

MR6250


**SPERRY UNIVAC
REMOTE KEYSTATION
ADAPTER
TYPE 8598**

**FUNCTIONAL ANALYSIS
AND SERVICING**

AUGUST 1980

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HANDBOOK APPLICATION

SPERRY UNIVAC 1900 CADE,
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HB2367 SPERRY UNIVAC
Remote Keystation Adapter
Type 8598 Servicing

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SECTION 1

INTRODUCTION

1-1. GENERAL

This section describes the SPERRY UNIVAC Remote Keystation System (RKS) and its relationship to the system processor. The RKS consists of two remote keystation adapters (RKAs), associated keystations, modems, and an optional printer (see Figure 1-1).

1-2. REMOTE KEYSTATION SYSTEM

The RKS is connected between a system processor and the keystations at a remote site. The RKS provides a coaxial interface between the system and the local and remote keystations. It is a modular, standalone system operating under processor control.

1-3. SYSTEM OVERVIEW

A total of 32 keystations can be used in any combination of remote and local sites. Each RKS can handle up to four keystations (see Figure 1-1). Eight RKSs can be interfaced to a system processor.

1-4. SYSTEM DESIGN

The RKS is transparent to keystations operation so that no operating software changes are required. The system supports an 18,000 keystroke per hour input rate for each group of four keystations. Response time/performance determines the type of modem selected. The system provides no internal modem capability. Except for the establishment of the data link when using dial-up modems, the system is capable of unattended operation.

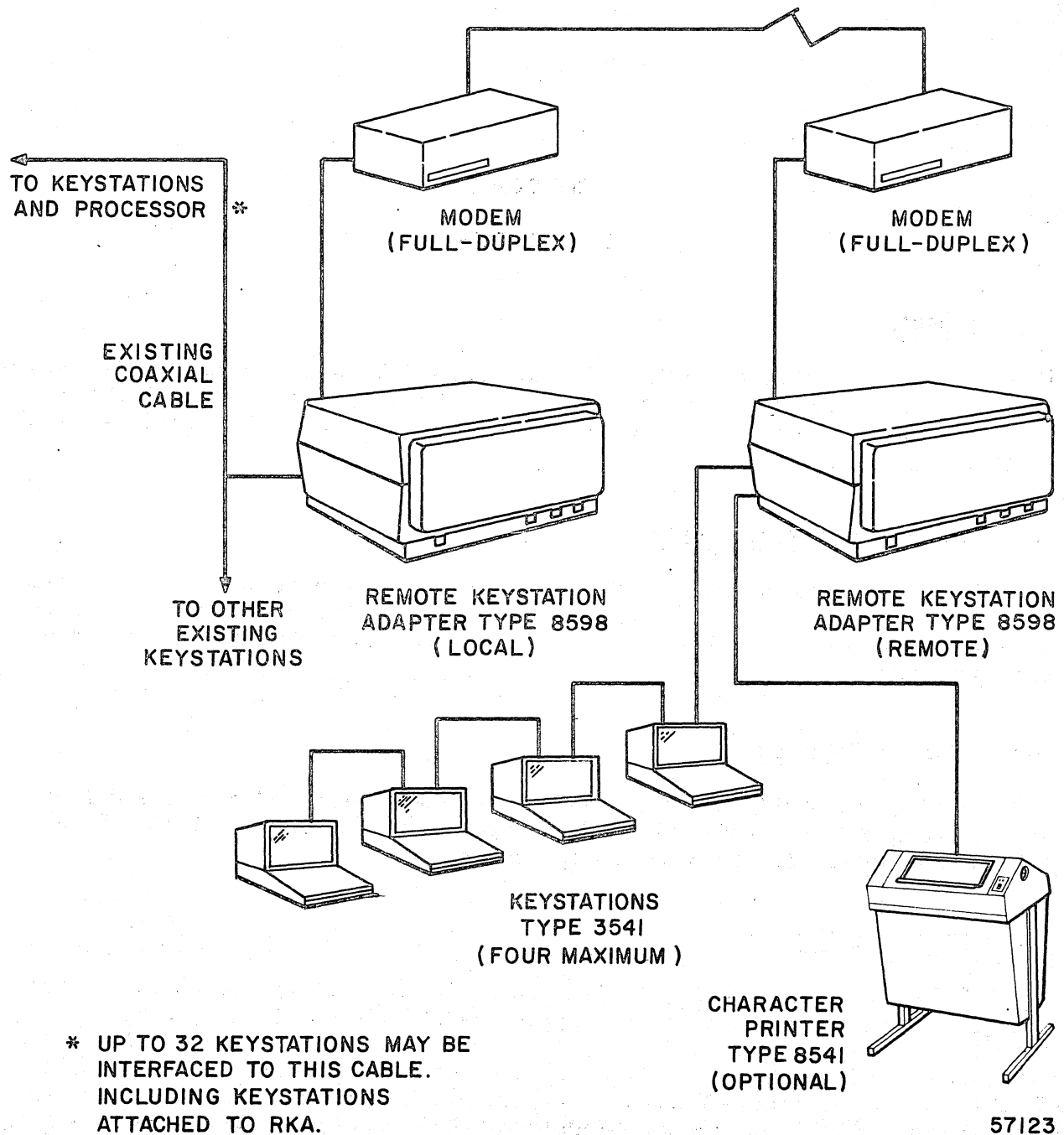


Figure 1-1. Remote Keystation System

1-5. REFERENCE MATERIAL

The following documents provide reference information.

<u>Manual</u>	<u>Description</u>
MR6249	SPERRY UNIVAC Remote Keystation Adapter Type 8598 Installation Procedures
MR6251	SPERRY UNIVAC Remote Keystation Adapter Type 8598 Illustrated Parts Breakdown

SECTION 2

PHYSICAL DESCRIPTION

2-1. INTRODUCTION

This section describes the SPERRY UNIVAC Remote Keystation Adapter Type 8598 (RKA) as shown in Figure 2-1. It also lists power requirements, power interrupts, and a brief analysis of power supply operation.

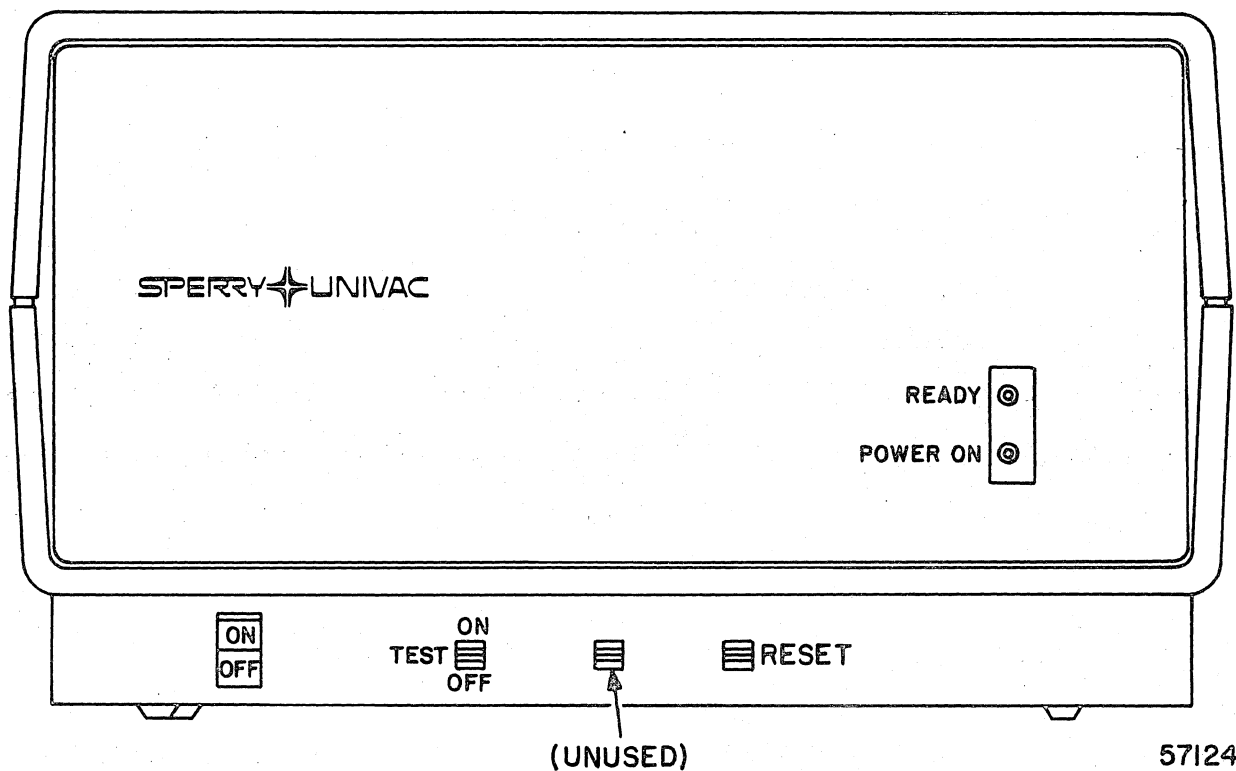


Figure 2-1. Remote Keystation Adapter Type 8598

2-2. REMOTE KEYSTATION ADAPTER

The RKA is a tabletop unit consisting of two printed circuit assemblies (PCAs) and a power supply. The housing consists of a base, cover, and front panel. The RKA is 21 inches wide, 18 inches deep, 12 inches high and weighs approximately 45 pounds. Four inches of clearance is needed at the right, left, and rear to permit adequate cooling. Adequate clearance must be provided to permit access to the front of the RKA for operator and maintenance personnel. The local and remote RKAs are physically identical.

2-3. RKA TYPES AND FEATURE

The RKA is configured into four types and one feature. The type numbers vary according to use (local or remote) and input voltage as follows:

Type		Volts AC
Local	Remote	
8598-00	8598-02	100 to 120v 50 or 60 Hz
8598-01	8598-03	200 to 240v 50 or 60 Hz

An optional printer interface is available to allow attachment of one Type 8541 character printer at the remote site.

2-4. POWER REQUIREMENTS AND VOLTAGE OUTPUTS

Both the local and remote RKAs consume a maximum of 40 watts of power. The output power of the supply is 150 watts maximum. The power supply provides the following output voltages at the indicated current ratings:

<u>Voltage</u>	<u>Current</u>	
+5.2 (+5.19 to +5.21)	5.0 Minimum	20.0 Maximum
+12.0 (+11.4 to +12.6)	0.1 Minimum	2.5 Maximum
-12.0 (-12.6 to -11.4)	0.1 Minimum	1.0 Maximum

2-5. POWER SUPPLY OPERATION

The input power first passes through a radio frequency interference filter and then is either voltage doubled and rectified for 115-volt operation or simply rectified for 230 volt-operation. Switching transistors are alternately activated, with the on-times modulated to provide output voltage regulation. Three transformers drive the bases of the switching transistors and primary current-sensing circuit. Only the 5.2 volt output is sense regulated. Other voltages track well enough to remain within their specified tolerances.

2-6. POWER INTERRUPTS

The power is interrupted to prevent damage to the power supply or the RKA in the event of a power supply malfunction.

2-7. LOW INPUT POWER

If a low input line-voltage condition is sensed, the power supply shuts down until the line voltage recovers. Hysteresis between the shutdown and startup thresholds prevents oscillation.

2-8. INTERNAL SHORT

Either an internal short in the secondary power supply circuits or a short in one or more of the positive dc outputs causes the power supply to be temporarily shut off. Samples taken several times each second monitor the overload condition and operation is resumed when the power supply load is restored to normal.

2-9. CIRCUIT SHUTDOWN CONDITIONS

Three conditions cause the power supply to shut down:

- (1) A short on the negative 12-volt output
- (2) An overvoltage in the 5.2-volt or 12-volt outputs
- (3) An overtemperature condition

To restore power supply operation the power ON/OFF switch must be set to OFF then to ON.

2-10. PRIMARY CIRCUIT COMPONENT FAILURE

A circuit breaker protects the power supply against a primary circuit component failure.

SECTION 3

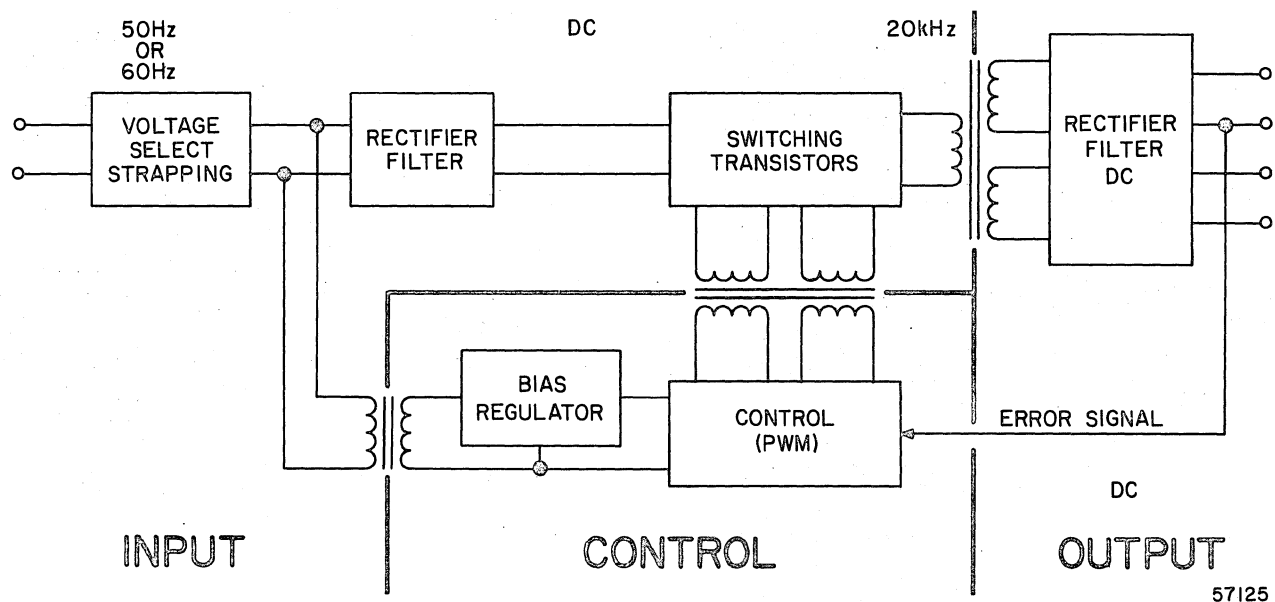
RKA POWER SUPPLY

3-1. INTRODUCTION

This section presents a description and functional analysis of the switching regulator type power supply used on the SPERRY UNIVAC Remote Keystation Adapter Type 8598 (RKA).

3-2. FUNCTIONAL ANALYSIS

The switching regulator power supply circuits are divided into three major groups: input, control, and output. Figure 3-1 shows the block diagram for the power supply.



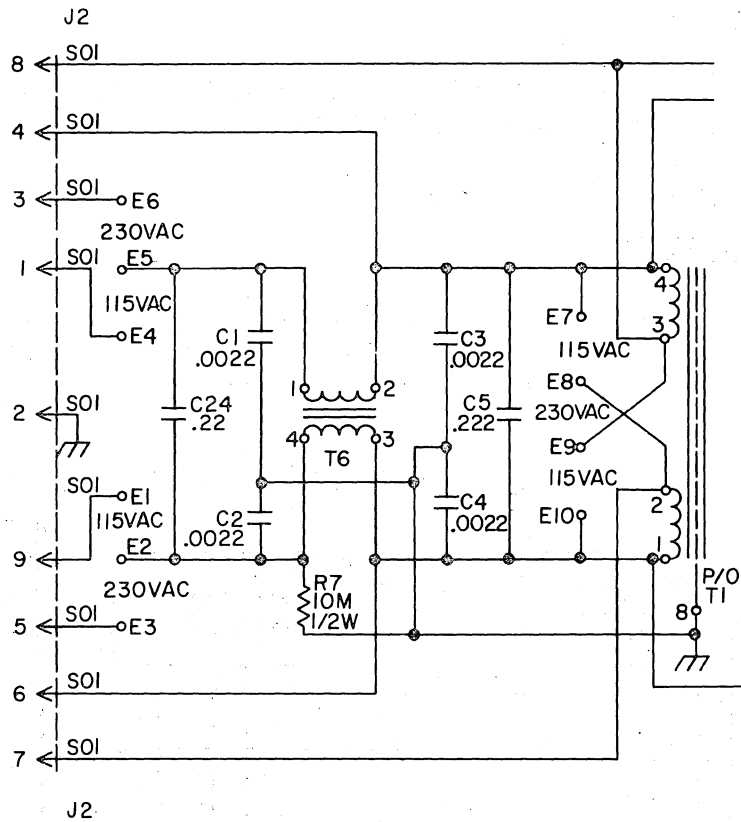
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Figure 3-1. Power Supply Block Diagram

3-3. INPUT

Primary ac power is applied through connector J2 and the voltage selection straps to terminals E2 and E5. Line voltage is applied to the primary of transformer T1 through voltage selection straps connecting E7 to E8 and E9 to E10 for 115-volt operation, or E8 to E9 for 230-volt operation (see Figure 3-2).

The purpose of the primary rectifier circuit is to provide 160 volts dc to operate switching transformers Q1 and Q2. When the primary ac voltage is 115 or 230 volts, 160 volts is provided. This is accomplished by doubling the voltage for 115-volt input or by bridge rectification of a 230-volt power input.



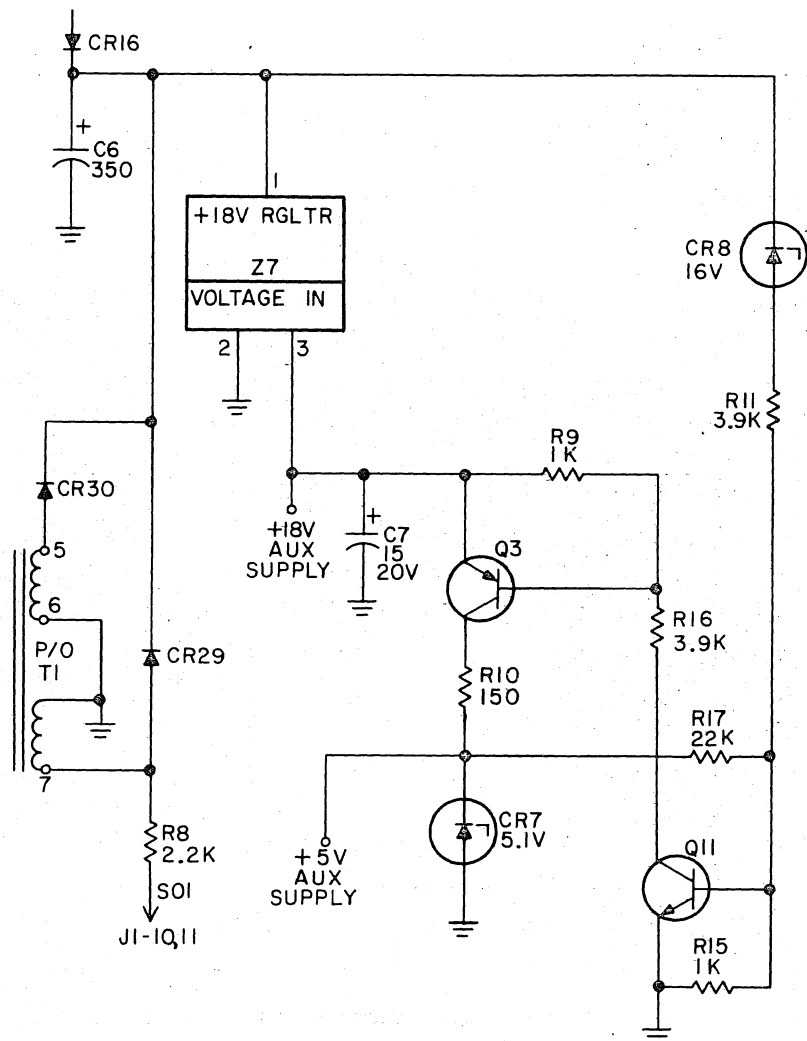
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Figure 3-2. Power Supply Strapping Selections

3-4. CONTROL

The control circuit is divided into three areas: auxiliary/start-up power supply, main control circuits, and protection circuits.

3-5. AUXILIARY/START-UP POWER SUPPLY. The auxiliary/start up power supply is a full-wave, capacitor input supply circuit. The purpose of the start up power supply is to provide an internal control voltage and operational voltage for the power supply. Series regulator Z7 provides a regulated 18-volt dc output from the nominal 24-volts dc input (see Figure 3-3). The 18-volt output is used to supply the operational bias to the control circuits for the various out-put voltages.



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Figure 3-3. Auxiliary/Start-Up Power Supply

3-6. MAIN CONTROL CIRCUITS. The main control circuits provide: 40kHz oscillation, output voltage regulation, and current limiting.

3-7. PROTECTION CIRCUITS. Three protection circuits are provided: the low line voltage sensing circuit, the current sensing circuit, and the overvoltage/overtemperature circuit. The current sensing circuit monitors the output current of the 18-volt circuit. If an overload condition is sensed, the power supply output is reduced to zero until the overcurrent condition is removed. The overvoltage/overtemperature circuit monitors the power supply voltage output and the air temperature in the power supply. If the output voltage or air temperature rises to an unsafe level, the power supply output is reduced to zero. To restore operation in this event, the power ON/OFF switch must be set to OFF then to ON.

3-8. OUTPUT

The 5.2, 12, and 24-volt dc outputs are generated from the center-tapped secondary windings of transformer T2. A full-wave, center tapped rectifier circuit with reverse diodes provides the negative 12-volt output. Choke input filters are used at each voltage output (see Figure 3-4).

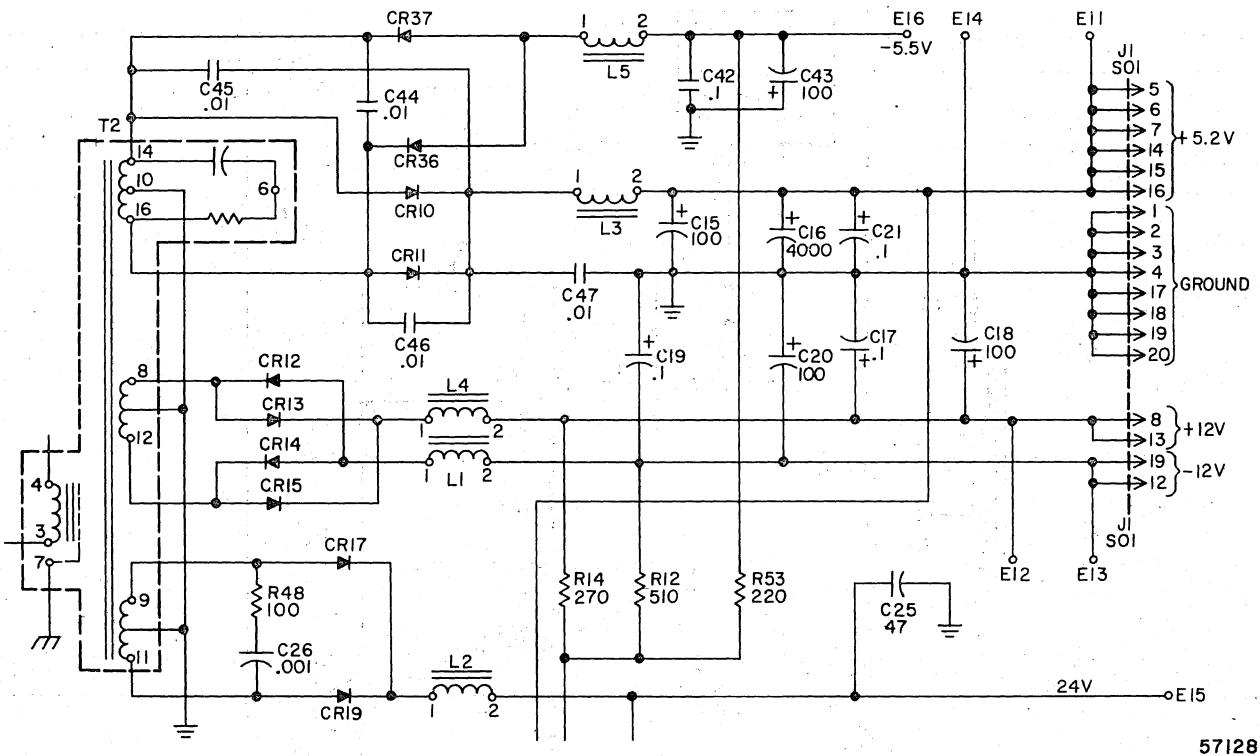


Figure 3-4. Power Supply Output Circuit

SECTION 4

RKA FUNCTIONAL ANALYSIS

4-1. INTRODUCTION

This section describes the interface between the system processor and the keystations used with the SPERRY UNIVAC Remote Keystation Adapter Type 8598 (RKA). It also describes the printed circuit assembly (PCA) logic used in the RKA.

4-2. FUNCTIONAL OVERVIEW

Communications between the system processor and the keystations is by 12-bit serial character propagation at a 1 MHz rate through a coaxial cable. The uniquely addressed selection (poll) or data (display) characters are broadcast to all keystations connected to the cable but only the addressed keystation responds. All activity on the coaxial cable is under control of the system processor.

The remote keystation system consists of a local and a remote adapter which converts the 1 MHz 12-bit coaxial cable characters to a data rate and format compatible with the modems. A remote RKA appears to the remote keystations as if it were a system processor while the local RKA appears to the system processor as if it were a keystation; the two RKAs communicate with each other via synchronous full duplex modems at up to 9600 baud. Each has its own unique microprocessor controlled protocol. See Figure 4-1 for a block diagram of the RKA.

4-3. RKA LOGIC

Each RKA contains a processor PCA (part number 2823884) and a coaxial interface PCA (part number 2872304).

4-4. PROCESSOR PCA. The processor PCA performs various control, sequencing, timing and communications protocol functions of the RKA.

An 8-bit interrupt controlled Z80 microprocessor along with random-access memory (RAM), read-only memory (ROM), and associated control circuitry performs the required input, output, and test functions. A keystation display screen image is maintained in RAM while the various microcode programs which control the Z80 microprocessor are stored in ROM. The microcode determines whether the unit functions in the local or remote mode.

The RS-232 communications interfaces are also contained on the processor PCA, one for the modem and one for an optional screen printer.

4-5. COAXIAL INTERFACE PCA. The coaxial interface PCA contains the coaxial cable interface, control and logic circuitry to convert the 1 MHz 12-bit keystation data characters to a format suitable for transmission through the modems and converts the modem data to the format required for transmission on the coaxial cable.

Switch selectable addressing is provided so that when operated in the local mode the local RKA appears to the system processor as a keystation (the remote keystation is transparent to addresses).

The coaxial interface PCAs are identical on both the local and remote RKAs, the processor PCA firmware (PROMs) determines whether it functions in the local or remote mode.

A miniprocessor, based on the Fairchild 9405A arithmetic logic register stack, is used to read and write 4-bit characters to various registers and to perform logical and arithmetic operations. The 9405A also contains eight 4-bit registers for temporary data storage. A detailed description of the 9405A is presented in the Fairchild Macrologic Catalog.

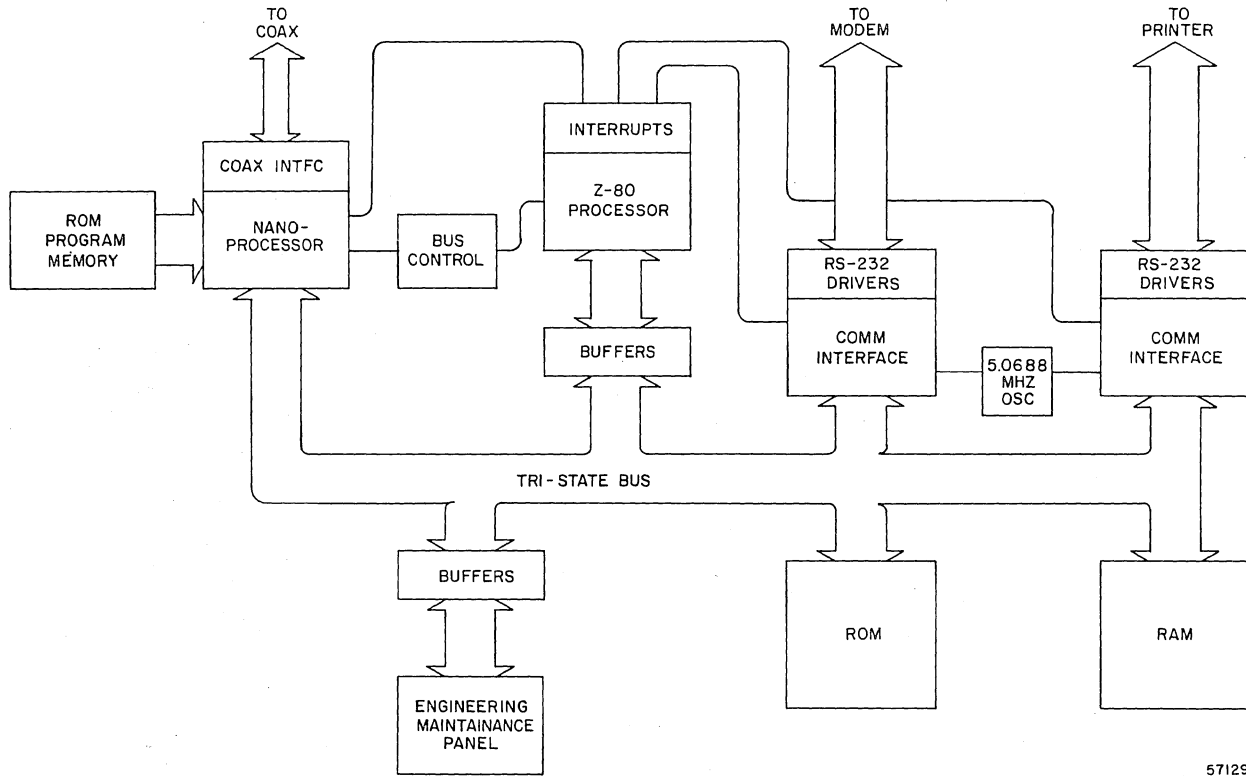
4-6. DATA TRANSFERRING OPERATIONS

A tri-state bus links the processor and coaxial interface PCAs. Data to and from the modems is interfaced by the processor PCA while coaxial data is handled by the coaxial interface PCA.

The coaxial interface miniprocessor assembles the received coaxial character, and then, through the bus control logic, signals the processor PCA microprocessor that data is present on the tri-state bus for transmission via the modem.

The processor PCA, in turn, signals the coaxial interface PCA when data is ready for transmission via the coaxial cable.

Receive/transmit data conflicts are avoided as the coaxial data is handled in an inquire-respond mode, the modems operate full duplex, priority is given to handling keystation keystroke data, and adequate buffering is provided to avoid data overruns.



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Figure 4-1. RKA Block Diagram

SECTION 5
CONTROLS AND INDICATORS

5-1. INTRODUCTION

This section describes the controls and indicators on the SPERRY UNIVAC Remote Keystation Adapter Type 8598 (RKA).

5-2: CONTROLS AND INDICATORS

Three switches and two indicators are situated on the front of the RKA unit (see Figure 2-1). Table 5-1 describes these switches and indicators.

Table 5-1. Control and Indicator Descriptions

Indicator/Switch#	Description
READY indicator	Indicates successful completion of self-test.
POWER ON indicator	Indicates when power is applied to RKA.
Power ON/OFF switch	Controls ac power to the RKA.
RESET switch	Initializes RKA when reset (master cleared).
TEST ON/OFF switch	Initiates internal self-test mode.

*Names for switches as used in this table indicate the actual use of switch.



SECTION 6

MISCELLANEOUS MAINTENANCE MATERIAL

6-1. GENERAL

This section describes the loopback test used as a troubleshooting procedure with the SPERRY UNIVAC Remote Keystation Adapter Type 8598 (RKA).

6-2. LOOPBACK TEST

The loopback test is not part of the POC test but is performed as a troubleshooting procedure. In the loopback test, only the RKA, modem and cables are tested. Nothing appears on the display screen. The procedure is as follows (Figure 2-1):

- (1) Place OPERATE/TEST switch in TEST position (modem).
- (2) Press TEST ON/OFF switch to ON to re-initialize system (RKA).
- (3) Press RESET switch (RKA).

If the loopback test is successful, the READY light lights on the RKA.

NOTE

The loopback test may also be performed on a local RKA. Only the type 208 and 209 modems have a loopback option.

Table 6-1 lists light indications and screen displays used in fault isolation procedures. The table is organized to indicate failures in either the remote or the local RKA.

Table 6-1. RKA Fault Definition

Indicators		Failure
Remote RKA	Local RKA	
READY light off and no display	READY light off and loopback test successful	Failure occurred in RKA, keystation or coaxial cable from keystation to RKA. If there are multiple keystations and none receives a message, the failure is in the remote coaxial board or coaxial cable.
READY light off Display: BASIC POC SUCCESSFUL	READY light on	Failure occurred during the local transmit operation or remote receive operation. Loopback feature can determine if the problem is in the modem, in the local RKA transmit chip, in the remote RKA receive chip, or in the communications line.
READY light on Display: SYSTEM READY	READY light off	Failure occurred during the local receive operation or remote transmit operation: Loopback feature can determine if the problem is in the modem, in the local RKA receive chip, in the remote RKA transmit chip, or in the communications line.
READY light off Display: BASIC POC SUCCESSFUL	READY light off	The failure occurred in the local RKA processor or in the communications line. Running the loopback test will help determine the problem.
READY light on Display: NO CCU ACTIVITY	READY light on	The failure occurred in the CCU.
READY light on and keystrokes not processed	READY light on	The failure occurred in the local coaxial board.

Most modems provide a loopback capability which can be used with the RKA to identify communications-related problems; for those modems without this feature, a specially fabricated cable is required. (See modem documentation for further information on the loopback test.)