# MR6314

# SPERRY UNIVAC REMOTE DEVICE ADAPTER TYPE 8598

# FUNCTIONAL ANALYSIS AND SERVICING

FEBRUARY 1981



SPERRY UNIVAC

HANDBOOK APPLICATION

SPERRY UNIVAC 1900 CADE, 1900/10

HB2367 SPERRY UNIVAC
Remote Keystation/Device Adapter
Type 8598 Servicing

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| 4-1 thru 4-3 | - |
| 5-1 | - |
| 6-1 and 6-2 | - |

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ILLUSTRATIONS



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# SECTION 1

# INTRODUCTION

## 1-1. GENERAL

This section describes the SPERRY UNIVAC Remote Device Adapter System (RDS) and its relationship to the system processor. The RDS consists of two remote device adapters (RDAs), associated keystations (or devices), and modems (see Figures 1-1 and 1-2).

## 1-2. REMOTE DEVICE ADAPTER SYSTEM

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

## 1-3. SYSTEM OVERVIEW

A total of 32 devices can be used in any combination of remote and local sites. Each RDS can handle up to four keystations (see Figures 1-1 and 1-2). Up to eight RDAs can be interfaced to a system processor.

## 1-4. SYSTEM DESIGN

The RDS is transparent to device operation where feasible so that no operating software changes are required. The system supports an 18,000 keystroke per hour input rate for the attached 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.

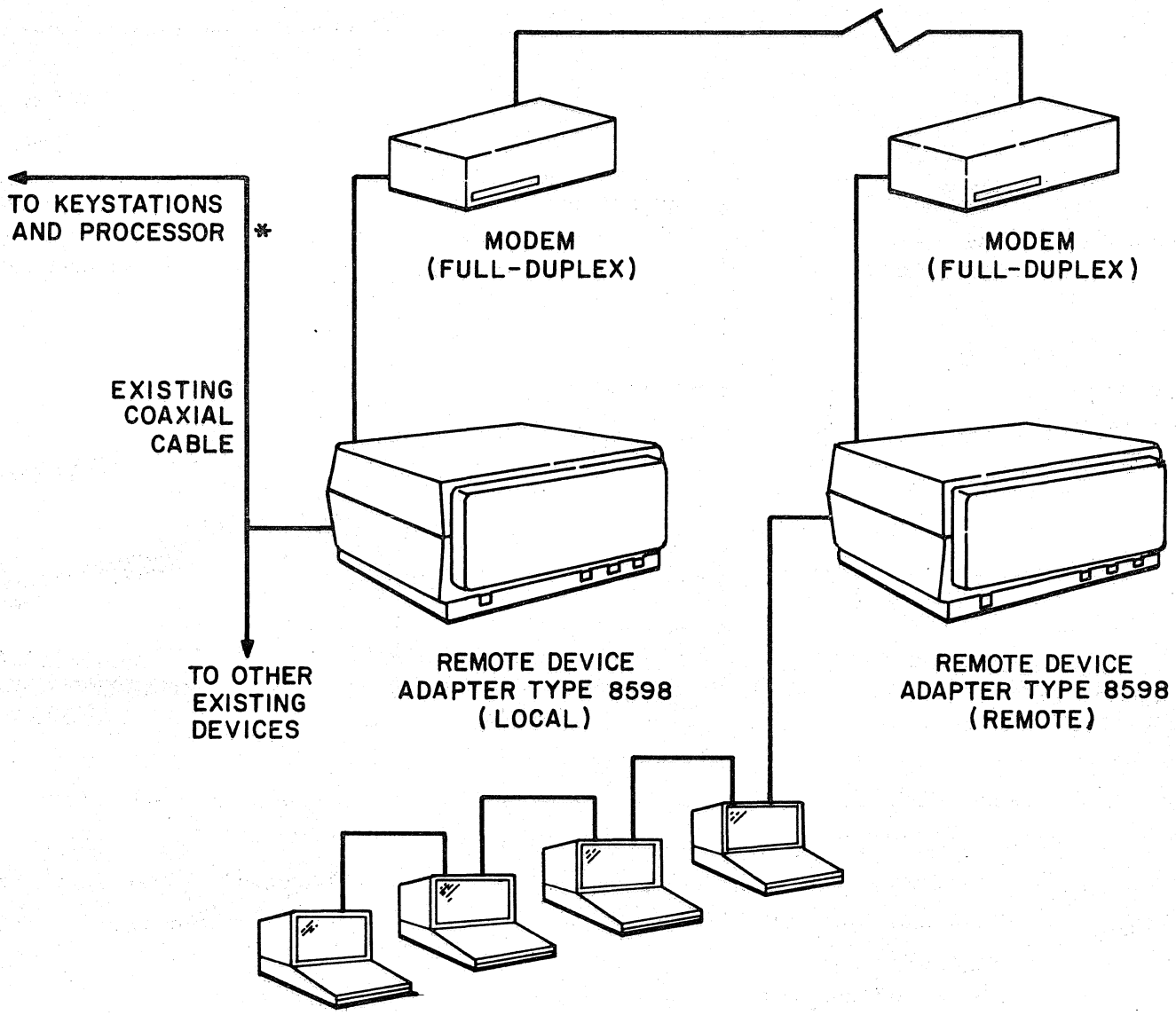


Figure 1-1. Remote Device Adapter System in SPERRY UNIVAC 1900 CADE System

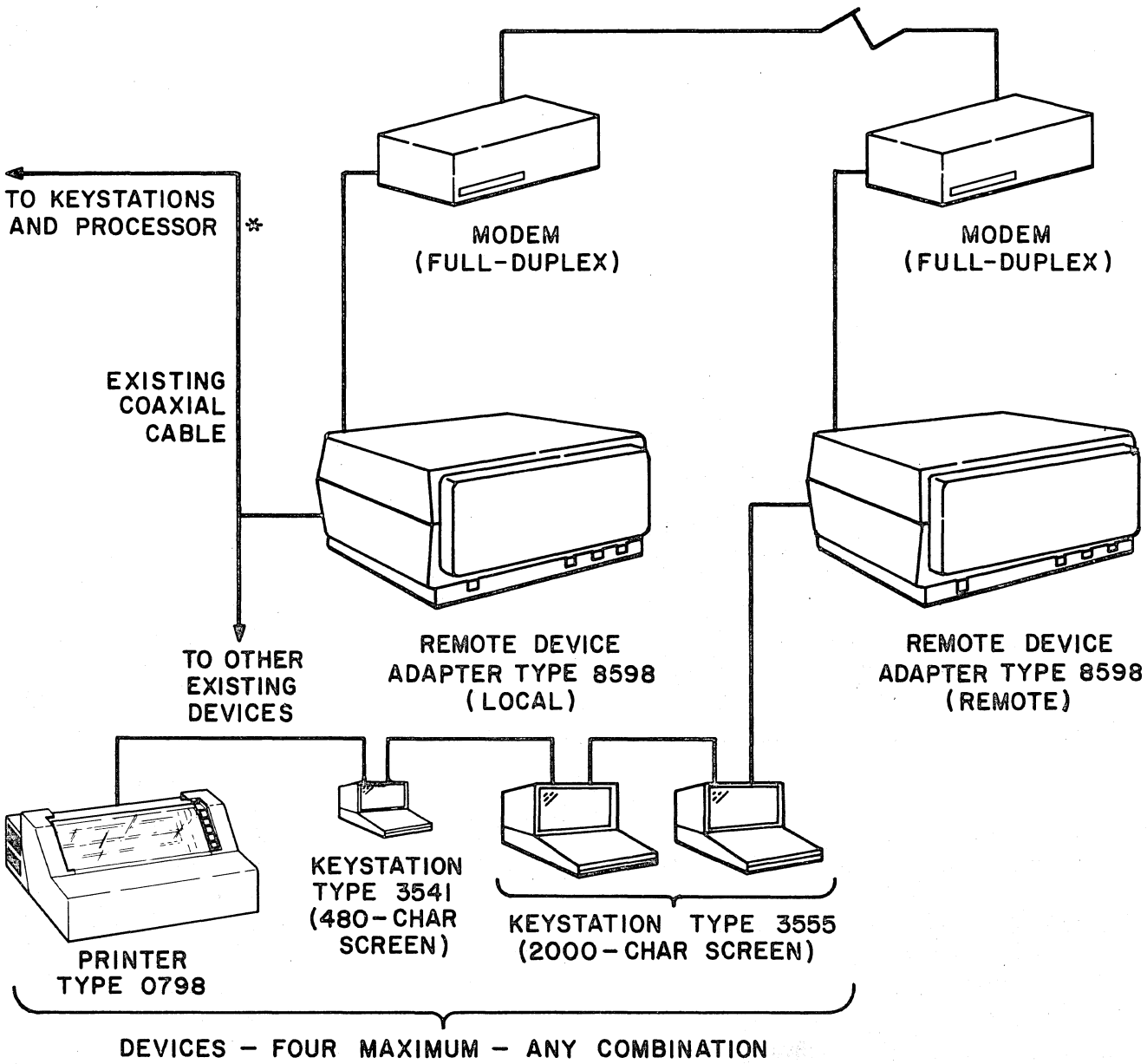


Figure 1-2. Remote Device Adapter System in SPERRY UNIVAC 1900/10 System

## 1-5. REFERENCE MATERIAL

The following documents provide reference information.

| Manual | Description |
|---|---|
| MR6313 | SPERRY UNIVAC Remote Device Adapter Type 8598 Installation Procedures |
| MRXXXX* | SPERRY UNIVAC Remote Device Adapter Type 8598 Illustrated Parts Breakdown |

*Indicates book is not available yet.

SECTION 2

PHYSICAL DESCRIPTION

## 2-1. INTRODUCTION

This section describes the SPERRY UNIVAC Remote Device Adapter Type 8598-04, -05 (RDA) as shown in Figure 2-1. This section also describes the RDA types in detail, list the power requirements, and voltage outputs.

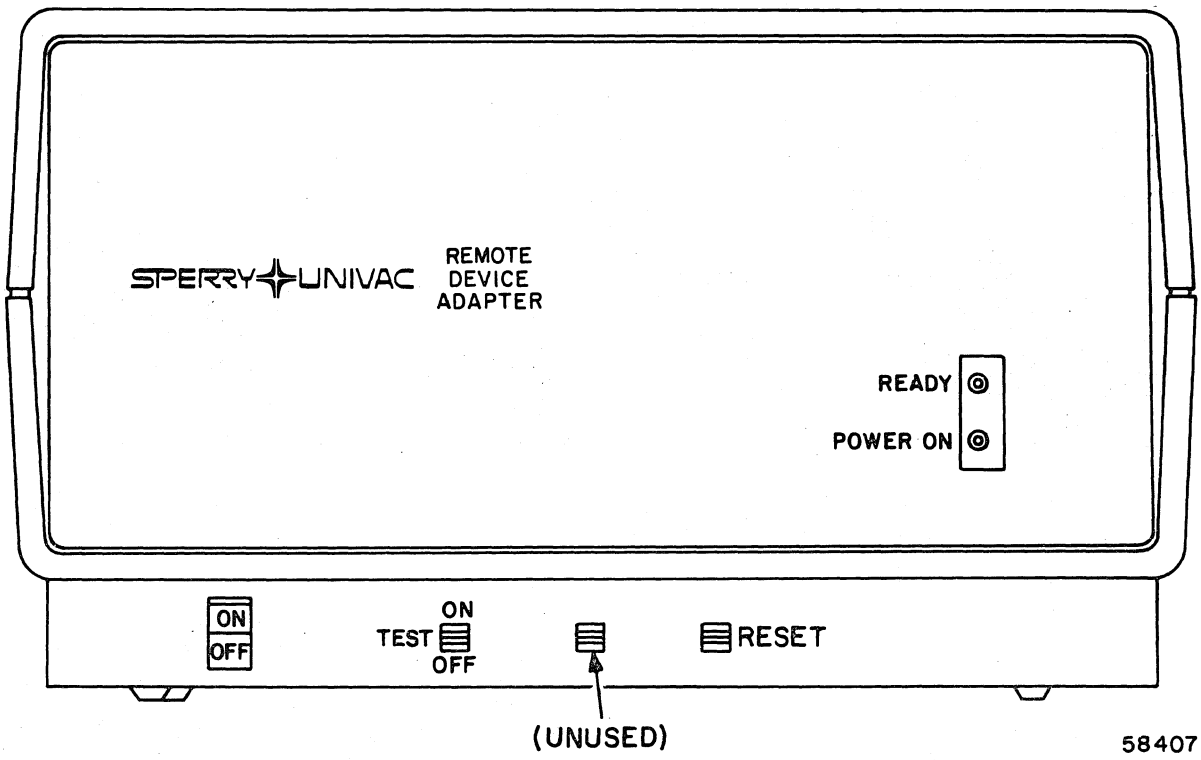


Figure 2-1. Remote Device Adapter Type 8598-04, -05

## 2-2. REMOTE DEVICE ADAPTER

The RDA 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 RDA 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 RDA for operator and maintenance personnel. The local and remote RDAs are physically identical.

## 2-3. RDA TYPES

The RDA is configured into two types. The type numbers vary according to input voltage as follows:

| Type | |
|---|---|
| Local/Remote | Volts AC |
| 8598-04<br>8598-05 | 100 to 120v 50 or 60 Hz<br>200 to 240v 50 or 60 Hz |

## 2-4. POWER REQUIREMENTS AND VOLTAGE OUTPUTS

Both the local and remote RDAs 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:

| Voltage | Current | |
|---|---|---|
| +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 |

# SECTION 3

# POWER DESCRIPTION

## 3-1. INTRODUCTION

This section presents a description and functional analysis of the switching regulator type power supply used on the SPERRY UNIVAC Remote Device Adapter Type 8598-04, -05 (RDA).

## 3-2. 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.

## 3-3. POWER INTERRUPTS

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

## 3-4. 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.

## 3-5. 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.

## 3-6. 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.

## 3-7. PRIMARY CIRCUIT COMPONENT FAILURE

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

## 3-8. 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.

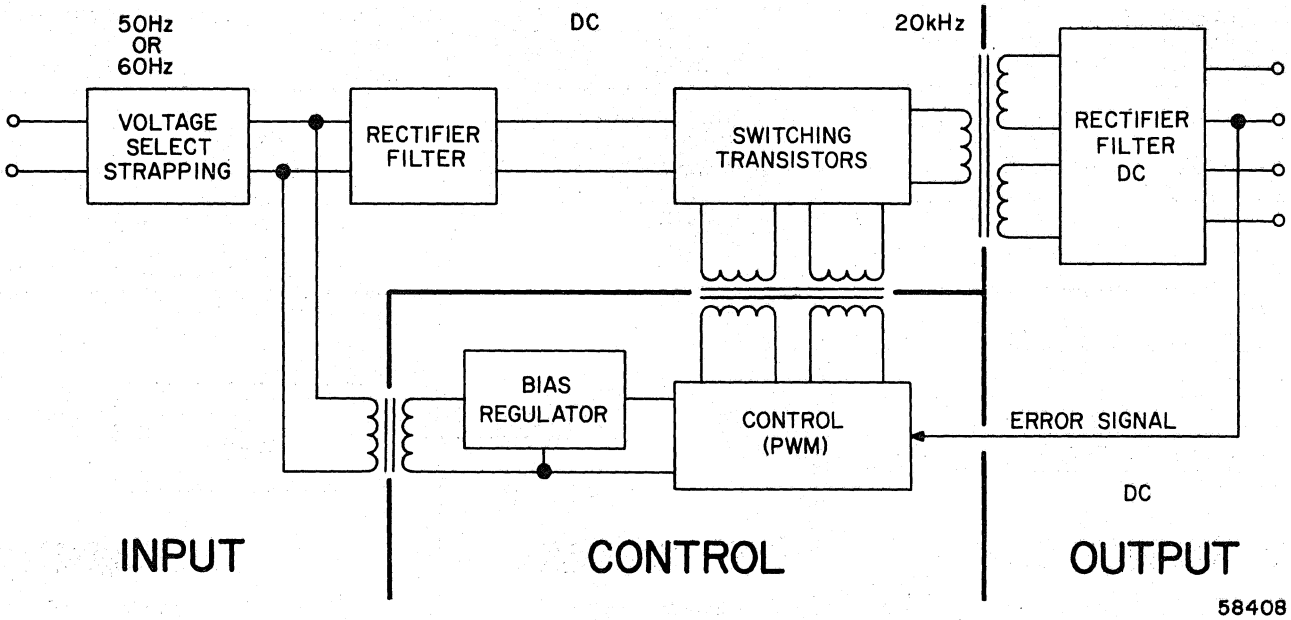


Figure 3-1. Power Supply Block Diagram

## 3-9. 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 whether the primary ac voltage is 115 or 230 volts. This is accomplished by doubling the voltage for 115 volt input or by bridge rectification of a 230-volt power input.

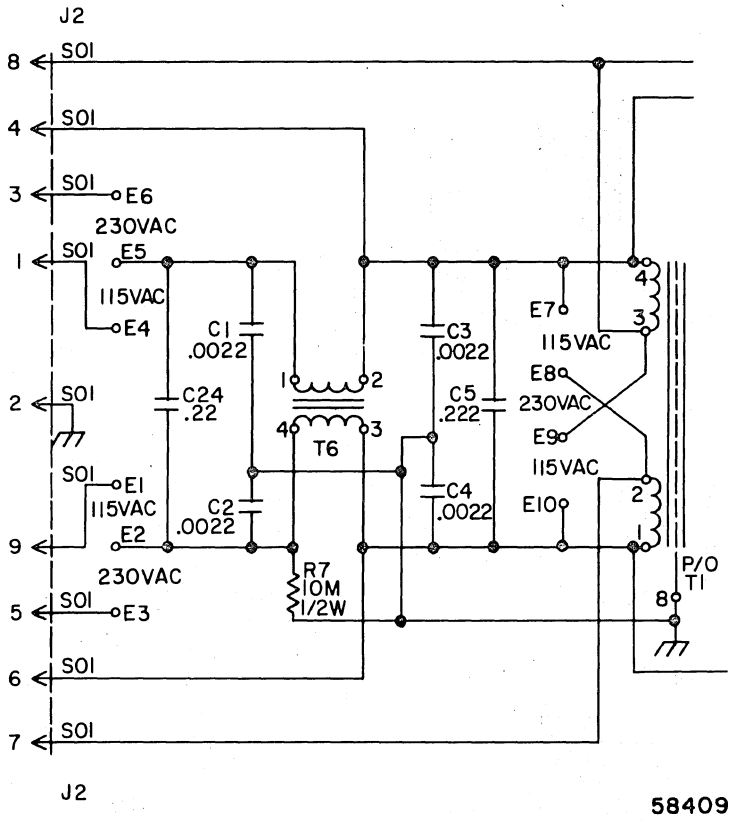


Figure 3-2. Power Supply Strapping Selections

## 3-10. CONTROL

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

3-11. 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 output voltages.

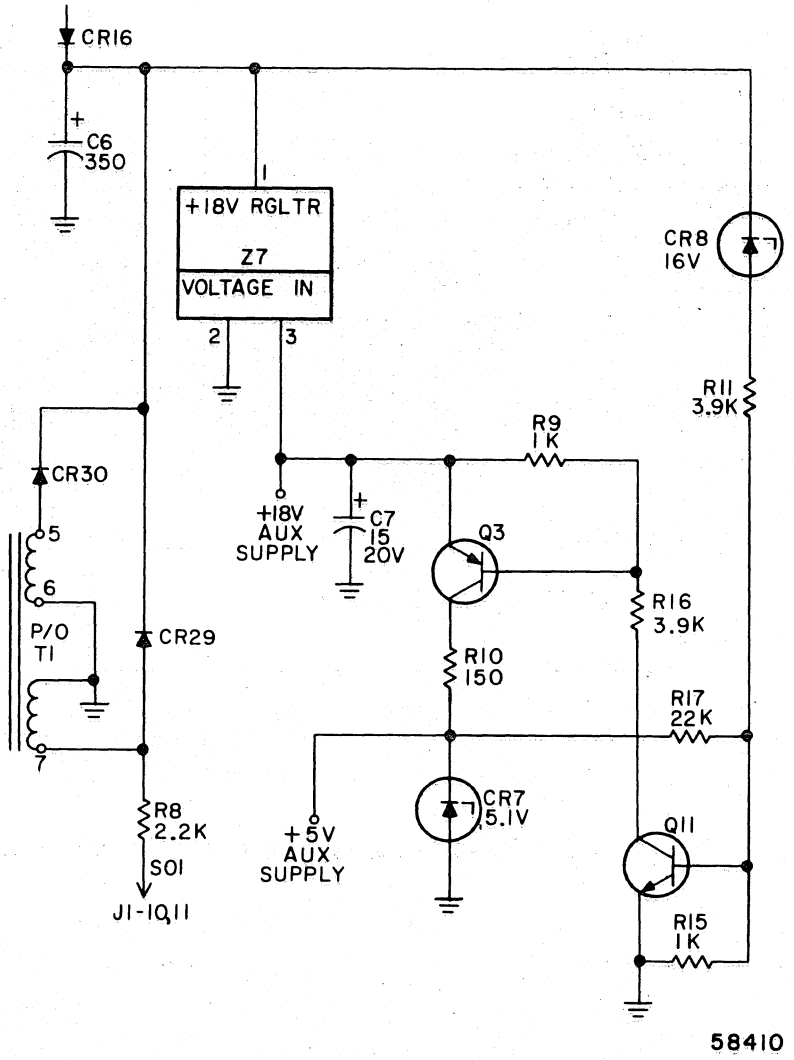


Figure 3-3. Auxiliary/Start-Up Power Supply

3-12. MAIN CONTROL CIRCUITS. The main control circuits provide: 40kHz oscillation, output voltage regulation, and current limiting.

3-13. 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.

3-14. 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).

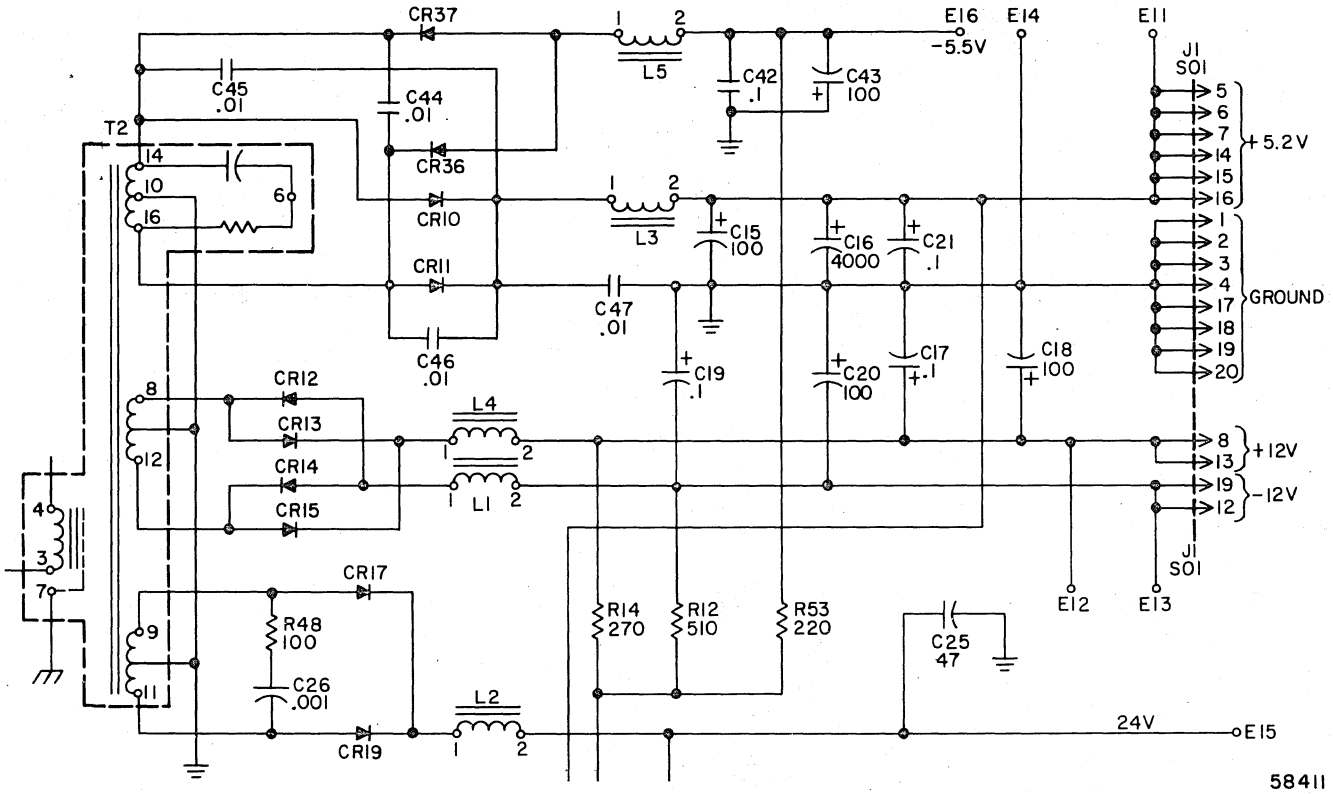


Figure 3-4. Power Supply Output Circuit

SECTION 4

# FUNCTIONAL ANALYSIS

## 4-1. INTRODUCTION

This section describes the interface between the system processor and the keystations used with the SPERRY UNIVAC Remote Device Adapter Type 8598-04, -05 (RDA). It also describes the printed circuit assembly (PCA) logic used in the RDA.

## 4-2. FUNCTIONAL OVERVIEW

Communications between the system processor and the attached devices 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 devices connected to the cable but only the addressed device responds. All activity on the coaxial cable is under control of the system processor.

The remote device adapter system consists of a local and a remote adapter which converts the 1MHz 12-bit coaxial cable characters to a data rate and format compatible with the modems. A remote RDA appears to the remote devices as if it were a system processor while the local RDA appears to the system processor as if it were an attached device; the two RDAs 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 RDA.

## 4-3. RDA LOGIC

Each RDA contains a processor PCA (part number 2818795) and a coaxial interface PCA (part number 2818796).

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

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 for both types of keystations is maintained in RAM while the various microcode programs which control the Z80 microprocessor are stored in ROM. The device strapping determines whether the unit functions in the local or remote mode.

An RS-232 communications interface is also contained on the processor PCA for the modem.

4-5. COAXIAL INTERFACE PCA. The coaxial interface PCA contains the coaxial cable interface, control and logic circuitry to convert the 1MHz 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 RDA appears to the system processor as a keystation (the remote keystation is transparent to addresses) or station printer.

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

The nanoprocessor, 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 nanoprocessor 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.

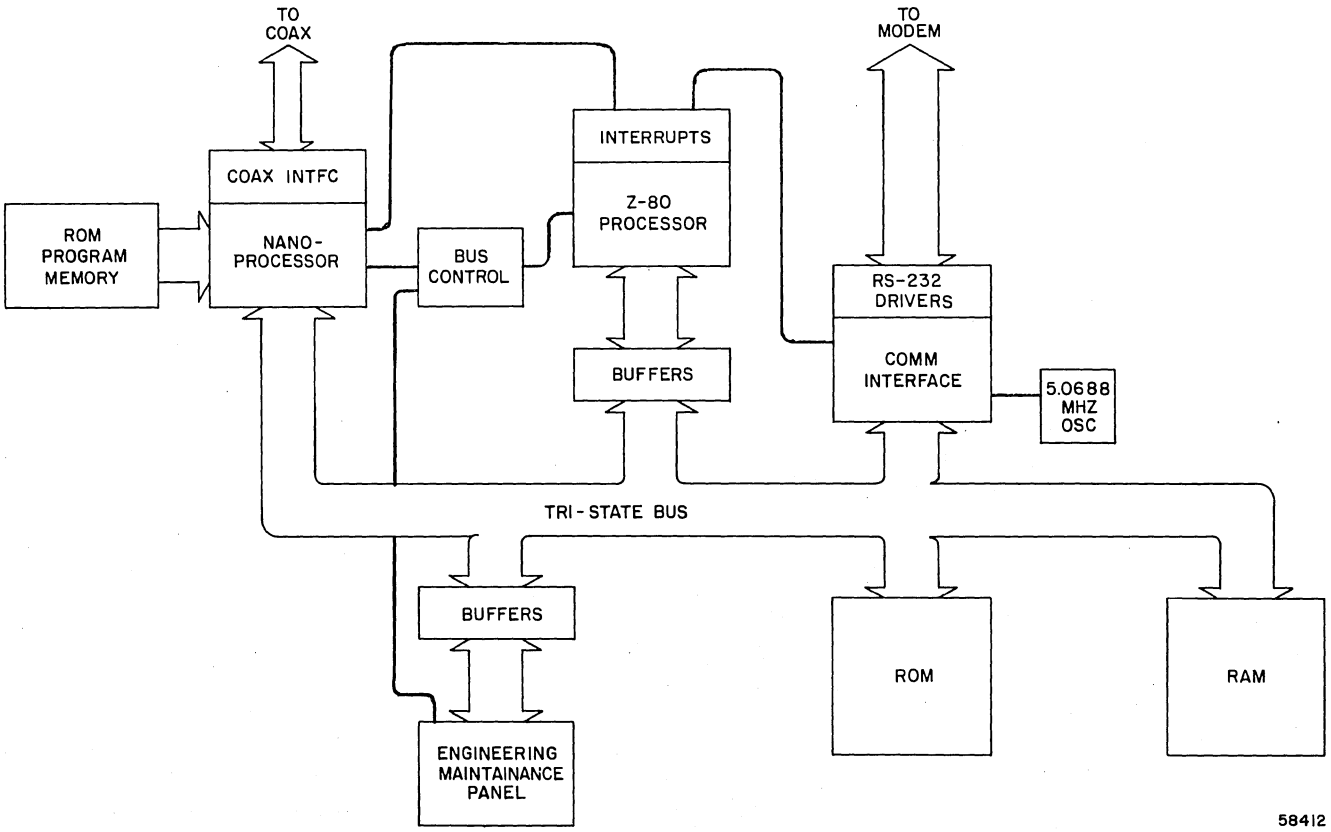


Figure 4-1. RDA Block Diagram

# SECTION 5

# CONTROLS AND INDICATORS

## 5-1. INTRODUCTION

This section describes the controls and indicators on the SPERRY UNIVAC Remote Device Adapter Type 9598-04, -05 (RDA).

## 5-2. CONTROLS AND INDICATORS

Three switches and two indicators are situated on the front of the RDA 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 RDA. |
| Power ON/OFF switch | Controls ac power to the RDA. |
| RESET switch | Initializes RDA 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 Device Adapter Type 8598-04, -05 (RDA).

## 6-2. LOOPBACK TEST

The loopback test is not part of the power-on confidence (POC) test but is performed as a troubleshooting procedure. In the loopback test, only the RDA, 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 (on modem).

(2) Press TEST ON/OFF switch to ON (on RDA).

(3) Press RESET switch to re-initialize system (on RDA).

If the loopback test is successful, the READY indicator lights on the RDA.

NOTE

The loopback test may also be performed on a local RDA.

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 RDA.

Table 6-1. RDA Fault Definition

| Indicators | | Failure |
|---|---|---|
| Remote RDA | Local RDA | |
| READY light off | READY light off | Internal RDA failures. Check internal POC LED indicator lights to determine whether coaxial interface or processor PCA failed POC. |
| READY light on. No display, no audible alarm sounds. | READY light on | Check attached remote devices -- that power to each unit is turned on. |
| READY light on. Loopback test is successful and no display | READY light on and loopback test successful | Communications link problem. |
| READY light on. Loopback test is successful and no display | READY light on and loopback test unsuccessful | Local communications, modem, or processor PCA input/output (I/O) problem. |
| READY light on and loopback test unsuccessful | READY light on and loopback test successful | Remote communications, modem, or processor PCA I/O problem. |
| READY light on. Loopback test is successful. No CCU activity. | READY light on. Loopback test is successful. | Failure occurred in central control unit (CCU). |

Most modems provide a loopback capability which can be used with the RDA 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.)