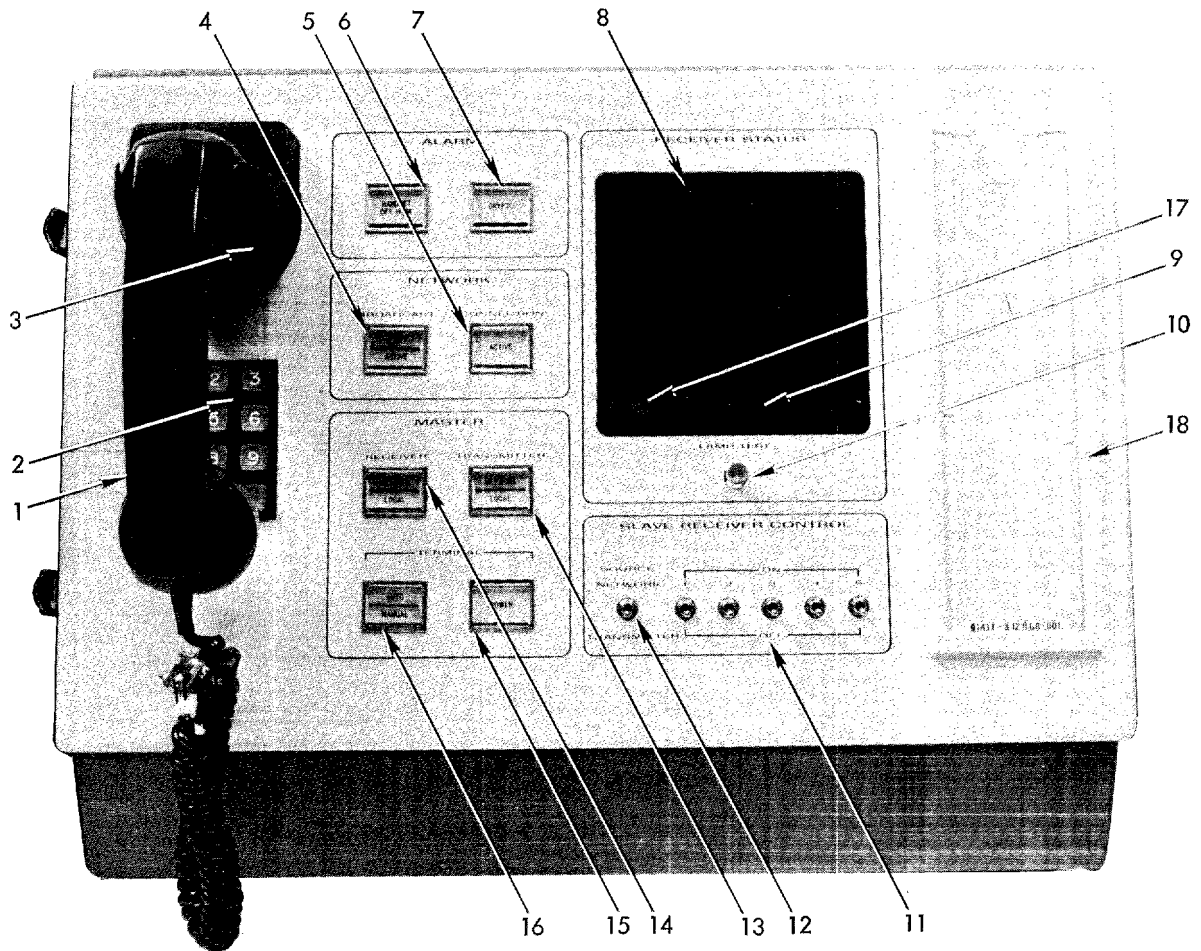
Item Fig. 2-1	Nomenclature	Description	Function
10	<u>Receiver Status</u> LAMP TEST	Momentary contact push- button	When depressed and held, lights all unlighted Receiver Status indicators of network subscribers, slave receivers, and address display for lamp testing. (Address display will indicate 88.)
11.	<u>Slave Re- ceiver Control</u> 1 thru 5 ON/OFF	Two position toggle switches	When set to the ON position selects the associated slave receiver (1 thru 5) to be placed on the slave receiver buss. Operates in conjunction with the Source - NETWORK/TRANSMITTER switch.
12	<u>Slave Receiver Control</u> Source NETWORK/ TRANSMITTER	Two position toggle switch	When set to the NETWORK position, the slave receivers on the slave receiver buss will receive incoming facsimile data from the network. When set to the TRANSMITTER position, the slave receivers on the slave receiver buss will receive facsimile data from the local facsimile transmitter.

Table 2-1. Voice Control Unit Front Panel Controls and Indicators (Continued)

Item Fig. 2-1	Nomenclature	Description	Function
13.	<u>Master Transmitter</u> NETWORK/LOCAL	Alternate action push- button/two section indicator - NETWORK (white)/ LOCAL (amber).	When depressed and re- leased, selects either NETWORK or LOCAL opera- tion for the master transmitter (appropri- ate indicator illuminates). When NETWORK is selected, the master transmitter can transmit facsimile data to the network and to slave receivers that are on the slave re- ceiver buss. When LOCAL is selected, the master transmitter can trans- mit facsimile data only to the local receiver and/or slave receivers that are placed on the slave receiver buss.
14.	<u>Master Receiver</u> NETWORK/ LOCAL	Alternate action push- button/two section indicator - NETWORK (white)/ LOCAL (amber).	When depressed and re- leased, selects either NETWORK or LOCAL opera- tion for the master receiver (appropriate indicator illuminates). When NETWORK is selected, the master receiver can receive facsimile data from the network. When LOCAL is selected, the master receiver can receive facsimile data only from the local transmitter.
15.	<u>Terminal POWER</u>	Indicator (white)	When illuminated, indi- cates that dc power is applied to the Remote Terminal Voice Control Unit.

Table 2-1. Voice Control Unit Front Panel Controls and Indicators (Continued)

Item Fig. 2-1	Nomenclature	Description	Function
16.	<u>Terminal</u> AUTO/MANUAL	Alternate action push-button/two section indicator - AUTO (white)/MANUAL (amber).	When depressed and released, selects either automatic (AUTO) reception mode or MANUAL mode of operation for the terminal. When the AUTO mode is selected, the terminal automatically acquires and receives facsimile and control data without operator intervention. When the MANUAL mode is selected operator intervention is required to establish a connection with another Remote Terminal
17.	Address Display	Two digit display (00 to 99).	Displays the two digit address of the connected RTS or the two digit broadcast address, for the broadcaster only during the broadcast mode. Displays to broadcast receive RTS's the address of the broadcaster.
18.	Directory Holder	Card holder	Used for the address number directory of allocated network subscriber addresses and allocated network broadcast list addresses.

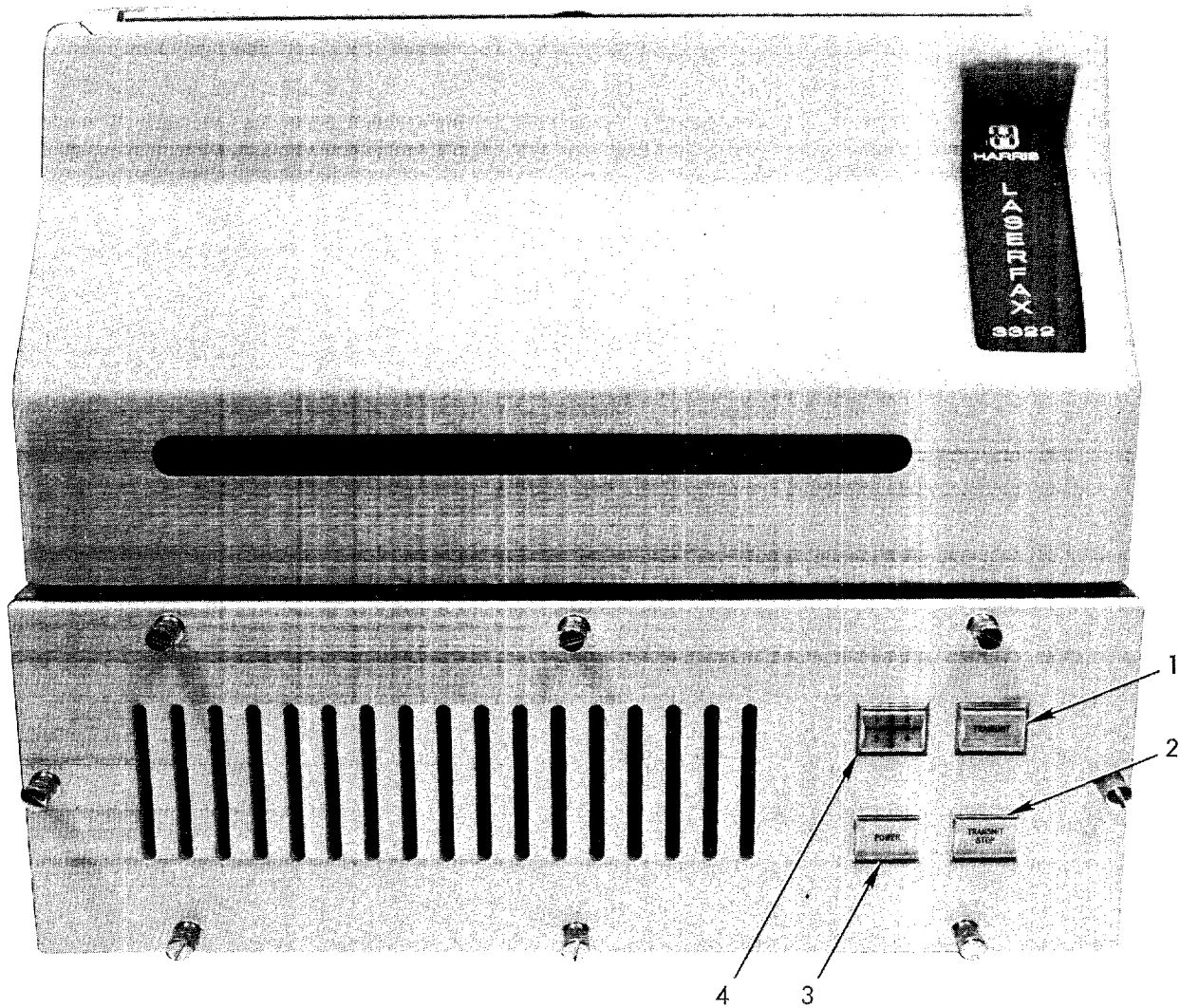


77-2632

Figure 2-1. Voice Control Unit, Front Panel Controls and Indicators

Table 2-2. LASERFAX Facsimile Transmitter Front Panel Controls and Indicators

Item Fig. 2-2	Nomenclature	Description	Function
1.	TRANSMIT	Momentary contact pushbutton/indicator (red).	Controls the start of document transmission. When depressed, indicator lights and document transmission begins when enabled by the VCU. Indicator remains lit until end of document transmission or until XMIT STOP pushbutton is depressed.
2.	TRANSMIT STOP	Momentary contact pushbutton	When depressed, stops transmission of a document.
3.	POWER ON	Alternate action pushbutton/indicator (white).	When depressed, indicator lights and primary ac power is applied to the facsimile transmitter.
4.	OBJECT ENHANCEMENT 1,2,3,4	Momentary contact pushbutton/ four section indicator (white).	Controls the selection of 1 of 4 transfer functions for object enhancement for an input document. When all four sections are extinguished, no object enhancement is applied. When depressed and released, steps to the next transfer function for object enhancement and the respective section of the indicator illuminates.



77-2630

Figure 2-2. LASERFAX Facsimile Transmitter Controls and Indicators

Table 2-3. LASERFAX Facsimile Receiver Front Panel Controls and Indicators

Item Fig. 2-3	Nomenclature	Description	Function
1.	POWER ON	Alternate action push-button (white).	When depressed, indicator lights and primary ac power is applied to the facsimile receiver, enabling the receiver for reception.
2	RCVR INOP (receiver inoperative)	Indicator (amber).	When illuminated, indicates that the receiver has gone into an inoperative state. The indicator will remain on until the inoperative state has been removed and the machine cleared. An inoperative state indicates that: 1) the machine is out of paper, or 2) there is a paper jam, or 3) there is a loss of video signal.
3.	PAPER LOW	Indicator (white).	When illuminated, indicates 20 feet of paper remaining in the paper cassette (the exact level at which this indication is given is adjustable and therefore may vary).
4.	PROCESS (processor)	Indicator (white).	Illuminates and remains lit when the copy is in the heat processor. Extinguishes when the copy exits the processor. Flashes when temperature in the heat processor deviates from the temperature setting by $\pm 5^{\circ}\text{F}$.

Table 2-3. Laserfax Facsimile Receiver Front Panel Controls and Indicators

Item Fig. 2-3	Nomenclature	Description	Function
5.	RECORD	Indicator (green).	Illuminates during reception of a transmission (while video data is being received).
6.	RAPID ADVANCE	Momentary contact pushbutton/indicator (white).	Controls manual advance of the paper. When depressed and released, paper is advanced six inches, cut, processed and delivered to the output tray. Primary function is to clear paper that was fogged during paper loading.

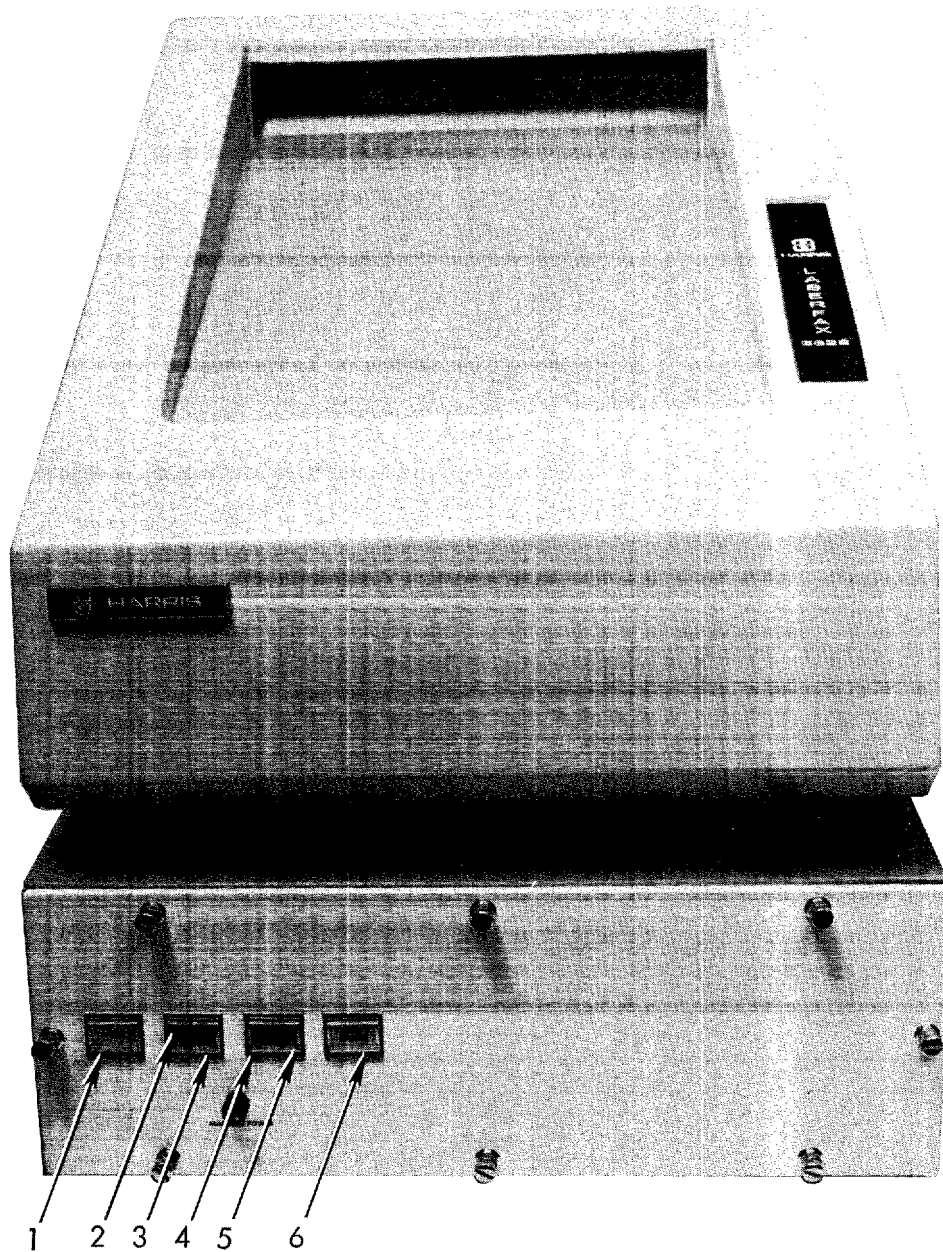
2-3. Paper Loading Procedure.

NOTE

The roll of photopaper must be supplied with an opaque leader or the cassette must be loaded in a dark light-tight room to prevent paper exposure.

a. 3M Company No. 7771 or No. 7773 Dry Silver Photopaper or equivalent is recommended. Paper rolls are 8 1/2-inches wide or 11-inches wide by 500 feet long for No. 7771 paper and 350 feet long for No. 7773 paper.

b. Remove paper shaft from cassette. Insert one plastic end cap on roll, insert shaft, and install opposite end cap so that end caps support roll.



77-2631

Figure 2-3. LASERFAX Facsimile Receiver Controls and Indicators

c. Mount paper roll into cassette with shaped ends of shaft fitting into notched supports of cassette housing. Refer to figure 2-4.

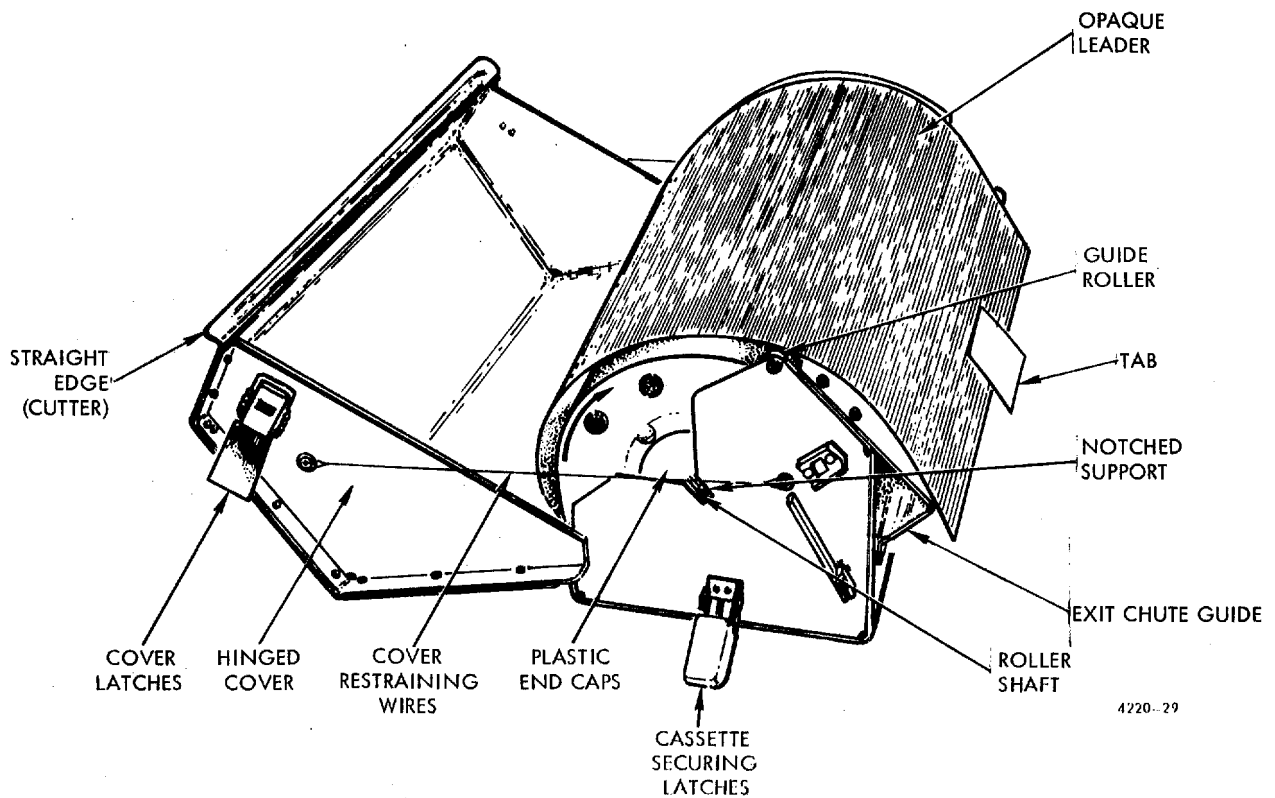


Figure 2-4. Cassette and Light Sensitive Paper Roll

d. Feed opaque black leader from rear of cassette, over interior guide roller and past exit chute guide.

e. Close and lock hinged cassette cover.

- f. Gently pull leader out of cassette until photopaper appears.
- g. Tear off paper. Pull paper against straight edge of the cassette's upper side.

NOTE

Care must be taken that a clean tear is made, and that the paper does not slip back into the cassette. If paper slips back into cassette, dark room reloading will be necessary.

- h. Refer to figure 2-5. Place cassette in position on receiver frame and push cassette against capstan assembly. Slide cassette to extreme left, then slowly withdraw cassette away from capstan assembly allowing studs to fall into mounting slots. Latch cassette in place.
- i. Depress MANUAL RAPID ADVANCE switch (red button on right side of unit) while holding photopaper against capstan, until edge of paper begins feeding under transport slide plate above capstan assembly.
- j. Close light-tight exterior receiver cover.
- k. Depress control panel RAPID ADVANCE switch to clear unit of paper exposed during loading.

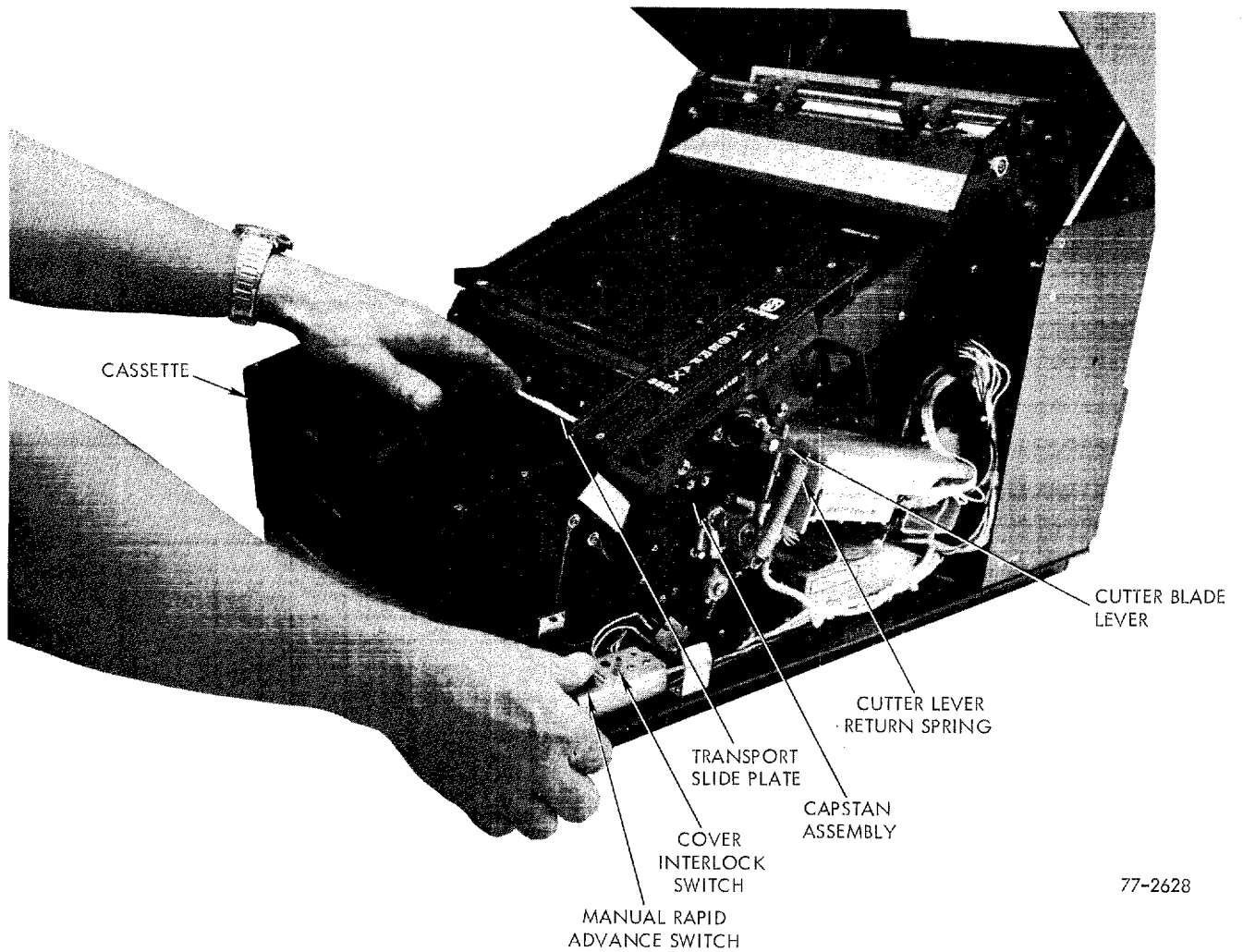


Figure 2-5. Recorder Paper Loading

2-4. Input Document Loading Procedure (Facsimile Transmission).

The input document to be transmitted (refer to figure 1-8) can be either a film transparency which must be used with a frosted Mylar backing sheet or an opaque copy with a mat finish and white background, 3 mils to 44 mils thick, 11 inches wide maximum and 6 inches wide minimum, 14.5 inches long maximum and 6 inches long minimum. Since the transmitter has an active scan width of 8.125 ± 0.125 inches, an 8.5 inch document will have a minimum of 0.125 inch unscanned margin on the left hand side of the document. Documents that are wider than 8.5 inches will have a wider unscanned margin. The active scan length is 5.5 inches to 14 inches leaving an unscanned margin of 0.375 inch at the top of the document and 0.125 inch at the bottom of the document. To load the document in the transmitter, proceed as follows:

a. Examine document for gray levels (refer to paragraph 2-6.j). If object enhancement is desired, determine which enhancement curve will produce best results. If desired, select one of four levels by stepping the transmitter OBJECT ENHANCEMENT pushbutton. If no object enhancement is desired, the switch must be stepped until all four sections of the indicator are extinguished.

b. If positive film transparency is to be transmitted, align a frosted Mylar backing sheet of equal size on the reverse side of the transparency. The frosted side of the backing sheet should be against the transparency.

c. Insert document (opaque copy or transparency) in input slot with the image facing out toward front of slot (facing operator). For transparencies, ensure that backing sheet is toward rear of slot.

d. For 8.5 inch wide documents or smaller, align left edge of document with scribe mark on back of input slot cover (figure 1-5). For documents wider than 8.5 inches, place document to left of scribe mark to even out unscanned area margin if desired.

2-5. Operator General Information.

a. Class Marking. All RTS subscribers are class marked for the purpose of limiting access to other RTS subscribers. Four levels of access with their corresponding class marks are identified as follows:

Level 1 -has access to all subscribers.

Level 2 - has access to all subscribers except Level 1.

Level 3 - has access to Level 3 and Level 4 subscribers only.

Level 4 - has access to other Level 4 subscribers only.

All calls to subscribers to which connections are prohibited by class marking will not be connected and an invalid number information signal will be sent to the calling party.

b. Address Number Organization. The following address groups are assigned in the ITS-W network. Specific RTS addresses (terminal identities) and Broadcast Lists are not given in this manual.

<u>Address Numbers</u>	<u>Usage</u>
00 through 09	Invalid Addresses
10 through 69	Remote Terminal Addresses
70 through 79	Invalid Addresses
80 through 89	Network Broadcast List Addresses
90 through 99	Invalid Addresses

All calls to unimplemented subscribers or invalid numbers will be sent an invalid number information signal.

c. Telephone Tone Signals. The telephone signals generated conform to standard telephone service requirements. An audible beeper provides the ring at the RTS.

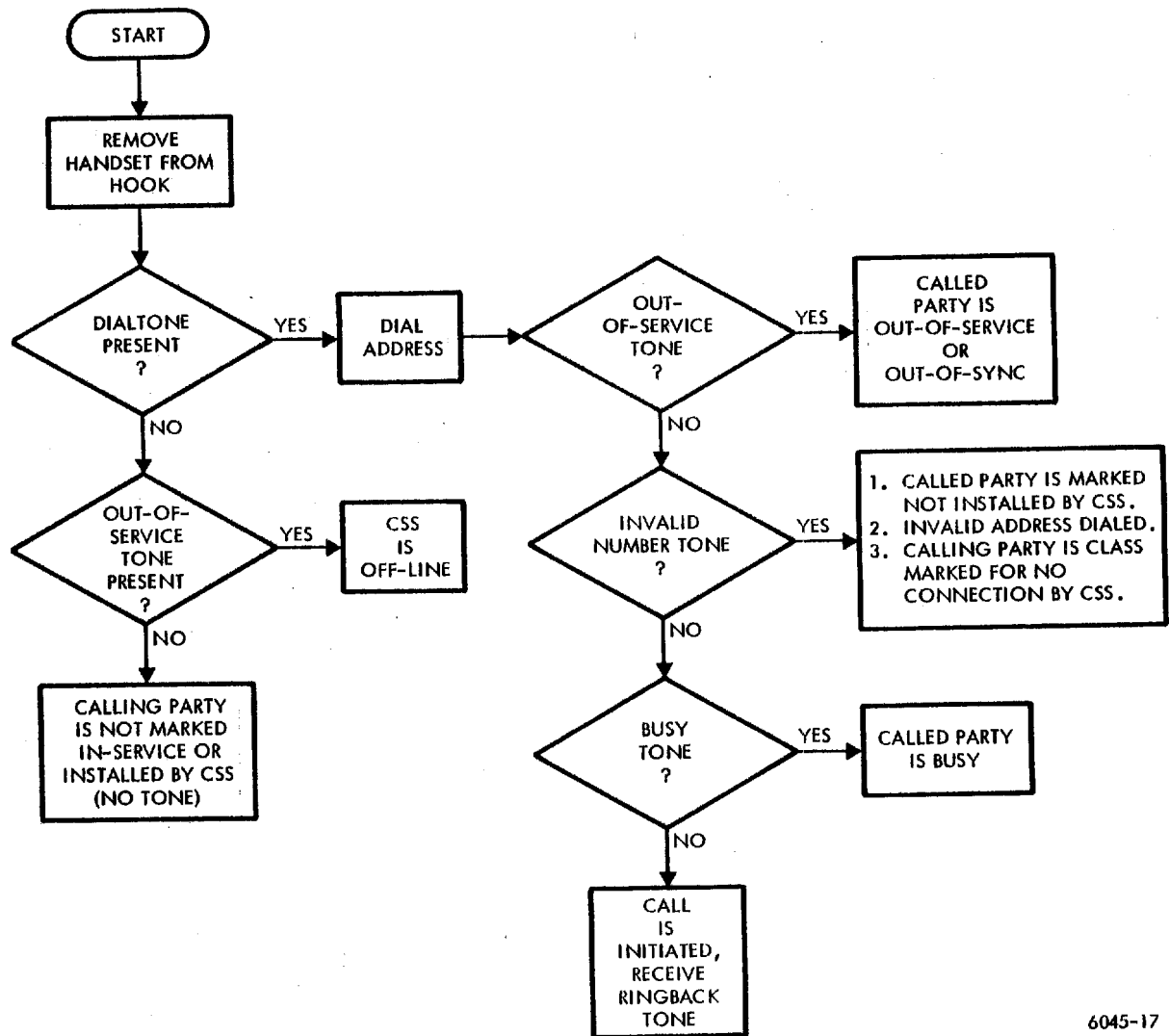
<u>Information Signal</u>	<u>Tone Frequency Range</u>	<u>Interruption Rate</u>
Busy Tone	480 Hz and 620 Hz	0.5 second on, 0.5 second off
Out of Service Tone	480 Hz and 620 Hz	0.3 second on, 0.2 second off
Invalid Number Tone	480 Hz	None
Dialtone	350 Hz and 440 Hz	None
Ring or Ringback	440 Hz and 480 Hz	None

d. Operator Diagnostic. Figure 2-6 illustrates through flow chart form the sequence and reason for all information tone signals.

2-6. Remote Terminal Operating Modes and Operational Sequences.

a. Full Duplex Mode. The full duplex mode of operation allows an RTS operator to dial up another authorized remote terminal and establish a full duplex connection (via the Central Site Subsystem) for simultaneous voice and facsimile transmission and reception. Once a connection is established, both the calling or called parties can transmit facsimile data.

b. Broadcast Mode. The broadcast mode of operation allows a broadcast authorized RT operator to dial up to 10 broadcast lists and establish simplex connection (via the Central Site Subsystem) with all RTS's on the list. During broadcast, facsimile transmission and voice operation is simplex (one way) from the broadcasting (calling) party to the receiving (called) parties. The RTS will not simultaneously operate in broadcast transmit and broadcast receive modes. Authorization for broadcast initiation is on an individual list basis, modifiable through the CSS switch only.



6045-17

Figure 2-6. Information Tone Signals Diagnostic

c. Automatic and Manual Reception Modes. The automatic or manual reception mode is manually selectable by the VCU control panel terminal AUTO/MANUAL pushbutton. When the terminal is in the AUTO mode of operation, the called RTS requires no operator intervention and images transmitted by the calling operator are received and recorded automatically. No audible ring will be heard. When the terminal is in the MANUAL mode of operation, the called RTS requires operator intervention, i.e., the called operator must remove the handset from the hook (when an audible ring occurs) to establish a connection with the calling operator. The AUTO mode is normally used for an unattended console.

d. Hold Submode and Automatic Link Termination. The hold submode allows the RTS operator to hang up the handset after facsimile transmission has started, in either the duplex or broadcast mode, and maintain the connection as long as facsimile transmission is taking place. The RTS will automatically terminate the connection after facsimile transmission and/or reception is completed. The connection is also automatically terminated if the calling party hangs up the handset prior to facsimile transmission and/or reception. On-hook operation puts the terminal in a time-out mode after the connection has been established where requests for subsequent document transmission must occur within 15 seconds at the end of the previous document or the connection is terminated. In the hold submode, the RTS will respond to a "remote call" by producing an audible ring with the handset on-hook (paragraph 2-6 e.).

e. Remote Call. When RTS's are interconnected in the duplex mode, either RTS can manually ring the connected RTS at any time whether the called RTS handset is on-hook or off-hook. Calling operator action requires removing the handset from the hook and pressing the keypad CALL button. When the RTS's are interconnected in the broadcast mode, the authorized broadcast RTS can ring all connected RTS's; however, the connected RTS's cannot ring the broadcast RTS.

f. Handset Off Hook Alarm. The RTS's are designed specifically for facsimile transmission and reception. Voice communication is used mainly for coordination of facsimile operation. The system will automatically remind the operator via the HANDSET OFF HOOK indication alarm that normal practices are being violated. Normally, once an RTS operator has established a connection with another RTS and the Network Connection ACTIVE indicator illuminates, facsimile transmission should be initiated immediately. The HANDSET OFF HOOK alarm indicator will not illuminate if the handset is off-hook during transmission of document(s) or reception of document(s). If voice contact is desired during transmission, the remote call feature described in paragraph 2-6 e. can be used. The HANDSET OFF HOOK alarm indicator will illuminate under the following conditions:

(1) The handset is off-hook more than 15 seconds after the Network Connection ACTIVE indicator illuminates and facsimile transmission has not been started.

(2) The handset is off-hook more than 15 seconds after the end of the last document transmission.

g. Remote Terminal Status. Real-time receiver status is displayed for each network subscriber on the VCU control panel Receiver Status indicators. During the BROADCAST ALERT period the status display is used to inform the broadcast initiator as to the composition of the broadcast list and of the status of the individual members of the broadcast list. Status display is as follows:

NOTE

The receiver status display can only be considered valid for implemented terminals. The capability to display status is limited in every terminal with the capability being expanded as the network is expanded

NOTE

Terminals put in one of the available loopback modes may appear to other terminals as either BUSY or OUT OF SERVICE depending on which loopback is selected

(1) The normal receiver status display data is sent to all remote terminals in the idle mode (not connected), duplex mode, or broadcast receive mode.

- (a) Indicator extinguished - ready for reception .
- (b) Indicator illuminated steady - out-of-service or out-of- sync.
- (c) Indicator flashing - presently in operation or busy.

(2) The receiver status displayed to an authorized broadcasting party only is as follows:

(a) After the broadcaster has dialed the broadcast list number and received the Broadcast ALERT indication, status indicators of all parties on the broadcast list illuminate steady. All non-broadcast parties indicators are blanked.

(b) When the broadcast connection is activated (Broadcast ACTIVE indicator illuminates), the status indicators of all broadcast list parties revert to normal status as given in (1) above, i.e., all out-of-service broadcast list parties status indicators illuminate steady, status indicators of broadcast list parties receiving the broadcast flash. All non-broadcast parties indicators remain blanked.

h. Local Simplex Mode and Slave Receivers. The local simplex mode allows the operator to select (on the VCU control panel) the master transmitter as the source for the local master receiver and/or for the slave receivers. In this mode the VCU remains on line and permits reception of control functions such as "Broadcast Alert." The operator may elect to keep the master receiver switched to the network during local simplex document transfers to the slave receivers. This permits simplex reception of facsimile data and full duplex voice operation with the network. Through local switch setup configurations, individual slave receivers may be selected (up to five) to receive facsimile data from the network, or facsimile data being transmitted to the network by the local transmitter, or facsimile data directly from the local transmitter in lieu of network operation. All possible switch setup configurations are given in paragraph 2-7. When the master receiver is operating in LOCAL, a busy status is sent to the network, however the Central Site Subsystem does not mark the terminal as busy and will permit incoming calls to be attempted.

i. Self Call. A self call feature allows the operator to dial his own number when not receiving a transmission and establish a simplex connection through the Central Site Subsystem. This feature is used for maintenance purposes so that an operator can transmit a document through the link to the Central Site Subsystem and link back to his terminal receiver for recording.

j. Object Enhancement. The LASERFAX facsimile transmitter provides for four selectable levels of object enhancement (OBJECT ENHANCEMENT four section/pushbutton indicator). Proper use of this feature requires operator experience to determine the type of object enhancement desired for a specific document. It is recommended that the operator experiment with documents of various pictorial content to gain the required experience. Normally, object enhancement is not required for documents having good contrast. Where documents have poor contrast or have large areas of light gray and dark gray, (gray shades of limited range) object enhancement may be used to improve the contrast of light or dark areas.

k. Stopping a Facsimile Transmission Prior to Normal Stop. Facsimile transmission may be stopped anytime prior to the normal stop by depressing the TRANSMIT STOP pushbutton. The following sequence of events will occur:

(1) The transmitting RTS facsimile transmitter will physically stop. If the handset is on-hook, the RTS to RTS connection is terminated in 15 seconds if a new transmission is not started. If the handset is off-hook, the network connection is not terminated; however, the HANDSET OFF HOOK indicator will illuminate in 15 seconds if a new transmission is not started.

NOTE

The document in the transmitter may be removed by gently pulling the document out of the input or output slot.

(2) At the receiving RTS, facsimile recording is stopped when the transmitting RTS operator depressed the TRANSMIT STOP button, and paper is cut and processed in the normal manner provided a minimum of six inches of copy has been produced. If less than six inches has been exposed, the receiver advances the paper and cuts it at six inches.

2-7. VCU Switch Setup Configuration for Transmission and Reception.

The following VCU control panel switch setups are for operation in duplex and broadcast modes except for local transmission to the master receiver when slave receivers are not available for network reception (setup b.). Normal switch setup and optional setups when slave receivers are available are given. The switch setups include the terminal AUTO or MANUAL reception mode and is indicated in the MANUAL mode. If in the MANUAL mode, operator intervention is required as given in paragraph 2-6 c.

a. Normal Terminal Setup. This set of switch selections allows the terminal to transmit facsimile data to the network and receive facsimile data from the network on the master receiver.

Master Transmitter	- NETWORK
Master Receiver	- NETWORK
Terminal	- MANUAL
Slave Receiver Control	
Switches 1-5	- Not Applicable
Source	- Not Applicable

b. Local Simplex Transmission to Master Receiver. This set of switch selections allows the terminal to transmit facsimile data to the master receiver. Network facsimile transmission and reception is inhibited.

Master Transmitter	- LOCAL
Master Receiver	- LOCAL
Terminal	- MANUAL
Slave Receiver Control	
Switches 1-5	- Not Applicable
Source	- Not Applicable

c. Local Simplex Transmission to Master Receiver and Network Reception on Slave Receiver. This set of switch selections allows the terminal to transmit facsimile data only to the master receiver and to receive facsimile data from the network on the slave receivers (see paragraph 2-6.h).

Master Transmitter	- LOCAL
Master Receiver	- LOCAL
Terminal	- MANUAL
Slave Receiver Control	
Switches 1-5	- ON (Select 1 to 5)
Sources	- NETWORK

d. Local Simplex Transmission to Slave Receivers and Network Reception on Master Receiver. This set of switch selections allows the terminal to transmit facsimile data only to the slave receivers and to receive facsimile data from the network on the master receiver.

Master Transmitter	- LOCAL
Master Receiver	- NETWORK
Terminal	- MANUAL
Slave Receiver Control	
Switches 1-5	- ON (Select 1 to 5)
Source	- TRANSMITTER

e. Transmission to Network and Slave Receivers. This set of switch selections allows the terminal to transmit facsimile data to the network and slave receivers and receive facsimile data from the network on the master receiver.

Master Transmitter	- NETWORK
Master Receiver	- NETWORK
Terminal	- MANUAL
Slave Receiver Control	
Switches 1-5	- ON (select 1 to 5)
Source	- TRANSMITTER

f. Transmission to Network with Slave Receivers on Network Reception. This switch setup allows the terminal to transmit facsimile data to the network while the master and slave receivers receive facsimile data from the network.

Master Transmitter	- NETWORK
Master Receiver	- NETWORK
Terminal	- MANUAL
Slave Receiver Control	
Switches 1-5	- ON (select 1 to 5)
Source	- NETWORK

2-8. Operational Setup and Checkout Procedure.

This procedure is accomplished after all related equipment power has been turned on (CICU, COMSEC, etc.) and the ITS network Central Site Subsystem is in operation.

- a. Set console main power circuit breaker to ON position.
- b. Verify that VCU terminal POWER indicator illuminates and circulating fan is operating.
- c. Depress VCU LAMP TEST pushbutton and ensure that all unlighted, implemented Receiver Status indicators of network subscribers illuminate (address display will indicate 88).
- d. Set VCU master receiver and master transmitter NETWORK/LOCAL pushbutton switch to NETWORK.
- e. Set VCU terminal AUTO/MANUAL pushbutton switch to MANUAL.
- f. Depress facsimile transmitter POWER ON pushbutton. Verify that pushbutton indicator illuminates and circulating fan is operating.
- g. Depress facsimile receiver POWER ON pushbutton. Verify that pushbutton indicator illuminates and circulating fan is operating. The RCVR INOP and PAPER LOW indicators should be illuminated, and PROCESS indicator should be flashing.
- h. Load paper cassette in facsimile receiver as given in paragraph 2-3. The RCVR INOP and PAPER LOW indicator should extinguish. The PROCESS indicator will extinguish when processor has reached normal operating temperature.
- i. Load document to be transmitted in facsimile transmitter as given in paragraph 2-4.

j. The console operation may be checked out by using the Self Call feature (dialing one's own number) and following the procedure in paragraph 2-9 for transmitting a document. When the copy exits into the receiver tray, examine it for conformance with table 1-1 and figure 1-9.

NOTE

Trouble symptoms and probable causes are listed in the maintenance section of this manual.

2-9. Calling Operator Procedure for Duplex Facsimile Transmission and Reception.

NOTE

Prior to operation of the terminal, set up or check terminal switch configuration (paragraph 2-7 a., e. or f.)

a. Observe the control panel Receiver Status of the RT to be called and ensure that the indicator is extinguished (in-service, not busy).

b. Remove handset from cradle, hear dialtone, and dial authorized two digit address (numbers 10 through 69). Observe dialed number on control panel Address Display.

NOTE

If invalid number tone, out-of-service tone or busy tone is received, place handset on hook. Reinitiate called party number if desired.

(1) The Network Connection ACTIVE indicator will illuminate immediately if the called terminal is in the AUTO mode of operation. Observe the control panel Address Display and ensure that the correct called party is connected. Start the facsimile transmission as given in step c. or wait for reception as given in step d. if the called party has previous knowledge he is to transmit.

(2) Ringback will be heard if the called terminal is in the MANUAL mode. Ringback will stop and the Network Connection ACTIVE indicator will illuminate when the called operator acknowledges the ring (removes handset from cradle). Observe the control panel Address Display and ensure that the correct called party is connected. Voice communication may take place during this period to instruct called party. Start the facsimile transmission as given in step c. and/or wait for reception as given in step d.

c. Insert the document in the transmitter. Transmit the document by depressing the facsimile transmitter TRANSMIT pushbutton. The TRANSMIT indicator will remain illuminated during document transmission. Subsequent documents may be transmitted within 15 seconds after the end of each document transmission (after the TRANSMIT indicator is extinguished). Documents may be inserted immediately after the previous one clears the transmitter. Automatic controls will hold up transmission until the receiving terminal(s) is ready.

d. Documents being received will require no operator action. When recording begins, the facsimile receiver RECORD indicator will illuminate, followed by the PROCESS indicator illuminating.

e. The calling operator at his option may hang up the handset.

NOTE

An RTS call (signal) may be initiated by either the calling or called operator during the time the Network Connection ACTIVE lamp is illuminated by removing the handset from the cradle and pressing the keypad CALL button.

2-10. Called Operator Procedure for Duplex Facsimile Transmission and Reception.

a. No operator action is required for facsimile recording if the terminal is in the AUTO mode. The Network Connection ACTIVE indicator will illuminate when the calling RT is connected. The calling RTS address will appear on the control panel Address Display. The facsimile receiver RECORD indicator illuminates when transmission begins, followed by the PROCESS indicator illuminating. If the called operator has prior knowledge that he is to transmit a document, transmit the document as given in step c.

b. If the terminal is in the MANUAL mode of operation, an audible ring will be heard when a connection is requested. Remove the handset from the cradle. The Network Connection ACTIVE indicator will illuminate. If the called operator has been instructed or has prior knowledge that he is to transmit a document, transmit the document as given in step c. If receiving a document, observe the receiver indications as given in step a.

c. To transmit a document, first observe the control panel Receiver Status of the calling RT and ensure that the indicator is extinguished (ready for receiving). Insert the document in the transmitter. Transmit the document by depressing the facsimile transmitter TRANSMIT pushbutton. The TRANSMIT indicator will remain illuminated during document transmission. Subsequent documents may be transmitted within 15 seconds after the end of each document transmission (after the TRANSMIT indicator is extinguished). Documents may be inserted immediately after the previous one clears the transmitter. Automatic controls hold up transmission until the receiving terminal(s) is ready.

d. At the end of document transmission and/or reception, the RT-to-RT connection is automatically terminated and the Network Connection ACTIVE indicator is extinguished. If the handset remains off-hook, dialtone will be heard in the earphone.

2-11. Calling Operator Procedure for Broadcast Operation.

NOTE

Prior to broadcast operation, setup or check the terminal switch configurations (paragraph 2-7 a. or e.).

a. Remove handset from cradle, hear dialtone, and dial authorized two digit broadcast list address (numbers 80 through 89).

NOTE

If a busy tone is received, a broadcast is presently in operation in the network. Place handset on hook and reinitiate call if desired.

b. The Network Broadcast ALERT indicator will illuminate.

(1) Ringback will be received.

(2) Observe the control panel Address Display and ensure that the correct broadcast list address is displayed.

(3) Observe the control panel Receiver Status indicators of the RT's on the broadcast list. All RTS's on the list will have their indicators illuminated. All others will be blanked out.

NOTE

A network 60 second minimum delay (programmable at the CSS) is incorporated between Broadcast ALERT and ACTIVE to allow busy RTS's to complete in-progress transmission or reception.

c. The Network Broadcast ACTIVE and Connection ACTIVE indicator will illuminate. Transmit the document as given in step d. Observe the control panel Receiver Status. All RTS's on the list not answering the call will have their indicators extinguished and normal status indications will be restored for all others on the broadcast list who have answered the call. The RTS's not on the broadcast list will be blanked out.

d. Insert a document in the transmitter. Transmit the document by depressing the facsimile transmitter TRANSMIT pushbutton. The TRANSMIT indicator will remain illuminated during document transmission. Subsequent documents may be transmitted within 15 seconds after the end of each document transmission (after the TRANSMIT indicator is extinguished). Documents may be inserted immediately after the previous one clears the transmitter. Automatic controls hold up transmission until the receiving terminal(s) is ready.

e. The broadcast operator at his option may hang up the handset.

NOTE

A Remote Call may be initiated by the calling broadcast operator during the time the Network Broadcast ACTIVE indicator is illuminated by removing the handset from the cradle (if the handset is on-hook) and pressing the keypad CALL button.

f. At the end of document transmission(s), the broadcast connection is terminated automatically after 15 seconds (if handset is on-hook), and the Network Broadcast ACTIVE and Connection ACTIVE indicators extinguish.

2-12. Called Operator Procedure for Broadcast Operation.

a. Operator action is not required for facsimile recording of a broadcast transmission if the terminal is in the idle mode (not connected) and if the terminal is in the AUTO mode of operation. The sequence of events will be as follows:

- (1) The Network Broadcast ALERT indicator will illuminate.
- (2) The Network Broadcast ALERT indicator will extinguish in approximately 1.5 minutes and the Network Broadcast ACTIVE and Connection ACTIVE indicators will illuminate.
- (3) The broadcast facsimile transmission should commence immediately. The facsimile receiver RECORD indicator illuminates when the broadcast transmission begins, followed by the PROCESS indicator illuminating.
- (4) The operator can observe the Address Display for the terminal address of the broadcaster.
- (5) At the end of broadcast transmission, the broadcast connection is automatically terminated and the Network Broadcast ACTIVE and Connection ACTIVE indicators are extinguished.

b. Operator action is required for facsimile recording of a broadcast transmission if the terminal is presently duplex or simplex (self call) connected and/or if the terminal is in the MANUAL mode of operation. Observe the following sequence of events and perform the operator actions as indicated:

(1) The Network Broadcast ALERT indicator will illuminate at both duplex connected RTS's and at a simplex connected self call RTS on the broadcast list.

(2) If the handset is off-hook, conclude conversation and hang up handset.

NOTE

If document transmission or reception is presently in progress, the duplex connection will automatically be terminated at the end of the present transmission. Subsequent transmission is inhibited.

(3) If the terminal is in the MANUAL mode of operation, an audible ring will be heard. Remove the handset from the hook to establish the broadcast connection.

(4) The Network Broadcast ALERT indicator will extinguish in approximately 1.5 minutes, and the Network Broadcast ACTIVE and Connection ACTIVE indicators will illuminate only for the broadcast list terminal(s).

(5) Indications from this point on are identical to steps a. (3), (4) and (5). If the handset remains off-hook after the connection is automatically terminated, dialtone will be heard in the earphone.

c. A remote call initiated by the broadcaster will ring the called terminal whether the handset is on-hook or off-hook. Remove the handset from the cradle and listen for instructions.

Section III. MAINTENANCE

3-1. General.

This section contains information on operator maintenance of the RTS receiver, transmitter, VCU and power supply. The troubleshooting procedures in this section list the more common symptoms that may be encountered and identify the most probable cause of the malfunction. General checks and services are provided as a means of preventative maintenance.

3-2. Checks and Services.

To ensure that the RTS console and equipment is always ready for operation, a systematic inspection will ensure that defects may be discovered and corrected before serious damage or failure occurs. The operator checks and services on the equipment are listed in table 3-1. Defects discovered during the operation of the equipment should be noted and correction should be made as soon as operation has ceased. Stop operation immediately if a deficiency is noted during operation which would damage the equipment. Record all deficiencies together with corrective action taken.

Table 3-1. Operator Checks and Services

Sequence Number	Item to be Inspected	Procedures	Corrective Action
1.	Console and equipment	Check for completeness and general condition.	See paragraph 3-3 for cleaning instructions.
2.	Indicators/switches	Check that switches (except console MAIN POWER ON switch) operate freely and for damaged indicators.	Replace defective indicator lamps per paragraph 3-5.
3.	Operation	Perform the operational setup and checkout procedure in paragraph 2-8.	Refer to equipment troubleshooting in paragraph 3-4 if normal indications are not obtained.

3-3. Cleaning.

a. Remove dust, dirt and other foreign matter with a soft-bristle brush and a clean lint-free cloth.

b. Remove grease, fungus, and ground-in dirt with a lint-free cloth dampened with cleaning a detergent and water solution.

3-4. Equipment Troubleshooting.

a. To determine whether a malfunction exists in the local equipment rather than with transmitted or received facsimile signals, the master transmitter and receiver should be put in a (self call) configuration to determine whether the observed trouble symptom is common to the communication network or came from another remote terminal. This procedure is given in paragraph 2-8j. Do not commence fault isolation operations until it is determined that the observed fault is unique to the local equipment. To determine if local equipment is at fault, perform the local simplex mode of operation as defined in paragraph 2-6 h. and 2-7 b.

b. Tables 3-2 (receiver) and 3-3 (transmitter) give the most frequent trouble symptom and probable cause. Corrective repair, in most cases, is limited to replacement of fuses, lamps, and clearing paper jams in the receiver. There is no operator maintenance requirements for the VCU, other than lamp replacement. Table 3-4 lists the lamps, and table 3-5 lists the fuses for the equipment. Paragraph 3-5 provides procedures for clearing a paper jam, paragraph 3-6 provides procedures for lamp replacement and paragraph 3-7 provides information on fuse locations.

Table 3-2. Recorder Fault Isolation

Fault Symptom	Probable Cause
<p>Receiver completely inoperative. RCVR INOP indicator is extinguished.</p> <p>RCVR INOP indicator lights.</p> <p>Processor does not heat, PROCESS indicator flashes, and motor is not operating.</p> <p>Copy does not advance either normally or rapidly.</p> <p>Copy exits all black.</p> <p>Copy has poor contrast.</p> <p>Copy will not exit.</p>	<ul style="list-style-type: none"> o Cover not latched tight o Fuse F1 blown. o Fuse F2 blown. o Paper jam o Out of paper o Loss of video input signal. Fuse F3 blown. Fuse F4 blown. Paper exposed (fogged) Paper fogged. o Fuse F3 blown. o Fuse F4 blown.

Table 3-3. Transmitter Fault Isolation

Fault Symptom	Probable Cause
<p>Transmitter completely inoperative.</p>	<ul style="list-style-type: none"> o Cover not latched tight. o Fuse F1 blown. o Fuse F2 blown.

Table 3-4. Spare Lamp List

Unit	Indicator Nomenclature	Figure Reference	Type Lamp
Facsimile Receiver	All Indicators	2-3	LA328
Facsimile Transmitter	All Indicators	2-2	LA328
Voice Control Unit	All Indicators Except Receiver Status Indicators	2-1	LA328

Table 3-5. Spare Fuse List

Unit Transmitter	Fuse Designator	Figure Reference	Type Fuse
Facsimile Receiver	F1 (MAIN)	3-1	3AG 6 Amp 125 V
	F2 (RECEIVER)		3AG 6 Amp 125 V
	F3 (PROCESSOR)		3AG 4 Amp 250 V
	F4 (CAPSTAN)		3AG 2 Amp 250 V
Facsimile Transmitter	F1 (MAIN)	3-2	3AG 6 Amp 250 V
	F2 (LASER)		3AG 2 Amp 250 V

3-5. Paper Jam Clearing (Receiver).

If the copy does not exit within one minute after the end of reception, RCRD indicator extinguished and PROC indicator illuminated, open the light-tight Receiver cover, and manually extract the paper from the Recorder. If the paper is jammed in the cutter assembly: 1) Disconnect the cutter return spring (figure 2-5) and manually move the cutter shaft lever counter-clockwise. This action will cause the blade to move forward, cutting the paper. With the blade in the forward position the paper is accessible through the access holes in the paper guide mounted on the rear of the moving blade. 2) Using appropriate tools (long-nose pliers, forceps, etc.) remove all paper from the blade assembly and paper guides. 3) Replace the return spring removed above. Ensure that any paper scraps torn from the received copy are removed as these may cause additional paper jams. With the cover open, advance a strip of paper through the Recorder.

- a. Pull cover-activated power interlock switch (figure 2-5) to up (on) position. Ensure that POWER ON switch is in ON position.
- b. Depress MANUAL RAPID ADVANCE switch.
- c. Observe paper transport mechanism for any signs of jamming or binding.
- d. If paper jams, remove obstruction and repeat this procedure beginning at step b.
- e. Close light-tight cover.
- f. Run two test strips, by depressing the RAPID ADVANCE switch, to check operation and clear Receiver of any exposed paper.

3-6. Lamp Replacement Procedure.

Spare indicator lamps are given in table 3-4. To replace a lamp, grip lens cover on both sides and pull forward and down to expose lamps. Push lamp from front of holder through rear. Replace lamp and lens by reversing procedure. Ensure that lens "snaps" into place.

3-7. Fuse Locations.

Fuses are located on the rear of the transmitter and receiver. There are no fuses on the VCU. Figures 3-1 and 3-2 provide the locations and table 3-5 lists the fuse types.

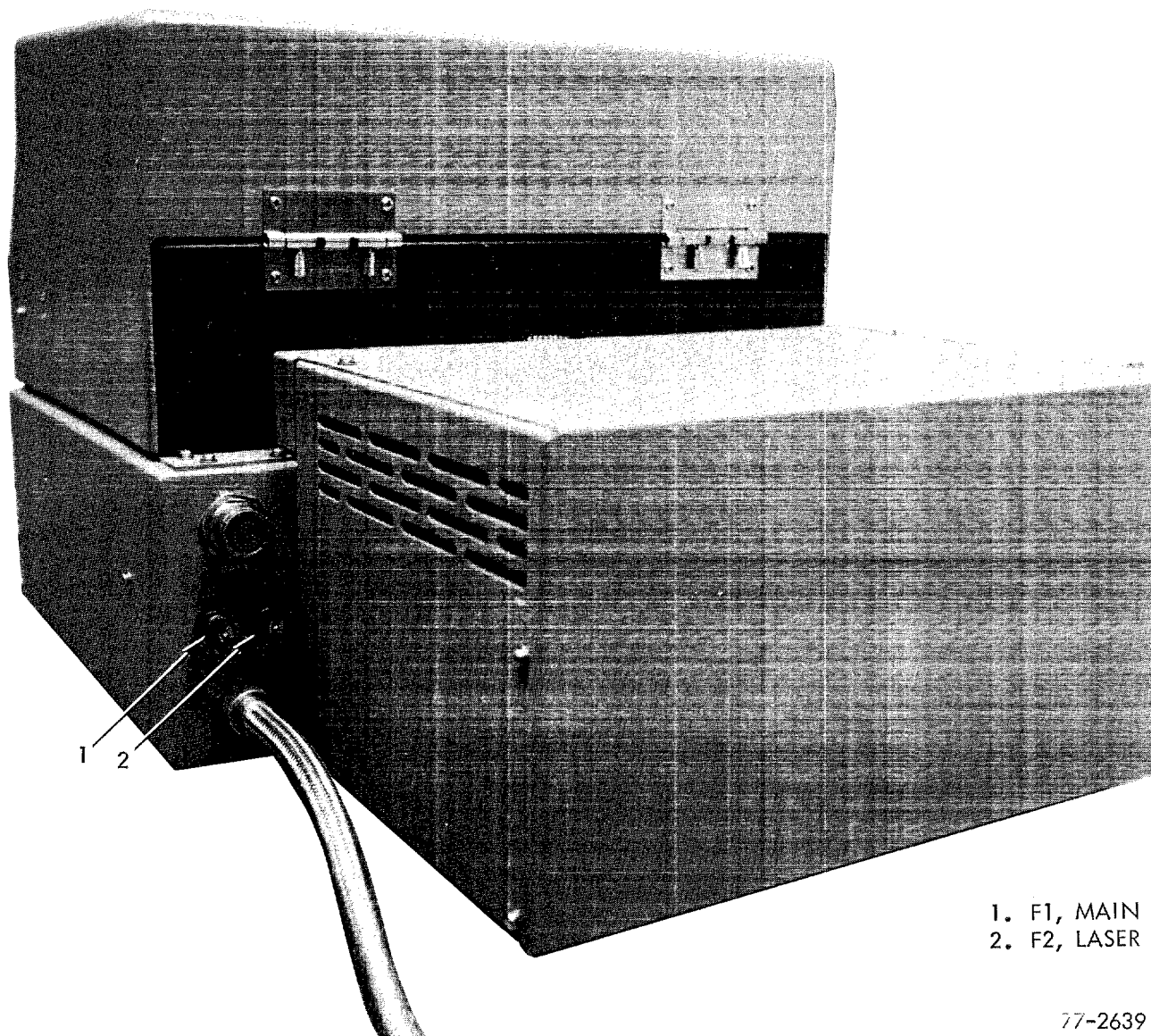


Figure 3-1. Transmitter Fuse Locations.

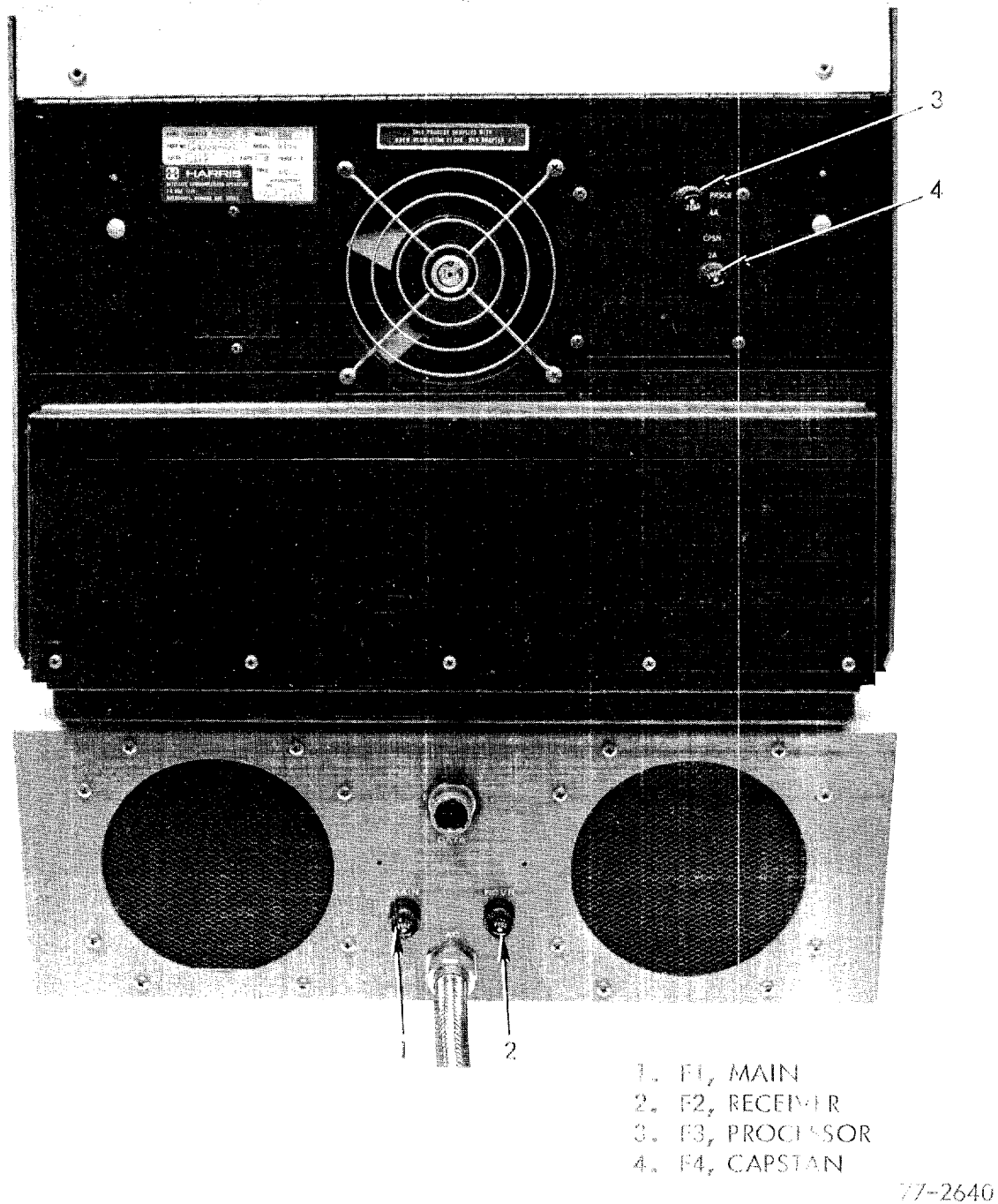


Figure 3-2. Receiver Fuse Locations