

דעבאונעם

5710
Computer Unit
Technical Manual

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5710 COMPUTER

MAINTENANCE

TABLE OF CONTENTS

1. GENERAL	1
Features.	1
2. PHYSICAL DESCRIPTION	3
Front Panel	5
Rear Panel	5
Card Cage — S-100 Bus.	8
S-100 Bus Cards	9
Main Power Supply Module.	13
5.25" Winchester Drive.	13
Cartridge Tape Drive.	13
3. FUNCTIONAL DESCRIPTION	14
4. SPECIFICATIONS	20
5. OPERATION AND INSTALLATION	26
Unpacking	26
Ac Line	27
Options	27
Set Up and Turn On.	27
6. MAINTENANCE.	31
Cartridge Tape Drive.	31
Cartridge Tape Media.	31
Cabinet	32
Customer Support Service.	32
Repacking and Returning Material.	32
Fault Location.	34
Power Supply Module Voltages and Adjustment	34
Removing Assemblies	36
7. REFERENCES	42
S-100 Bus	42
Schematics and Replaceable Parts.	42
OEM Equipment	42

TABLES

Table 1.1	5710 Computer, Storage Capacity Per Model	2
Table 1.2	Storage Capacity Per Cartridge Tape	2
Table 2.1	5710 Computer, Front Panel Controls and Indicators.	4
Table 2.2	5710 Computer, Rear Panel Controls and Connectors	6
Table 2.3	5710 Computer, Interior Major Assemblies.	11
Table 4.1	5710 Computer Functional Specifications	21
Table 6.1	Troubleshooting Chart	39
Table 7.1	Dynabyte S-100 Bus Pin Assignments.	43
Table 7.2	5710 Computer Replaceable Parts List.	50

FIGURES

Figure 2.1	5710 Computer, Front Panel.	4
Figure 2.2	5710 Computer, Rear Panel	6
Figure 3.1	5710 Computer Functional Block Diagram.	16
Figure 5.1	Central Processing Unit, Option Switch Settings	29
Figure 5.2	64K Random Access Memory, Option Switch Settings	30
Figure 6.1	Dynabyte Identification Plate	34
Figure 6.2	Power Supply Module Voltage Test Points, BS1.	35
Figure 7.1	5710 Computer Chassis Wiring Diagram.	49

1. GENERAL

1.01 This manual provides a physical and functional description and the operating theory necessary for effective installation and field service of the 5710 Computer.

Features

1.02 The 5710 Computer, illustrated on the title page, is a stand-alone system that can also function as a system component to a larger Dynabyte computer system. It incorporates within one desk-top unit the following features:

- Z-80 microprocessor operating at 4 MHz
- Two serial, software-programmable 110 to 76,800 baud ports. Each of the ports' data lines may be configured to an RS-232C level or 20 mA current loop data communication line interface.
- One parallel port with full handshaking logic
- Built-in 5.25" Winchester Drive
- Winchester Controller
- Built-in Cartridge Tape Drive
- Cartridge Tape Controller
- Ten interval timers
- Eight prioritized vectored interrupts
- A real-time clock
- 64K of Random Access Memory. Optional memory to 400K bytes can also be provided with additional memory cards.
- The main power supply module features preregulation to minimize operational problems from brown outs and line voltage surges.
- A built-in Voltage Conversion Switch allows setting voltages to 115 or 230 V for easy conversion.
- Efficient cooling of the components is assured by a 4-5/8 inch axial fan drawing air through the chassis and exhausting it through the rear panel.
- The backplane is shielded and fully socketed for 12 S-100 card positions.
- Heavy duty metal construction

- The front panel switches POWER and RESET-HALT are illuminated.
- Two line fuses are provided for AC line protection. One protects 230 V lines and the other protects 115 V lines.
- Each internal subassembly is modular and is unit-replaceable for ease in servicing.
- Each 5710 carries a 90-day end user warranty.

Table 1.1 5710 Computer, Storage Capacity Per Model

5.25" Winchester Hard Disk Drive

	5710-A1	5710-B1
Surfaces	4	6
Unformatted Capacity	10.67MB	16MB
Formatted Capacity	8.9MB	13.4MB

Removable Cartridge Tapes provide unlimited additional storage capacity in the following units. See Section 7.03 for a summary of the Cartridge Tape models certified for use with the 5710 computer.

Table 1.2 Storage Capacity Per Cartridge Tape

Removable Cartridge Tape

	300-Foot	450-Foot
Tracks	4	4
Unformatted Capacity	11.5MB	17.2MB
Formatted Capacity	8.9MB	13.4MB

1.03 Dynabyte maintains hardware and software compatibility with Dynabyte S-100 cards used in the Dynabyte S-100 Bus only. S-100 I/O cards, e.g., modems, clocks, and parallel ports from other manufacturers will be compatible with the Dynabyte S-100 Bus in most cases. Contact Dynabyte for specific applications.

2. PHYSICAL DESCRIPTION

2.01 The 5710 Computer is an integrated piece of electronic equipment incorporating all necessary component assemblies. The principle assemblies are:

- (1) Main Power Supply Module
- (2) Central Processing Unit (CPU)
- (3) 12 Slot S-100 Bus Card Cage and Motherboard
- (4) Random Access Memory (RAM)
- (5) Winchester Controller
- (6) 5.25" Winchester Hard Disk Drive
- (7) Cartridge Tape Drive Power Supply
- (8) Cartridge Tape Controller
- (9) Cartridge Tape Drive
- (10) Data Separator Card

Some of the optional assemblies are:

- (11) Up to two Octaports (an eight-port serial I/O)
- (12) Additional Random Access Memory (RAM) to a maximum of 400K in increments of 64K

Details on these individual assemblies, as well as their schematic diagrams and replaceable parts lists, are furnished under separate cover as individual technical manuals. These assemblies have been enclosed in a compact package measuring 52 cm x 47 cm x 18 cm (20.5 in. x 18.5 in. x 7 in.) weighing 29.5 kg (about 65 lbs.).

2.02 The 5710 draws nominally 400 VA of 115 VAC, 60 Hz or 230 VAC, 50 Hz, depending on the position of the Voltage Conversion Switch.

2.03 The 5710 is designed to operate efficiently in an environment with an ambient temperature range from 10 to 35 degrees Centigrade (50 to 95 degrees Fahrenheit) and with a relative humidity from 20 to 80 percent.

2.04 Figures 2.1 and 2.2 provide number key callouts of all components located on the front and rear of the 5710. Associated Tables 2.1 through 2.3 provide a cross reference for each callout, identifying the respective part as to function, description and/or designation.

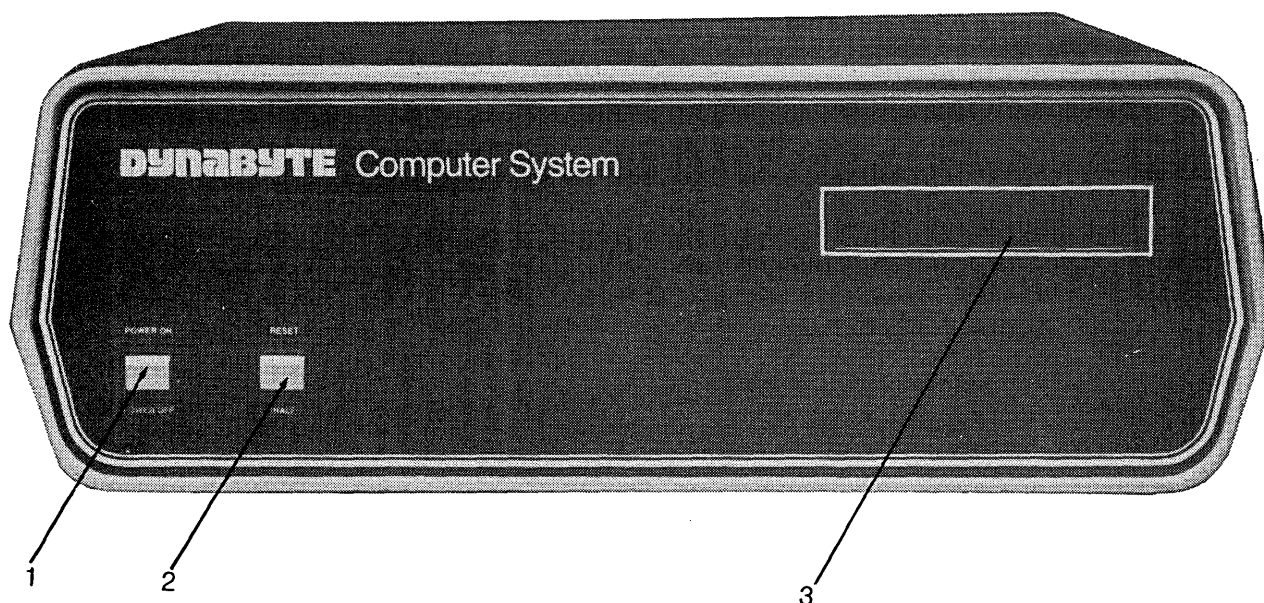


Figure 2.1 5710 Computer, Front Panel 807129

Table 2.1 5710 Computer, Front Panel Controls and Indicators

Key	Element	Function
1	POWER ON/OFF Switch and Indicator	Applies the AC line to the 5710 Computer and the AC power receptacle on the rear panel. Refer to Figure 2.2, Key 3. The indicator lights when +8 Vdc is available from the power supply.
2	RESET Switch and HALT Indicator	Momentarily grounds the S-100 Reset line generating a Power On Clear (POC) sequence: (1) CPU Program Counter is reset, (2) Tape Controller is reset. When the indicator is lit, the CPU has stopped at a Z-80 HLT (76H) instruction in the program.
3	Cartridge Tape Drive Slot	Provides for reading and writing onto inserted .25" magnetic Cartridge Tape units for permanent storage of programs and data files.

Front Panel

2.05 Refer to Figure 2.1 for the description which follows. The 5710 Computer Front Panel has only two operating controls with which the user should be concerned.

(1) The POWER ON/OFF Switch turns the computer on and off, and connects the AC line power to a convenience receptacle on the rear panel. The switch also contains an indicator which lights when there is an output from the internal +8 VDC main power supply.

(2) The RESET Switch is used to restart the computer if it should become locked up due to a software or hardware malfunction. Operating the RESET Switch causes the S-100 Reset Line, Pin 75, to be active low. The Reset Line is an input to the Power On Clear (POC) circuits and resets the CPU Program Counter, Cartridge Tape Controller, etc. Then the CPU initiates a reboot by jumping to a starting address appropriate for the user's system. The switch also contains an indicator, which, when lit, indicates the CPU has read a Halt (HLT) instruction and has stopped.

The right half of the front panel contains the slot for insertion of Cartridge Tapes into the Cartridge Tape Drive. Cartridge Tapes cannot physically be inserted incorrectly into the slot.

Rear Panel

2.06 Figure 2.2 illustrates the Rear Panel of the 5710 Computer. Table 2.2 tabulates and describes each of the rear panel elements. AC line and computer Input Output (I/O) connections are through the rear panel. At the right, the AC line is connected through an IEC connector. This permits the 5710 to be connected domestically to 115 VAC, 60 Hz with a National Electrical Manufacturers Association (NEMA) cord set, or internationally with a cord set appropriate for that country. A line fuse provides protection for the 5710 and equipment powered from the AC convenience receptacle above.

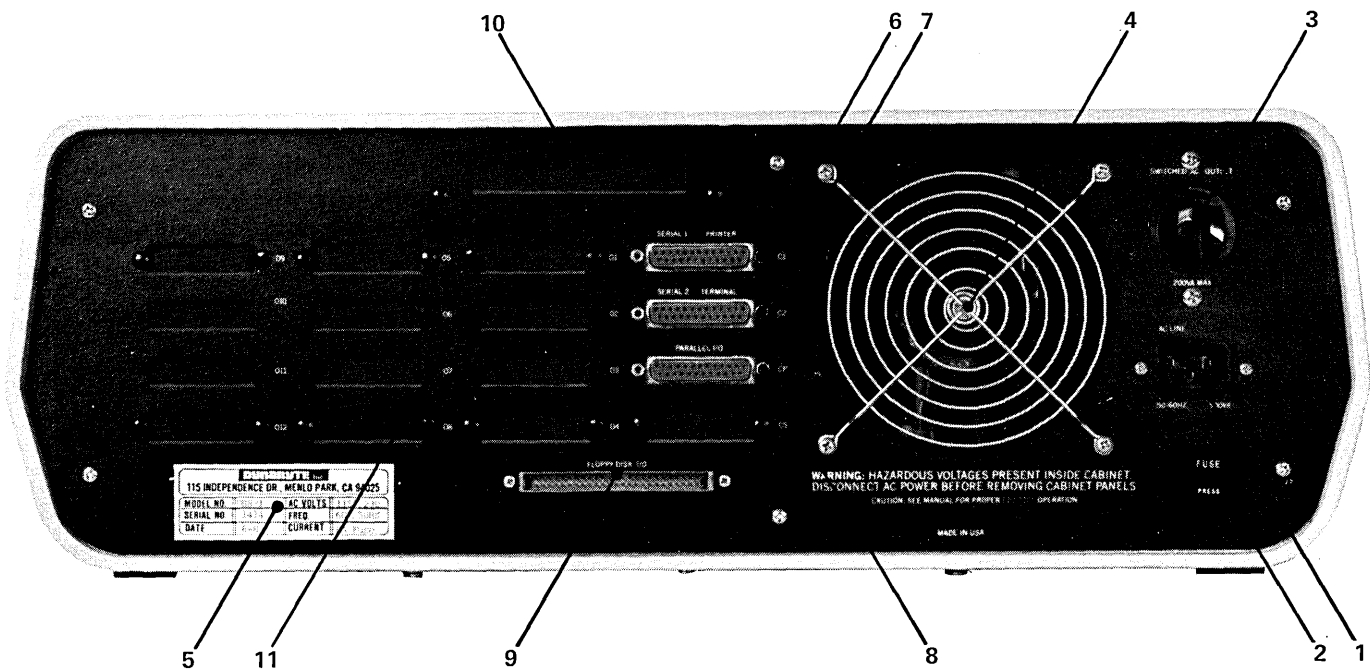


Figure 2.2 5710 Computer, Rear Panel - 802470

Table 2.2 5710 Computer
Rear Panel Controls and Connectors

Key	Element	Function
1	AC Line Receptacle (J6)	IEC standard three-wire male receptacle. Provides for AC line, neutral and a third wire bonded to the chassis frame. Mates with Belden P-2392 AC cord set for U.S. domestic use or the appropriate cord set for the export country.
2	Ac Line Fuse (F1)	Provides AC line overcurrent protection: (1) 115 VAC — 6 A. (2) 230 VAC — 3 A.
3	Switched AC Outlet Receptacle (J7)	NEMA three-wire female receptacle provides for the AC line, neutral and third wire bonded to the chassis frame. This receptacle is switched by the POWER ON Switch on the front panel - refer to Figure 2.1, Key 1 - and is protected

		by fuse, Key 2, above. Power consumption from the AC receptacle is limited to 200 VA.
4	Axial Fan	Provides for drawing heat from the power supply module and internal heat dissipating printed circuit assemblies.
5	Dynabyte Identification Plate	Furnishes the model and serial number necessary for warranty service. Refer to Figure 6.1.
6	Serial 1 Printer Port Receptacle	DB-25-S connector. EIA RS-232C interface. Connection point for the EIA cable to the Serial Printer.
7	Serial 2 Terminal Port Receptacle	DB-25-S connector. EIA RS-232C interface. Connection point for the EIA cable to the Video Terminal.
8	Parallel I/O Port Receptacle	DB-25-S connector. Eight-bit parallel I/O connection point to 25-conductor cable which interfaces to a parallel printer or other parallel-driven device.
9	Floppy Disk I/O Receptacle	50-conductor ribbon connector. Provides a connection point for the cable to additional Disk Storage.
10	Hard Disk or Floppy I/O Hole and Clamp	Furnishes a hole and clamp for the cable to the optional Dynabyte 5010, 5011, or 5015 unit.
11	I/O Port Connector Area	Provides positions for DB-25-S connectors. Figure 2.2 illustrates connectors for: (1) Three ports from the CPU (2) Up to 16 ports from up to two Octaport cards.

CAUTION

Power consumption from the AC convenience receptacle is limited to 200 VA.

2.07 A four-inch fan draws heat dissipated internally out of the rear panel. Air is drawn into the 5710 cabinet through louvers in the bottom of the cabinet.

IMPORTANT

Install the 5710 Computer so as not to obstruct the air flow through the louvers in the bottom of the cabinet and allow a three-inch clearance from the rear of the fan.

Desk-type system cabinets supplied from Dynabyte are designed to assure constant air flow through the computer.

2.08 Several mass storage devices can be used with the 5710. The rear panel furnishes connector access for these devices.

A rectangular hole provides access for a multi-wire ribbon cable for disk I/O signals, control and status to a Dynabyte 5010, 5011, or 5015 storage unit.

2.09 Sixteen positions are provided on the rear panel for DB-25-S connectors and are used for I/O signals to the system peripheral devices such as:

- (1) Serial Printers
- (2) Video Terminals
- (3) Parallel I/O Printer
- (4) Acoustic Coupler or Modems

Each installation will vary, depending upon the selection of peripheral devices and the applications programs in use. Three I/O ports are standard, furnished as part of the CPU. These are shown connected to the rear panel illustrated in Figure 2.2. In applications requiring additional ports, a Quadraport or an Octaport may be installed into the S-100 Bus and interconnected to the rear panel. Both the front and rear panels are secured to their respective bezel by 6-32 Kep nuts. Each bezel is secured to the base plate by 6-32 screws. In the field, both panel and bezel may be easily removed for servicing or installation of additional I/O ports.

Card Cage -- S-100 Bus

2.10 The card cage furnishes a rigid support structure for the S-100 Bus cards when they are inserted into the S-100 Bus. The Motherboard PC Assembly contains 12 S-100 Bus receptacles or jacks, J1 through J12. Each jack has 100 separate pins. The actual bus consists of 100 parallel traces on the PC board connecting the same pin on each jack. Each line has a ground trace between it and the adjacent line to minimize coupling between signal lines.

2.11 The S-100 Bus lines are described by function in Part 3 of this manual. Physically they make up five groups:

- (1) Power and common lines. These are connected to the power supply module discussed in 2.19. 6 lines.
- (2) Address lines. 16 lines.
- (3) Data In and Out lines. 16 lines.
- (4) Control Signal lines. 40 lines.
- (5) Dynabyte Reserved lines. 22 lines.

The Motherboard PC Assembly also contains a few discrete components which make up the Halt Detector. The Halt Detector and Reset line are connected to the front panel by a four-conductor receptacle, J13, connected to plug, P13, mounted at the front edge of the Motherboard PC Assembly.

S-100 Bus Cards

2.12 Dynabyte S-100 Bus cards are PC assemblies normally measuring 5 x 10 inches. A 100-pin edge connector mates with the S-100 Bus connector on the motherboard. This connector is offset by 5/8 inch from the card centerline, i.e., an S-100 Bus card cannot be inserted into a jack backwards.

2.13 Dynabyte S-100 Bus cards may have one or more on-board regulators for regulating and distributing the DC power supply voltages from the bus to the logical elements on the card.

NOTE

An S-100 Bus card should never be inserted or removed from the bus when the AC line power is on.
--

2.14 A solder mask is applied to the component and non-component sides of the PC boards when it is manufactured and before it is loaded with components. This mask covers all surfaces except:

- (1) The 100 gold-plated fingers of the edge connectors,
- (2) Each of the plated-through holes.

The solder mask assures there will be no bridges between traces. The soldering operation can then only take place at a hole where normally solder joins a component lead and a pad.

2.15 Dynabyte S-100 Bus cards usually provide sockets for most multi-lead active devices to facilitate fault location and servicing.

2.16 Options for Dynabyte S-100 cards are provided by three methods:

- (1) Dual-In-Line packaged (DIP) switches of one to nine poles, SPST, are normally used in functions which may have to be set to the user's individual installation.

(2) Bare wire straps are soldered into the PC board for options which are installed at the factory. These are not to be changed in the field except by instructions from Dynabyte Customer Support or when specified in the individual Dynabyte S-100 Bus Card Technical Manual.

IMPORTANT

Never change the settings of an Option Switch without referring to the Option Switch Tables in the individual Dynabyte S-100 Bus Card Technical Manual.

(3) Instructions are written into a programmable read-only memory (PROM) at the Dynabyte factory, resulting in a read-only memory (ROM). In some applications a ROM can be "phantomed" into a desired range of addressed RAM. Phantoming means a memory segment can replace another under program control. When the 5710 is set to POWER ON or RESET is operated, the CPU jumps to the starting address of the Tape Controller ROM. The ROM boot instructions are overlaid at the common address location. These instructions direct the CPU to read the first file, called DYNABYTE.TAP, from the Boot Tape. The DYNABYTE.TAP file MUST be the first file on the tape or the ROM will display the message: NOT A BOOT TAPE!

The DYNABYTE.TAP file contains additional instructions which are loaded into RAM and executed. By entering "T" (for TAPE) in response to the first prompt: BOOT FROM?, these instructions cause the CPU to read the Dynabyte Disk Operating System from the Boot Tape. This second operation is called the TAPE BOOT. The ROM is then switched out.

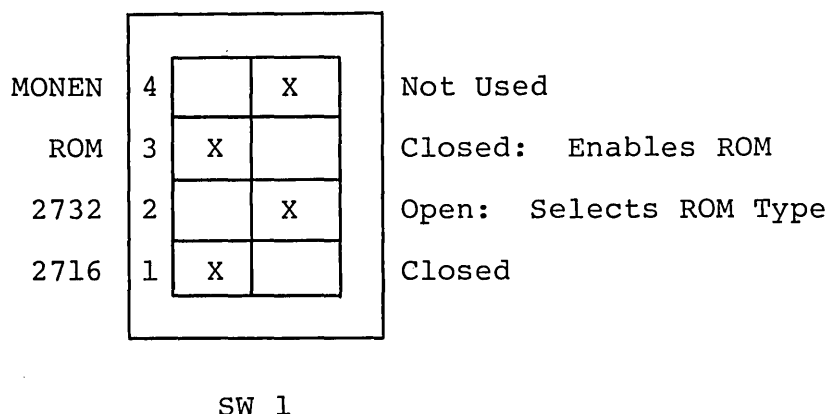
The first boot on a 5710 Computer must be performed from the Boot Tape, distributed by Dynabyte, which contains the Dynabyte Disk Operating System. Following this initial boot, however, the user may choose the menu option "MIN" (MINI WINCHESTER) which formats the 5.25" Winchester Disk Drive. Then a new Operating System configuration can be generated onto the Winchester Disk Drive with the "HDS" (HDSYSGEN HARD DISK) menu option. Subsequent boots may then be performed from the Winchester Hard Disk Drive.

NOTE

Dynabyte ROMs are individually marked with a Dynabyte part number. The part number represents an individual program for a specific equipment configuration. The ROM part numbers are tabulated for various equipment configurations in the specific S-100 Bus Card Technical Manual.

The 5710 computer is shipped with ROM part number 807888 and the Tape Controller is wired correctly for that ROM. Early 5710 models contain ROM enable switches on box SW1 of the Tape Controller. Do not change this switch setting unless a different type of ROM is installed or the 5710 is connected to another system whose ROM will be enabled. In these events, the 5710 ROM

must be disabled with switch #3 on box SW1. The SW1 box is replaced with a wire pin on newer 5710 models for increased reliability.



The switch box marked SW2 on the Tape Controller card is not used.

2.17 Dynabyte S-100 Bus cards carry a distinctive white silkscreened marking on the component side of the PC assembly.

(1) The card name and part number. This facilitates board identification for reordering, servicing and referencing the appropriate Dynabyte S-100 Card Technical Manual, schematic or replaceable parts list.

(2) Component reference designators are marked when practical. They facilitate locating the individual part on a schematic or parts list.

Most Dynabyte PC assemblies derive the major component reference designators from a row-column matrix silkscreened onto the PC board. For example, rows are A to D and columns are 1 to 18 on the 64K RAM card. An integrated circuit located in the upper left corner is A1 and the one located in the lower right corner is D18.

Table 2.3 5710 Computer, Interior Major Assemblies

Element	Function
Axial Fan 700504	Provides forced air cooling to the power supply module and internal heat dissipating PC assemblies.
Main Power Supply 807392	Accepts 115 or 230 VAC, 50-60 Hz and supplies the following preregulated voltages to the S-100 Bus and other assemblies:

	(1) +16 VDC (2) +12 VDC (3) + 8 VDC (4) + 5 VDC (5) Power Supply common (6) -16 VDC.
Card Cage and S-100 Bus 800038	Provides 12 PC assembly positions. Power and signal busses are tabulated by function in Table 7.1.
Front Panel Indicator Connector J13	A four-position connector which provides a connection point for the cable to the POWER ON, HALT indicators and the RESET switch on the front panel.
Front Panel Power Connector	A two-position connector which provides a connection point for the cable to the POWER ON switch on the front panel.
CPU I/O Cable 800285	Provides for the interconnection of data, status and control between the CPU PC Assembly and the rear panel I/O ports. Refer to Table 2.2, Keys 6, 7 and 8.
Random Access Memory 800589	Provides storage for the Operating System, Application Program and variables during program execution.
CPU 803439	Provides a central processor, interrupt logic, two serial I/O ports and one parallel I/O port.
Tape Controller 806641	Provides the logic, status registers and ROM bootstrap to support the Dynabyte Cartridge Tape Drive.
Winchester Controller 807677	Provides the logic, status registers and data buffer to support the 5.25" Winchester Disk Drive.
Cabinet Louvers	Provides air inlets for drawing air into the cabinet for ventilation.
Cartridge Tape Interface Cable 721145	Provides the status and data path between the Tape Controller and the Cartridge Tape Drive.
Data Separator Card 807243	Converts data in a disk format to data readable by the Winchester Controller.
5.25" Winchester Disk Drive 807829	Contains all the Winchester Drive electronics and read/write circuits.

Cartridge Tape Drive 807848	Contains all the Cartridge Tape Drive electronics and read/write circuits.
Tape Power Supply 721086	Accepts 115 or 230 VAC, 50-60 Hz and supplies preregulated 24 VDC to the Cartridge Tape Drive.
Winchester Drive to Data Separator Cable 721093	Provides the status and control signals between the Winchester Drive and the Data Separator card. 34-pin connector.
Winchester to Data Separator Cable 721111	Provides the data and clock signals between the Winchester Drive and the Data Separator card. 20-pin connector.
Winchester Controller to Data Separator Cable 721137	Provides the status and data path between the Winchester Controller and the Data Separator card. 50-pin connector.

2.18 Input/Output (I/O) Signals not affecting the S-100 Bus are transferred over special multi-pin connectors normally located at the top of the PC assembly. Cable harnesses which mate with these connectors are normally made up of flat multi-pair or flat twisted multi-pair cable.

Main Power Supply Module

2.19 The power supply module is located at the rear of the 5710 cabinet, directly in front of the axial fan. The power supply operates on 115 or 230 VAC, 50 or 60 Hz line, as determined by the setting of the Voltage Conversion Switch. It utilizes a phase-controlled regulator to provide AC line and load regulation. The supply operates at relatively high efficiency and utilizes a minimum of components, resulting in high reliability. The AC chassis wiring to the main power supply module includes an EMI filter to minimize radiation of power supply switching transients over the AC line.

5.25" Winchester Drive

2.20 The 5.25" Winchester Hard Disk Drive is mounted at the left front of the chassis. Power for this module is furnished from the 5710 power supply module.

Cartridge Tape Drive

2.21 The Cartridge Tape Drive is mounted at the right front of the chassis. Power for this module is furnished from the Tape Power Supply. Cartridge Tape units cannot physically be inserted incorrectly into the Cartridge Tape Drive slot.

3. FUNCTIONAL DESCRIPTION

3.01 Section 3 will furnish the user with an overview of the 5710 Computer and the S-100 Bus. Detailed information on individual Dynabyte S-100 cards is provided in the Card Cage and S-100 Bus Technical Manual.

NOTE

An * suffix to a signal name indicates logical NOT and active low.

3.02 Figure 3.1 illustrates the 5710 computer in block diagram. It should be used in conjunction with the schematic diagrams in Section 7 to familiarize the user with the circuits. The 5710 Computer chassis can be divided into five logical sections:

- (1) Operational Controls
- (2) Power Supply Module
- (3) S-100 Bus
- (4) 5.25 inch Winchester Hard Disk Drive
- (5) Cartridge Tape Drive

3.03 Two operational controls are provided on the 5710 Computer.

(1) The POWER switch applies AC line voltage to the fan, AC convenience receptacle, main power supply module, and tape power supply. The POWER ON indicator is lit when the power supply module outputs nominally +8 VDC.

(2) The RESET switch pulls the Reset line, Pin 75, of the S-100 Bus low to initiate a restart of the CPU, etc. The reset switch housing contains a lamp and indicates a halt when lit. A Halt Detector is part of the S-100 Motherboard PC Assembly. This detector monitors the HLTA line, Pin 48. When this status line goes high, a HLT instruction has been executed. The HALT indicator is lit.

3.04 The Power Supply Module converts AC line voltage to low DC voltages for the S-100 Bus and monitoring circuits. It provides regulation against AC line fluctuations and load variations of the S-100 Bus. Including output to the Tape Power Supply, the output voltages are nominally:

- | | |
|-------------|--------------------|
| (1) +16 VDC | (4) +5 VDC |
| (2) +12 VDC | (5) -16 VDC |
| (3) + 8 VDC | (6) <u>+24</u> VDC |

One adjustment, R2 on the Modulator PC Assembly and part of the power supply module, is used to set the +8 VDC supply output voltage. The other voltages are nominal and track the +8 VDC. Refer to Figure 6.2 for the tolerance range.

3.05 Regulation is provided by a triac modulating the AC line applied to the low voltage power transformer. The +8 VDC output line is monitored and a feedback loop is used to control the conduction of the triac, resulting in phase-controlled regulation.

3.06 The +16, +8 and -16 output voltages are passively filtered. Ripple on the +8 VDC line is 0.3 to 1 Volt. The +5 and +12 voltages are set and controlled by three terminal regulators. These two voltages power the Winchester Disk Drive. The Tape Power Supply powers the Cartridge Tape Drive.

3.07 The S-100 Bus system consists of a set of signal lines used to carry all information, interface messages, and device-dependent messages among interconnected devices.

3.08 The bus structure is organized into seven sets of signal lines: Refer to Table 7.1 for detailed descriptions of the following.

- (1) Data Lines
- (2) Address Lines
- (3) Status Bus
- (4) Control Output
- (5) Control Input Bus
- (6) Vectored Interrupt Bus
- (7) Utility Bus.

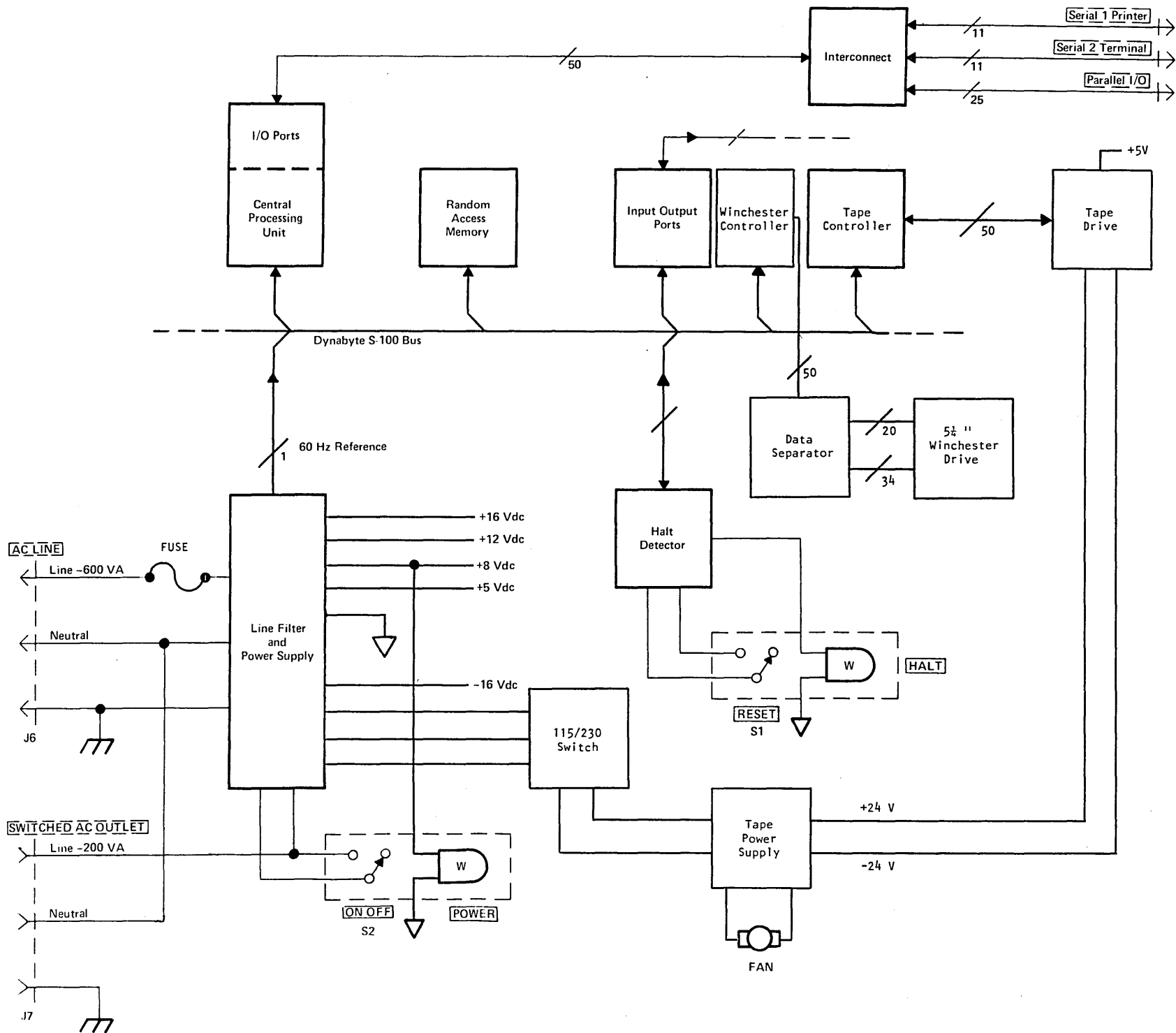


Figure 3.1 5710 Computer Functional Block Diagram

NOTE

In and Out References are in respect to the CPU.

3.09 The data bus consists of 16 lines grouped as two unidirectional 8-bit busses for byte operations.

- (1) Data output appears on the data output bus DO0 - DO7. DO7 is the most significant bit.
- (2) Data input appears on the data input bus DI0 - DI7. DI7 is the most significant bit.

3.10 The address bus consists of 16 signal lines used to select a specific location in memory or a specific input/output device for communications during the current bus cycle. The memory address bus consists of 16 lines specifying 1 of 64K memory locations. These 16 lines are named A0 through A15, where A15 is the most significant bit. The I/O device address bus consists of lines A0 through A7, specifying 1 of 256 I/O devices, with A7 used as the most significant bit. Address lines A15 - A8 are used as an I/O address modifier in specific cases, i.e., the Octaport.

3.11 The status bus consists of nine lines that identify the nature of the bus cycle in progress and qualify the nature of the address on the address bus. The mnemonics for status lines always begin with a lower case s and consist of:

- (1) Memory Read -- sMEMR
- (2) Op-Code Fetch -- sM1
- (3) Input -- sINP
- (4) Output - sOUT
- (5) Write Cycle -- sW0*
- (6) Interrupt Acknowledge -- sINTA
- (7) Halt Acknowledge -- sHLTA
- (8) Memory Request -- sMREQ*
- (9) Memory Refresh -- sRFSH*

3.12 The lines of the control output bus determine the timing and movement of data during any bus cycle. The mnemonics for the control output lines always begin with a lower case p. The four lines are:

- (1) pSYNC*, which indicates the start of a new bus cycle.
- (2) pDBIN, a generalized read strobe that gates data from an addressed slave onto the data bus.

(3) **pWR***, a generalized write strobe that writes data from the data bus into an addressed slave.

(4) **pHLDA**, the hold acknowledge signal that indicates to the highest priority temporary master that the permanent master is relinquishing control of the bus.

3.13 The five lines of the control input bus allow bus slaves to synchronize the operations of bus masters with conditions internal to the bus slave, e.g., data not ready, and to request operations of the permanent master, e.g., interrupt or hold. The five control input lines are:

- (1) **RDY**
- (2) **XRDY**
- (3) **INT***
- (4) **NMI***
- (5) **HOLD***

The ready lines are used by bus slaves to synchronize bus masters to the response speed of the slave. Thus cycles are suspended and wait states inserted until both ready lines are asserted. The **RDY** line is the general ready line for bus slaves. It is specified as an open collector line. The **XRDY** line is a special ready line used by test devices to stop and single-step bus masters. It is not specified as an open collector line and should not be used by other bus slaves since a bus conflict may exist.

3.14 The two interrupt lines **INT*** and **NMI*** are used to request service from the permanent bus master. The **INT*** line may be masked off by the bus master, usually via an internal software generation. If the bus master accepts the interrupt request on the **INT*** line, it may respond with an interrupt acknowledge bus cycle accepting vectoring information from the data bus.

3.15 The **NMI*** line is a nonmaskable interrupt request line, that is, it may not be masked off by the bus master. Accepting an interrupt on the **NMI*** line will not generate an interrupt acknowledge bus cycle. An interrupt request on the **INT*** line is asserted as a level, that is, the line is asserted until interrupt service is received. An interrupt request on the **NMI*** line, on the other hand, is asserted as a negative-going edge, since no interrupt acknowledge cycle will be generated. Both lines are specified as open-collector lines.

3.16 The hold request line, **HOLD***, is used by temporary bus masters to request control of the bus from the permanent bus master to prevent temporary masters from gaining bus control. The **HOLD*** line is specified as an open collector line and may only be asserted at certain times.

3.17 The eight lines of the vectored interrupt bus are used in conjunction with the generalized vectored interrupt request, **INT***, to arbitrate among eight levels of interrupt request priorities. The eight lines of the vectored interrupt bus are **VI0*** through **VI7***, where **VI0*** is considered the highest priority interrupt. The vectored interrupt lines should be implemented as

levels; that is, they should be held active until service is received.

3.18 Power in the Dynabyte S-100 Bus systems is distributed to bus devices as unregulated voltages. A total of six bus lines is used:

- (1) +8 Volts, 2 lines
- (2) +16 Volts, 1 line
- (3) -16 Volts, 1 line
- (4) Power supply common, 2 lines.

3.19 The system clock, 4 MHz PHASE 2, is generated by the CPU. The control timing for all bus cycles must be derived from this clock. This signal is never transferred during a bus exchange operation.

3.20 Another line, called CLOCK, is specified as a 2 MHz, 0.5 percent tolerance, signal with no relationship to any other bus signal. It is used by counters, timers, baud-rate generators, etc.

3.21 System reset functions are divided into two lines:

- (1) RESET* is an open collector input line that requests a Power On Clear (POC).
- (2) POC*, Power On Clear is active on POWER ON and when requested by RESET*, is specified as having a minimum active period of 10 ms.

3.22 The memory write strobe, MWRT, is generated by the permanent bus master and is defined as:

$$\text{MWRT} = \text{pWR} \bullet \text{sOUT*} \text{ (logic equation)}$$

3.23 Another line, PHANTOM*, is provided for overlaying bus slaves at a common address location. When this line is activated, phantom bus slaves are enabled and normal bus slaves are disabled. This line is specified as an open-collector line.

3.24 The remaining lines are designated as Dynabyte-reserved and for use in future S-100 card and system designs.

3.25 The Winchester Hard Disk Drive provides the 5710 Computer with mass storage of 8.9MB or 13.4MB formatted capacity (see Table 1.1).

3.26 The Cartridge Tape Drive provides the 5710 Computer with unlimited additional mass storage in units of 8.9 or 13.4 formatted Megabytes, depending on the length of the removable Cartridge Tape (see Table 1.2).

4. SPECIFICATIONS

4.01 Section 4 furnishes the user with the functional specifications of the 5710 Computer. Minor deviations from the specifications tabulated in Table 4.1 which do not affect the 5710 Computer are excluded from the Dynabyte Warranty.

4.02 The functional specifications of the 5710 Computer are determined by:

(1) The Dynabyte Disk Operating System and the particular application program running, i.e., the software.

(2) The specific Dynabyte S-100 cards installed in the bus, i.e., the hardware.

4.03 Table 4.1 summarizes the 5710 Computer Functional Specifications with the following hardware:

(1) Central Processing Unit

(2) 64K Random Access Memory.

For other hardware configurations the user should refer to the individual Dynabyte S-100 Card Technical Manual Specifications.

Table 4.1 5710 Computer Functional Specifications

PARAMETER	CHARACTERISTICS
Front Panel Section	
Power Switch	Alternate action. Lit in POWER ON condition.
Reset Switch	Momentary action. Lit when the CPU is in the HALT condition.
Card Cage Section	
System	Dynabyte S-100 Bus
Capacity	12 positions
EMI	Fully shielded backplane
Processor Section	
Type	Z-80A
Clock Rate	4 MHz
Instruction Set	158
Interval Timer	
Number	10
Time Unit	64 microseconds per count
Range	1 to 255 units (64 microseconds - 16.32 ms)
Interrupt	Interrupts on 0 count under program control
Real-Time Clock	
Frequency	AC line synchronous
Indication	Sets status bit or causes interrupt
Interrupts	
Number	16
Priority, Highest	Timer 6 Timer 7 Port Interrupt Timer 8 Serial 2 Receive Data Available Serial 2 Transmit Data Available Timer 9 Timer 10 or Parallel Port Input Bit 7 Timer 1 Timer 2 Real-Time Clock Timer 3 Serial 1 Receive Data Available Serial 1 Transmit Buffer Empty Timer 4

Table 4.1 5710 Computer Functional Specifications (cont.)

PARAMETER	CHARACTERISTICS
Priority, Lowest	Timer 5
Levels of Interrupt Masking	2
Level 1	Masks all interrupts
Level 2	Individual masking of interrupts
Off Card Interrupts	One maskable One unmaskable
Input/Output Section	
Serial Ports	2
Rates	110, 150, 300, 880, 1200, 2400, 4800, 9600, 19,200, 38,400, 76,800 baud
Rate Selection	Software control
Connector	DB-25-S
Data In	EIA RS-232C
Data Out	EIA RS-232C
Signal Common	EIA RS-232C
Parallel Port	1
Input	8 bits
Input Ready Flag	Edge triggered
Input Sense	1 bit
Output	8 bits
Output Strobe	1 bit
Output Flags	2
Connector	DB-25-S
Memory Section	
Random Access	
Address	16 bits
Size	65,536 bytes (64K)
Type	Dynamic
Cycle Time	400 ns
Optional Size	Bank switching 400K bytes maximum

Table 4.1 5710 Computer Functional Specifications (cont.)

PARAMETER	CHARACTERISTICS	
	MODEL 5710-A1	MODEL 5710-B1
Winchester Disk Drive		
Surfaces	4	6
Tracks per Surface	256	256
Unformatted Capacity		
Track	10.4K bytes	10.4K bytes
Surface	2.67MB	2.67MB
Total	10.67MB	16MB
Formatted Capacity		
Sectors per Track	17	17
Sector Size	512 bytes	512 bytes
Track Capacity	8704 bytes	8704 bytes
Surface Capacity	2.23MB	2.23MB
Total Capacity	8.9MB	13.4MB
Transfer Rate	5 mbits/sec	5 mbits/sec
Average Latency	8.3 msec	8.3 msec
Access Time		
Track to Track	20 msec*	20 msec*
Average Access	105 msec	105 msec
Track Density	345 tpi	345 tpi
Spindle Speed	3600 rpm	3600 rpm
Recording Density	8650 bpi	8650 bpi
Flux Density	8650 frpi	8650 frpi
Encoding Method	MFM	MFM
Reliability Estimate		
MTBF	8000 POH	8000 POH
PM	None	None
MTTR	30 minutes	30 minutes

*Track to Track includes settling time.

Table 4.1 5710 Computer Functional Specifications (cont.)

PARAMETER	CHARACTERISTICS	
	MODEL 5710-A1	MODEL 5710-B1
Error Rate		
Soft Read Errors	<1 in 10^{10} bits	<1 in 10^{10} bits
Hard Read Errors	<1 in 10^{12} bits	<1 in 10^{12} bits
Seek Errors	<1 in 10^6 seeks	<1 in 10^6 seeks
Cartridge Tape Drive		
Surfaces	1	
Tracks per Surface	4	
Media	Cartridge Tape ANSI X3.55 - 1977 .25" x 450' or 300'	
	450 FOOT TAPE	300 FOOT TAPE
Unformatted Capacity	17.2MB	11.5MB
Formatted Capacity	13.4MB	8.9MB
Transfer Rate	24 KB/sec	
Operating Speeds	30 ips Write, Bidirectional Read 90 ips Bidirectional Search and Rewind	
Start/Stop Time		
At 30 ips	25-26 msec	
At 90 ips	71-74 msec	
Nominal Start/Stop Distance		
At 30 ips	0.30-0.41 inches	
At 90 ips	2.97-3.42 inches	
Instantaneous Speed Variation	$\pm 3\%$ (Drive only, $\pm 7\%$ cartridge inclusive)	
Long Term Speed Variation	$\pm 2\%$ (Drive only, $\pm 3\%$ cartridge inclusive)	
Recording Density	6400 bpi	
Encoding Method	NRZ - MFM	

Table 4.1 5710 Computer Functional Specifications (cont.)

PARAMETER	CHARACTERISTICS
Reliability Estimate	
MTBF	3000 hours
MTTR	< 1 hour
Data Reliability	< 1 Error in 10^8 Bits
Main Power Supply Section	
Type	Phase-controlled regulator
Voltages	+16 VDC at 6 A +8 VDC at 20 A +12 VDC at 1.0 A, 1.3 A peak +5 VDC at 0.5 A
Adjustment	1
Tape Power Supply	
Voltage	+24 VDC at 1.8 A, 3.5 A peak
Rear Panel Section	
DB-25-S Connector Positions	16
Convenience Receptacle	Two-wire and grounded NEMA 200 VA maximum
Cooling	70 CFM, one 4-5/8 inch axial fan
Operating temperature	10 to 35 degrees Centigrade
Relative humidity	20% to 80%
Line Voltage	
Standard	115 +10% VAC, 60 Hz
Optional	230 +10% VAC, 50 Hz
Power	400 VA
Dimension	
Width	52.1 cm (20.5 inches)
Depth	47.0 cm (18.5 inches)
Height	17.8 cm (7.0 inches)
Weight	29.5 kg (65 lbs.)

5. OPERATION AND INSTALLATION

Unpacking

5.01 Section 5 provides information on shipping and installing the 5710 Computer. After the 5710 Computer arrives, the shipping cartons should be examined for visible loss or damage.

IMPORTANT

Each unit's shipping carton should be retained for the warranty period and used for the return of equipment to Dynabyte if it is necessary.

5.02 Check each unit for concealed loss, damage or omissions in shipment.

IMPORTANT

Remove only the three center screws from each side of the cover.

Step	Procedure
1	If additional I/O Ports were ordered, install them as instructed in the manual supplied with the option.
2	Check the interior for loss or damage during shipment: (1) Loose screws, nuts or washers (2) Broken wires or loose components (3) Major assemblies broken at mountings

IMPORTANT

The equipment is thoroughly tested, inspected and carefully packed before leaving the Dynabyte factory. Claims for loss or damage should be made upon the carrier -- NOT TO DYNABYTE -- as follows:

(1) Visible Loss or Damage -- must be noted on the freight bill or express delivery sheet. The form required to file such a claim will be supplied by the carrier.

(2) Concealed Loss or Damage -- means loss or damage which does not become apparent until the equipment has been

unpacked and placed in service. When the damage is discovered upon unpacking, make a written request for an inspection by the carrier's agent within fifteen days of the delivery date. Then file a claim with the carrier.

Obvious workmanship problems or incomplete shipments should be reported immediately to Dynabyte.

AC Line

5.03 The 5710 Computer can be operated from a 115 V, 60 Hz AC line or 230 V, 50 Hz AC line. Set the internal Voltage Conversion Switch to the correct setting for the country in which the 5710 will operate. This Voltage Conversion Switch allows easy conversion from one voltage to the other. Install the appropriate fuse as indicated by the serial tag. The AC line receptacle, J6, is provided with a third wire bonded to the chassis.

IMPORTANT

Safe operation of Dynabyte equipment depends upon the user providing a three-wire, grounded, 115 VAC, 15 Amp or appropriate 230 VAC service wall receptacle.

Select a wall receptacle which is not switched except for a circuit breaker. Ideally no other equipment should be connected to the branch circuit.

Options

5.04 The user should refer to the Dynabyte S-100 Card Technical Manual for detailed information for options to individual S-100 cards and system components. Figure 5.2 will furnish the 5710 user with option settings necessary for a 5710 system to run diagnostic programs.

Set Up and Turn On

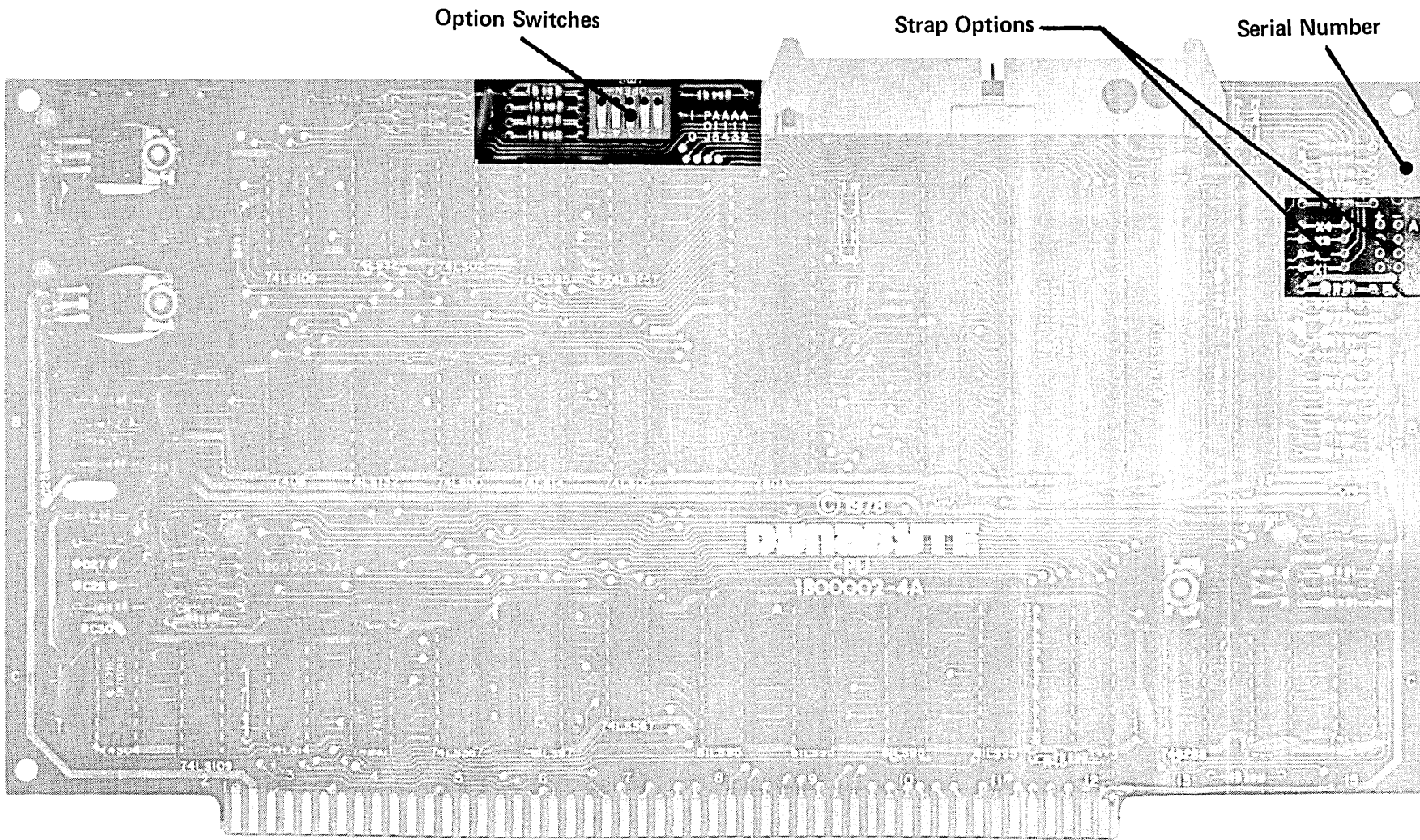
5.05 The following procedure will serve as a useful check list for setting up or resetting up the 5710 Computer. For illustration purposes, the system components are:

- (1) Serial 1 Port is connected to the Serial Printer, 300 baud, and is the listing device (LST:).
- (2) Serial 2 Port is connected to the Video Terminal, 9600 baud, and is the console device (CON:).
- (3) Dynabyte Disk Operating System Cartridge Tape.

NOTE

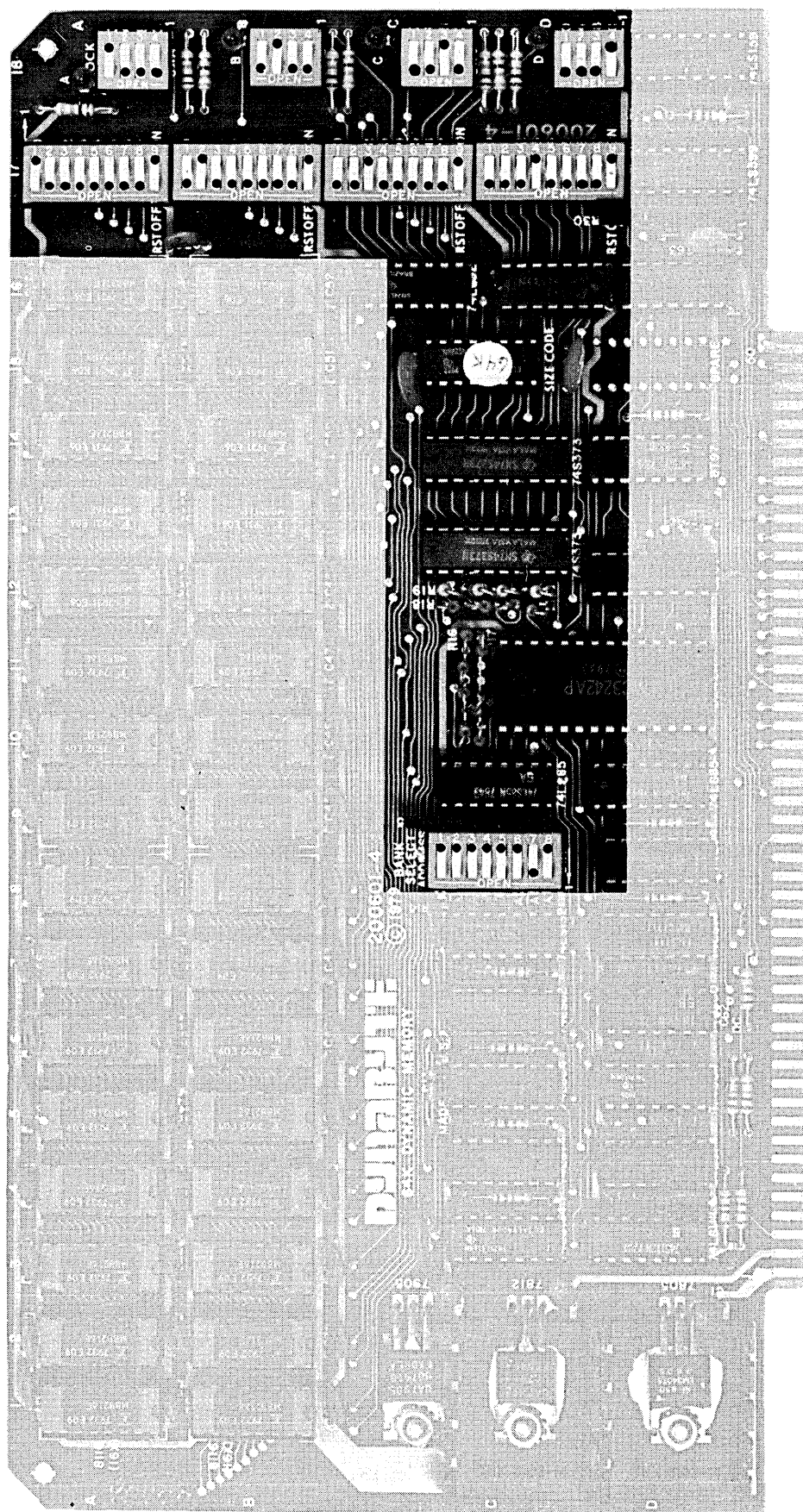
Set all AC line power switches to OFF.

Step	Procedure
1	Install the 5710 so as not to obstruct the air flow through the louvers in the bottom of the cabinet. Make certain there is a three-inch clearance from the rear of the fan. Dynabyte desk-type cabinets are designed to assure constant air flow through the equipment cabinets.
2	Check the option switch settings: (1) Each S-100 Bus card. Refer to 5.04 above. (2) Video Terminal. Refer to the product technical manual. (3) Serial Printer. Refer to the product technical manual.
3	Connect to computer system cables: (1) EIA cable between Port 1 and the Serial Printer. (2) EIA cable between Port 2 and the Video Terminal.
4	Connect the AC line cords: (1) Video Terminal AC line cord to the wall receptacle. (2) Serial Printer AC line cord to the wall receptacle. (3) 5710 AC line cord to the wall receptacle.
5	Turn on the AC power switches: (1) Video Terminal (2) Serial Printer (3) 5710 Computer
6	Verify the following: (1) POWER ON indicators on all units are lit. (2) Fan in the 5710 is running.
7	With the aluminum plate side down, insert the Cartridge Tape containing the Dynabyte Disk Operating System into the Cartridge Tape slot. The Cartridge Tape is constructed so that it cannot be incorrectly inserted into the tape slot.
8	The Video Terminal should present the Dynabyte boot option table.



NOTE: The dots on the switches indicate the direction in which the switch should be set for correct operation.

Figure 5.1 Central Processing Unit, Option Switch Settings



NOTE: The dots on the switches indicate the direction in which the switch should be set for correct operation.

Figure 5.2 64K Random Access Memory, Option Switch Settings

6. MAINTENANCE

6.01 The 5710 Computer is the result of several years of design, development and modern electronic manufacturing. The units are designed around the latest semiconductors and integrated circuits. They operate at relatively low power levels with adequate cooling. The 5710 Computer can be expected to operate at peak performance for long intervals.

Cartridge Tape Drive

6.02 Three parts of the Cartridge Tape Drive require routine maintenance - the tape head, capstan and tape cleaner. Figure 5.1 of the Cartridge Tape technical manual illustrates the location of parts requiring periodic cleaning. The reliability of the Cartridge Tape Drive can be ensured by frequent cleaning of the tape head and capstan with a noncorrosive, nonresidue cleaning agent such as isopropyl alcohol. Apply the alcohol with a cotton swab, wipe off any excess, and let the tape head and capstan dry before using the unit.

IMPORTANT

Do not use spray cleaners for cleaning any part of the Cartridge Tape Drive.

Never clean the tape head or tape cleaner with a hard object. Doing so could result in permanent damage to the tape unit.

Be very careful to protect the drive motor bearing from cleaning solvent.

6.03 The tape cleaner, which is the portion of the Cartridge Tape unit that removes loose foreign material from the tape, should be cleaned with the same frequency as the tape head. Clean it by inserting a folded piece of paper in the bottom of the cleaner and lift up. Compressed air or a brush will also effectively clean the tape cleaner. Occasionally, use the alcohol-cotton swab procedure on the tape cleaning section.

Cartridge Tape Media

6.04 The only Cartridge Tapes certified for use with the 5710 Computer are:

VERBATIM TC-8450 (450 Feet)
3M-SCOTCH DC-300A (300 Feet)
3M-SCOTCH DC-300XL (450 Feet)

We highly recommend using certified media. Poor performance will result from using media that is not certified for 6400 BPI.

The Cartridge Tapes should be removed from the Cartridge Tape slot when not in use and stored in a cool, dry place. The capstan can be permanently damaged

if an unused tape is left in the unit. Never, however, remove a Cartridge Tape while any type of tape data or program transfer is underway.

A Cartridge Tape with data stored on it can be write-protected by turning the screw on the top left of the Cartridge Tape casing to the SAFE position.

IMPORTANT

Be certain that NO Cartridge Tape is in the drive while turning the computer on or off.

Cabinet

6.05 The cabinet requires no routine maintenance except occasional dusting and cleaning of the painted surfaces with a good all-purpose cleaner which does not attack or scratch painted surfaces or plastic. We recommend Formula 409 All Purpose Cleaner which is available from most supermarkets.

Customer Support Service

6.06 Maintenance and procedures described in this manual should be performed in accordance with local instructions and the individual user's maintenance plan. Maintenance and repair of the 5710 Computer during the warranty period should be limited to:

- (1) returning the 5710 Computer
- (2) isolation of a fault to a specific PC assembly or unit
- (3) replacement of the AC line fuse once.

Repacking and Returning Material

6.07 The Dynabyte Customer Support staff is available by telephone for assistance in troubleshooting and recommendations for repairs. If equipment is to be returned for repair or replacement, the following procedure will expedite repair and return of the equipment. All communications and material should be directed to:

Dynabyte, Inc.
Customer Support
521 Cottonwood Drive
Milpitas, CA 95035
(408) 263-1221
TELEX 346-359

Step	Procedure
1	Call Dynabyte Customer Support by telephone and provide the following information: The Dynabyte Model Number and Serial Number of the equipment. Figure 6.1 illustrates the Dynabyte Identification Plate for equipment. Normally this is located at the rear of the equipment.
2	If the fault has been traced to a specific subassembly, e.g., an S-100 Bus card, furnish the type, part number and serial number. This information, marked on the component side of the PC assembly, is needed on the: (1) Subassembly replaced into the failed equipment if one was available. (2) Subassembly to be returned to Dynabyte.
3	Furnish a brief statement of the problem.
4	Customer Support will issue a Return Material Authorization Number (RMA Number). (1) The RMA permits the Dynabyte Customer Support staff to provide better coordination of returned material. (2) The RMA permits the Dynabyte customer to easily reference material returned to Dynabyte.
5	Package equipment in the Dynabyte packing carton in which the equipment was received. If the original packing material is not available, Dynabyte Customer Support will provide information and recommendations of material to be used.
6	Fill out and enclose a Dynabyte Repair Service Report with the equipment or provide the following information in writing: (1) The RMA number furnished by Dynabyte. (2) Model number and serial number of equipment. Refer to Step 1 above. (3) A brief statement of the problem.
7	Ship the equipment to Dynabyte, shipment prepaid.

NOTE

Material returned to Dynabyte without a Return Material Authorization for repair will be refused by Dynabyte and returned to the sender.

DYNABYTE 521 Cottonwood Drive, Milpitas, California 95035	
1	4
2	5
3	6
MODEL NO. SERIAL NO. DATE	AC VOLTS FREQ. CURRENT
Key	Function
1	Dynabyte Model Number.
2	Dynabyte Chassis Serial Number.
3	Dynabyte date of manufacture.
4	Ac line voltage which the chassis is wired for operation.
5	Ac line frequency which the chassis will operate.
6	Power dissipation of chassis.

Figure 6.1 — Dynabyte Identification Plate

Fault Location

6.08 A troubleshooting chart, Table 6.1, has been included in this manual to assist the user in isolating a fault location to one of three areas.

- (1) The fault symptom resulted from incorrect user operation of the 5710 Computer.
- (2) The fault symptom resulted from some other piece of equipment, e.g., cable, Cartridge Tape media, or terminal.
- (3) The fault symptom resulted from a 5710 S-100 card or power supply module.

Table 6.1 does not tabulate all the possible symptoms, only those Dynabyte Customer Support has found most likely to occur.

Power Supply Module Voltages and Adjustment

6.09 The procedure which follows will assist the user in checking and adjusting the power supply should it be necessary. The user will need a digital multimeter (DMM), e.g., Fluke 8020A or equivalent. Refer to Figure 6.2.

1	2	3	4	5	6	7
GND	GND	-16V	+8V	+5V	+16V	+12V
Terminal	Voltage	Tolerance				
Ac Line	115 Vac	±10%				
6	+16 Vdc	17 +3/-2 Vdc				
7	+12 Vdc	12 +3/-2 Vdc				
4	+ 8 Vdc	9 ±0.5 Vdc				
5	+ 5 Vdc	5 ±0.25 Vdc				
1 & 2	0 Vdc	PS Common Reference				
3	-16 Vdc	-17 -3/+2 Vdc				

Figure 6.2 Power Supply Module Voltage Test Points, BS1

Step	Procedure
1	Remove the top cover. Refer to 6.11 below.
2	Disconnect the cables described in Step 1 of 6.12.
3	The power supply voltages are distributed from barrier strip, BS1.
4	Connect the DMM (-) lead to Terminal 1 and the (+) lead to Terminal 4. The voltage should be: $9 \pm 0.5 \text{ VDC}$
5	If it is necessary to adjust the +8 VDC supply to bring this into tolerance, adjust R2 on the Modulator PC Assembly.
6	Check that each of the other voltages tabulated in Figure 6.2 are in tolerance.

Removing Assemblies

6.10 The user will need the following hand tools to remove the major assemblies from the 5710 Computer chassis:

- (1) 3/32 hex Allen wrench
- (2) 11/32 socket wrench
- (3) 1/4 socket wrench
- (4) No. 2 Phillips head screwdriver
- (5) No. 3 Phillips head screwdriver

6.11 Top Cover - The descriptions which follow view the 5710 Computer from the front. Perform the following:

Step	Procedure
1	Remove the <u>center</u> three 3/32 hex head screws from each side of the top cover. Do not remove the screws on the <u>end</u> of each screw row because these mount the front and back bezel to the bottom chassis panel.
2	Remove the cover, placing it in a position that will not scratch the surface during servicing.

WARNING

Hazardous voltages are present inside the cabinet. Disconnect AC power before removing the cabinet cover or assemblies.

6.12 Main Power Supply Module - is located at the rear of the 5710 cabinet in front of the axial fan. Perform the following:

Step	Procedure
1	Disconnect the following cables: (1) Port I/O Cable from the CPU. (2) Winchester Disk Drive Interface Cables from the Winchester Controller.

2	(3) Cartridge Tape Interface Cable from the Tape Controller. Dress cables back over the rear panel. Disconnect the Motherboard Power Cable. (1) BS1 - 1 BLK (2) - 2 BLK (2) - 3 VIO/WHT (1) - 4 ORG/WHT (2) - 5 ORG (3) - 6 RED/WHT (1) - 7 RED (2) (2) BS2 - 5 YEL (1)
3	Remove the four Phillips head 10-32 screws, star washers and flat washer which secure the Power Supply Module to the cabinet base.
4	Shift the Power Supply Module slightly to gain access to the rear interior. Disconnect the AC line, three push-on connectors on the EMI line filter.
5	Remove the Power Supply Module from the 5710.

NOTE

Handle I/O cables with care as they can be easily damaged.

6.13 Tape Power Supply - is located on the left center side of the chassis, directly next to the Winchester Disk Drive. It supplies +24 volts with a +5 volt ground wire to the Cartridge Tape Drive. Check that the Tape Power Supply produces the correct voltage.

6.14 Card Cage — S-100 Bus Motherboard - is located on the center right side of the chassis. The Motherboard Power Cable must be disconnected first. Repeat 6.12, Steps 1 and 2. Then perform the following:

Step	Procedure
1	Remove all the S-100 cards installed in the card cage.
2	Disconnect the front panel cable connector from J14, the four-conductor PC-mounted receptacle.
3	Remove the fourteen 6-32 x 3/8 Phillips head screws and star

	washers which secure the S-100 Motherboard PC Assembly to the cabinet base.
4	Remove the card cage from the 5710 Computer.
5	Remove the eight 6-32 x 3/8 Phillips head screws and star washers which secure the S-100 Bus Motherboard PC Assembly to the card cage.

6.15 Front or Rear Panel - Both panels are secured to the respective cabinet bezel by five 6-32 Kep nuts. It is more convenient to remove the entire bezel. Perform the following:

Step	Procedure
1	Remove the two 3/32 hex head screws from each side.
2	Remove the five 8-32 x 3/4 Phillips head screws and star washers which secure the bezel to the cabinet base. Two of these screws also secure rubber bumpers.
3	Disconnect the electrical connections from the respective panel. (1) Front Panel - Disconnect the AC line cable from the rear panel and the front panel cable connector from J14, the four-conductor PC mounted receptacle. (2) Rear Panel - Disconnect the AC line cable to the front panel and the AC line cable to the power supply. This consists of three push-on connectors on the EMI line filter.
4	Remove the panel.

Table 6.1 Troubleshooting Chart

No.	Symptom	Probable Cause	Remedy
1	POWER ON indicator does not light and fan is not running.	1. Power cord is not connected to the AC line. 2. The AC line fuse is blown.	1. Connect to the AC line. 2. Replace the fuse one time only. Then check the AC chassis wiring.
2	POWER ON indicator does not light and fan is running.	1. The power supply module is defective.	1. Replace or repair. Refer to Trouble 3 below.
3	POWER ON indicator flickers.	1. The power supply module is defective. 2. One of the S-100 Bus cards is defective.	1. Check all output voltages. Refer to Figure 6.2. Replace or repair. 2. Remove one card at a time from the bus. Monitor the power supply output until the trouble clears. Replace or repair the card.
4	POWER ON indicator is lit. RESET is pressed. The boot option table message is not presented on the console.	1. System cables or options are incorrect for the installation. 2. Power Supply module is defective.	1. Check cables and options. 2. Refer to Trouble 3 above.
5	POWER ON indicator is lit. RESET is pressed. Tape option is chosen to boot. The sign on message is not presented on the console.	1. Boot Tape is not fully inserted or is missing. 2. Boot Tape is defective or has incorrect operating system for the installation. 3. Chassis connectors or wiring is defective. 4. Power Supply module is defective.	1. Insert Boot Tape. Press RESET. 2. Insert a new Boot Tape. 3. Check. Refer to Part 7 for diagram. 4. Replace or repair. Refer to Trouble 3 above.

Table 6.1 Troubleshooting Chart (cont.)

No.	Symptom	Probable Cause	Remedy
		5. Tape Controller is defective.	5. Replace or repair.
		6. Tape Drive is defective.	6. Replace or repair.
6	POWER ON indicator is lit. RESET is pressed. Hard disk option is chosen to boot. The sign on message is not presented on the console.	1. Hard disk is not spun up to operating speed. 2. Operating system is not on hard disk. 3. Chassis connectors or wiring is defective. 4. Power Supply module is defective. 5. Data separator card is defective. 6. Hard disk controller is defective. 7. Hard disk is defective.	1. Wait 30 seconds. 2. Use tape to boot. 3. Check. Refer to Part 7 for diagram. 4. Replace or repair. Refer to Trouble 3 above. 5. Replace or repair. 6. Replace or repair. 7. Replace or repair.
7	RESET button pressed. No sign on message is presented on the console.	1. Console is not configured to the system. 2. Boot Tape has a defective operating system. 3. CPU is defective.	1. Check console cabling to port, data communication controls, e.g., baud rate of 9600, parity, etc. 2. Insert a new Boot Tape. 3. Replace or repair.
8	RESET is pressed. HALT indicator remains lit.	1. CPU is defective. 2. The phantom bootstrapping option jumper is not installed in the lowest addressed RAM.	1. Replace or repair. 2. Install jumper. Refer to the RAM Technical Manual.

Table 6.1 Troubleshooting Chart (cont.)

No.	Symptom	Probable Cause	Remedy
		This is appropriate to: 16K Dynamic 16K Static 32K Static 3. RAM is defective.	 3. Replace or repair.

7. REFERENCES

S-100 Bus

7.01 Shortly after the introduction of the 8080, 8080A and Z-80 Microprocessor integrated circuits, several high-technology companies developed the S-100 Bus structure for use in personal and business computer systems. The S-100 Bus has been adapted by over 50 other manufacturers who also offer products that connect to the bus. Table 7.1 tabulates the Dynabyte S-100 Bus pins by assignment and function in the 5710 Computer.

Schematics and Replaceable Parts

7.02 Figure 7.1 furnishes the chassis wiring for the 5710 chassis. Table 7. 2 tabulates replaceable parts for the 5710 Computer chassis covering:

- (1) Front panel assembly
- (2) Rear panel assembly
- (3) Frame assembly.

Schematics and replaceable parts lists for all other assemblies, modules and PC assemblies or S-100 cards are covered in the individual Dynabyte Technical Manuals.

OEM Equipment

7.03 Physical and functional descriptions, maintenance information and replaceable parts list for the OEM equipment part of the 5710 Computer are provided under separate cover or may be ordered from:

5.25" Winchester Disk Drive

Model CMI 5410 (10.67MB)
Model CMI 5616 (16MB)
Computer Memories, Inc.
9233 Eton Avenue
Chatsworth, CA 91311
(213) 709-6445

Cartridge Tape Drive

Model CMTD-3400S2
PN: 301 091 Rev S
Data Electronics Incorporated
11633 Sorento Valley Road
San Diego, CA 92121
(714) 481-0151

Only the following Cartridge Tapes are certified for use with the 5710 Cartridge Tape unit:

VERBATIM TC-8450 (450 feet)

3M-SCOTCH DC-300A (300 feet)

3M-SCOTCH DC-300XL (450 feet)*

* DC-300XL lot numbers 087-xxx, 089-xxx, and 8105/0505 are known to contain poorly performing media and should be avoided.

Table 7.1 Dynabyte S-100 Bus Pin Assignments

Pin No.	Signal-Type	Active Level	Description
1	+8 Volts (B)		Instantaneous minimum greater than 7 Volts, instantaneous maximum less than 25 Volts, average maximum less than 11 Volts.
2	+16 Volts (B)		Instantaneous minimum greater than 14.5 Volts, instantaneous maximum less than 35 Volts, average maximum less than 21.5 Volts.
3	XRDY (S)	H	One of two ready inputs to the current bus master. The bus is ready when both these ready inputs are true. See pin 72.
4	VI0* (S)	LOC	Vectored interrupt line 0.
5	VI1* (S)	LOC	Vectored interrupt line 1.
6	VI2* (S)	LOC	Vectored interrupt line 2.
7	VI3* (S)	LOC	Vectored interrupt line 3.
8	VI4* (S)	LOC	Vectored interrupt line 4.
9	VI5* (S)	LOC	Vectored interrupt line 5.
10	VI6* (S)	LOC	Vectored interrupt line 6.
11	VI7* (S)	LOC	Vectored interrupt line 7.
12	NMI* (S)	LOC	Nonmaskable interrupt.
13	Dynabyte Reserved		
14	Dynabyte Reserved		
15	Dynabyte Reserved		
16	Dynabyte Reserved		
17	Dynabyte Reserved		
18	SDSB* (M)	LOC	The control signal to disable the 8 status signals.
19	CDSB* (M)	LOC	The control signal to disable the 5 control output signals.

Table 7.1 Dynabyte S-100 Bus Pin Assignments (Continued)

Pin No.	Signal-Type	Active Level	Description
20	Dynabyte Reserved		
21	Dynabyte Reserved		
22	ADSB* (M)	LOC	The control signal to disable the 16 address signals.
23	DODSB* (M)	LOC	The control signal to disable the 16 address signals.
24	4 MHz Phase 2 (B)		The master timing signal for the bus
25	Dynabyte Reserved		
26	pHLDA (M)	H	A control signal used in conjunction with HOLD* to coordinate bus master transfer operations.
27	Dynabyte Reserved		
28	Dynabyte Reserved		
29	A5 (M)	H	Address bit 5.
30	A4 (M)	H	Address bit 4.
31	A3 (M)	H	Address bit 3.
32	A15 (M)	H	Address bit 15 (most significant).
33	A12 (M)	H	Address bit 12.
34	A9 (M)	H	Address bit 9.
35	DO1 (M)	H	Data out bit 1.
36	DO0 (M)	H	Data out bit 0.
37	A10 (M)	H	Address bit 10.
38	DO4 (M)	H	Data out bit 4.
39	DO5 (M)	H	Data out bit 5.
40	DO6 (M)	H	Data out bit 6.
41	DI2 (S)	H	Data in bit 2.

Table 7.1 Dynabyte S-100 Bus Pin Assignments (Continued)

Pin No.	Signal-Type	Active Level	Description
42	DI3 (S)	H	Data in bit 3.
43	DI7 (S)	H	Data in bit 7.
44	sM1 (M)	H	The status signal which indicates that the current cycle is an op-code fetch.
45	sOUT (M)	H	The status signal identifying the data transfer bus cycle to an output device.
46	sINP (M)	H	The status signal identifying the data transfer bus cycle from an input device.
47	sMEMR (M)	H	The status signal identifying bus cycles which transfer data from memory to a bus master, which are not interrupt acknowledge instruction fetch cycle(s).
48	sHLTA (M)	H	The status signal which acknowledges that a HLT instruction has been executed.
49	CLOCK (B)		2 MHz (0.5%) 40-60% duty cycle. Not required to be synchronous with any other bus signal.
50	GND (B)		Common with pin 100.
51	+8 Volts (B)		Common with pin 1.
52	-16 Volts (B)		Instantaneous maximum less than -114.5 Volts, instantaneous minimum greater than -35 Volts, average minimum greater than -21.5 Volts.
53	Dynabyte Reserved		
54	Dynabyte Reserved		
55	Dynabyte Reserved		
56	Dynabyte Reserved		
57	Dynabyte Reserved		

Table 7.1 Dynabyte S-100 Bus Pin Assignments (Continued)

Pin No.	Signal-Type	Active Level	Description
58	Dynabyte Reserved		
59	Dynabyte Reserved		
60	Dynabyte Reserved		
61	Dynabyte Reserved		
62	Dynabyte Reserved		
63	Dynabyte Reserved		
64	Dynabyte Reserved		
65	SMREQ* (M)	L	The status signal identifying bus cycles which reference memory read, write or refresh.
66	SRFSH* (M)	L	The status signal identifying the current address on A0 - A6 is a dynamic memory refresh address.
67	PHANTOM*	LOC	A bus signal which disables memory during disk controller ROM access.
68	MWRT (B)	H	A bus memory write signal. $\overline{\text{pWR}}\text{sOUT}^*$ (logic equation). This signal must follow $\overline{\text{pWR}}^*$ by not more than 30 ns.
69	Dynabyte Reserved		
70	Dynabyte Reserved		
71	Dynabyte Reserved		
72	RDY (S)	HOC	See comments for pin 3.
73	INT* (S)	LOC	The primary interrupt request bus signal.
74	HOLD* (M)	LOC	The control signal used in conjunction with $\overline{\text{pHLDA}}$ to coordinate bus master transfer operations.
75	RESET* (B)	LOC	Requests the reset of all bus master devices. Connects to the Front Panel Reset Switch and activates $\overline{\text{POC}}^*$.

Table 7.1 Dynabyte S-100 Bus Pin Assignments (Continued)

Pin No.	Signal-Type	Active Level	Description
76	pSYNC (M)	H	The control signal identifying the beginning of a processor cycle.
77	pWR* (M)	L	The control signal signifying the presence of valid data on DO bus.
78	pDBIN (M)	H	The control signal that requests data on the DI bus.
79	A0 (M)	H	Address bit 0 (least significant).
80	A1 (M)	H	Address bit 1.
81	A2 (M)	H	Address bit 2.
82	A6 (M)	H	Address bit 6.
83	A7 (M)	H	Address bit 7.
84	A8 (M)	H	Address bit 8.
85	A13 (M)	H	Address bit 13.
86	A14 (M)	H	Address bit 14.
87	A11 (M)	H	Address bit 11.
88	DO2 (M)	H	Data out bit 2.
89	DO3 (M)	H	Data out bit 3.
90	DO7 (M)	H	Data out bit 7.
91	DI4 (S)	H	Data in bit 4.
92	DI5 (S)	H	Data in bit 5.
93	DI6 (S)	H	Data in bit 6.
94	DI1 (S)	H	Data in bit 1.
95	DI0 (S)	H	Data in bit 0 (least significant for 8-bit data).
96	sINTA (M)	H	The status signal identifying the bus input cycle(s) that may follow an accepted interrupt request presented on INT*.

Table 7.1 Dynabyte S-100 Bus Pin Assignments (Continued)

Pin No.	Signal-Type	Active Level	Description
97	SWO* (M)	L	The status signal identifying a bus cycle which transfers data from a bus master to a slave.
98	Dynabyte Reserved		
99	POC* (B)	L	The Master Reset signal. The Power-On-Clear signal for all devices. When this signal goes low, it must stay low for at least 10 ms.
100	GND (B)		System ground and common to Pin 50.

NOTES:

- (1.) Signal Type (B) Bus
 (M) Bus Master
 (S) Bus Slave
 * Logical NOT
- (2.) Active Level H High
 L Low
 OC Open Collector

Figure 7.1 5710 Computer Chassis Wiring Diagram

CPU POINTS		
PARALLEL CONNECTOR		
CARD I/O NO.	SIGNAL NAME	WIRING NO.
32	PARALLEL IN 0	1
41	" 1	2
43	" 2	3
40	" 3	4
37	" 4	5
39	" 5	6
44	" 6	7
38	PARALLEL IN 7	8
8	GROUND	9
50	PARALLEL IN READY	10
22	SENSE	11
6	FLAG 1	12
45	INTERLUPT	13
26	PARALLEL OUT 0	14
29	" OUT 1	15
37	" OUT 2	16
28	" OUT 3	17
35	" OUT 4	18
27	" OUT 5	19
34	" OUT 6	20
33	PARALLEL OUT 7	21
10	GROUND	22
29	PARALLEL OUT 8	23
14	PARALLEL OUT 9	24
4	FLAG 2	25
2	GROUND	26
39	GROUND	27
31	GROUND	28
SERIAL 2 TERMINAL		
15	EIA IN	2
13	EIA OUT	3
7	RTS (OUT)	4
24	CTS (IN EIA)	5
16	DSR (IN)	6
47	GROUND	7
46	+20 MA OUT	11
21	-20 MA OUT	18
5	DTR (OUT)	20
25	+20 MA IN	21
15	-20 MA IN	25
SERIAL 1 CENTER		
2	EIA IN	2
17	EIA OUT	3
3	RTS (OUT)	4
20	CTS (IN EIA)	5
8	DSR (IN)	6
48	GROUND	7
46	+20 MA OUT	11
23	-20 MA OUT	18
1	DTR (OUT)	20
9	+20 MA IN	21
11	-20 MA IN	25

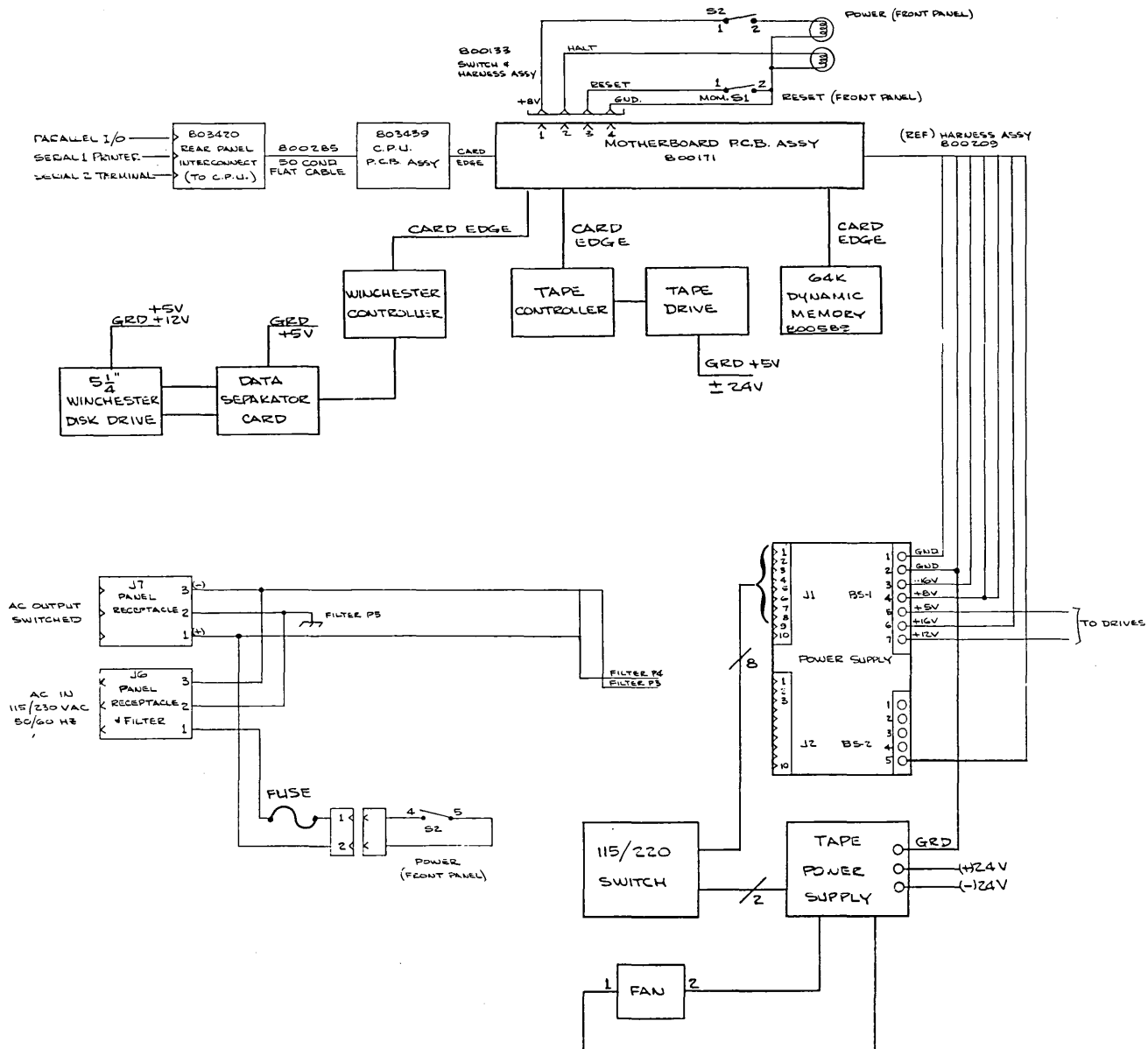
* CPU JUMPER TO ± 25 23Z

Table 7-2 — 5710 Computer Replaceable Parts List

Ref.	Description	Mfg.	Mfg. Part No.	Dynabyte Part No.
	COVER: TOP	DYNABYTE	700162	700162
	PANEL: BOTTOM	DYNABYTE	721068	721068
	DRIVE MOUNTING PLATE	DYNABYTE	720637	720637
	BEZEL: CABINET	DYNABYTE	700054	700054
	FOOT: RUBBER	DYNABYTE	700216	700216
	ASM: 5710 FRONT PANEL	DYNABYTE	807810	807810
	HARNESS: FRONT PANEL	DYNABYTE	800133	800133
	BRACKET: TAPE DRIVE	DYNABYTE	721050	721050
	BRACKET: WINCHESTER DRIVE	DYNABYTE	721032	721032
	SWITCH: ALTERNATE ACTION	CK	5101/W/BEZEL	711206
	SWITCH: ALTERNATE ACTION	CK	5108/W/BEZEL	702700
	LAMP: 10V	PRECISION	PL389	702717
	ASM: REAR PANEL	DYNABYTE	802470	802470
	FUSEHOLDER: 3AG	LITTLEFUSE	348-8-7-1	700594
	FUSE: 3AG 6A	LITTLEFUSE	312003	700198
	FUSE: 3AG 6A	LITTLEFUSE	312006	700180
	FAN: 115 VAC	IMC	WS2107F-2	700504
	FAN: 230 VAC	ROTRON	WRA31	714866
	GUARD: FAN	IMC	005-009	700522
	HARNESS: REAR PANEL REV B	DYNABYTE	804380	804380
	CONNECTOR: IEC M 250V 6A	BELDEN	17252	702880
	CONNECTOR: NEMA F 115V 15A	HUBBELL	5256	702862
	FASTENER: DB25 CONNECTOR	AMPHENOL	17893	700630
	MODULE: 5710 POWER SUPPLY	DYNABYTE	807392	807392
	MODULE: TAPE POWER SUPPLY	DYNABYTE	721086	721086
	HARNESS: TAPE DRIVE POWER	DYNABYTE	721163	721163
	ASM: CARD CAGE 12 SLOT	DYNABYTE	800038	800038
	ASM: S-100 CARD RETAINER	DYNABYTE	800152	800152
	PCA: MOTHERBOARD	DYNABYTE	800171	800171
	HARNESS: MOTHERBOARD	DYNABYTE	800209	800209
	5710 CABLE ASSEMBLIES			
	CABLE: CPU I/O	DYNABYTE	800285	800285
	CABLE: QUADRAPORT I/O	DYNABYTE	803705	803705
	CABLE: OCTAPORT I/P	DYNABYTE	803515	803515
	CABLE: WINI CONT/SEP CARD			
	50 CON	DYNABYTE	721137	721137
	CABLE: WINI DRIVE/SEP CARD			
	20 CON	DYNABYTE	721111	721111

Table 7-2 — 5710 Computer Replaceable Parts List (Continued)

Ref.	Description	Mfg.	Mfg. Part No.	Dynabyte Part No.
	CABLE: WINI DRIVE/SEP CARD 34 CON	DYNABYTE	721093	721093
	CABLE: TAPE DRIVE/CONT	DYNABYTE	721145	721145
	HARNESS: POWER SUPPLY TO WINI DRIVE	DYNABYTE	721171	721171
	CORD: 115 VAC POWER	BELDEN	17250	700414
	CORD: 230 VAC POWER	STORM	G2123-02M-GY	708100
	5710 S-100 CARDS			
	PCA: CPU	DYNABYTE	803439	803439
	PCA: DYNAMIC RAM 64K	DYNABYTE	800589	800589
	PCA: PCB, DATA SEP CARD	DYNABYTE	807243	807243
	PCA: WINCHESTER CONT 5.25"	DYNABYTE	807677	807677
	PCA: INTERCONNECT	DYNABYTE	803420	803420
	PCA: OCTAPORT	DYNABYTE	801995	801995
	PCA: OCTAPORT WITH TIMERS	DYNABYTE	801957	801957
	PCA: QUADRAPORT	DYNABYTE	802014	802014
	PCA: QUADRAPORT WITH TIMERS	DYNABYTE	801976	801976
	PCA: TAPE INTERFACE	DYNABYTE	806641	806641
	5710 DISK DRIVES			
	DRIVE: 5.25" WINI, 10MB	CMI	CM5410	720565
	DRIVE: 5.25" WINI, 16MB	CMI	CM5615	719611
	DRIVE: CARTRIDGE TAPE	DEI	CMTD-3400S2	807848
	5710 ROMS			
	ROM, MODEL 5710-A1,B1	DYNABYTE	807888	807888

NOTES

DYNABYTE
Business Computers