DESCRIPTION

The 11/A23 is a complete computer system that is intended for applications in research, business, and education. The 11/A23 is based on the popular DEC LSI-11/23 CPU which provides the PDP-11 instruction set and architecture, thus permitting use of a very large base of existing software and experience of the PDP-11 family. This computer system is ready to use, just add a terminal and software. It is an excellent base for building an LSI-11 system. The system comes with the DEC LSI-11/23 CPU, 256K bytes of memory, and 4 asynchronous serial channels. This system has full 22 bit addressing and can support up to 4M bytes of memory. It also has an 8x4 card cage for 8 quad width cards or 16 dual width cards. This system comes with a built in line time clock and front panel switches for power on/off and status light, system reset, enable/halt with status light, and line clock. The power supply has 3.4 Amps on the 12 Volt and 15 Amps on the 5 Volt. Also the 5 Volt supply can be optionally increased to 23 Amps. The system chassis is 19"W x 5.25"H x 17"D and can be table top or rack mounted.

The rear panel provides precut openings for a variety of 25 pin EIA connectors, 40 & 50 line flat cable connectors. There are three versions of the rear panel:

Precut holes: Option #	25 Pin EIA	40 Line Flat	50 Line Flat
-01 (Standard)	4	6	2
-02	8	2	2
-03	12	3	2

These cards are included as standard in the 11/A23 computer system:

KDF11-AA CPU
MEM11-128 MEMORY
MSI11-4 SERIAL INTERFACE

SPECIFICATIONS SUBJECT TO CHANGE WITHOUT NOTICE.

DESCRIPTION

The Model 11/A computer system is available without the CPU card, serial interface card, and internal cable. With this configuration the system chassis is ready for installation of up to 16 dual width, Q-Bus compatible cards. With the 11/A-E, you may assemble your own LSI-11 computer system easily. All other specifications and rear panel openings remain the same.

11/A-X
LSI-11 EXPANSION CHASSIS
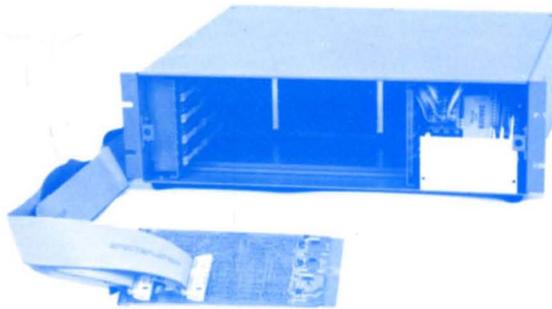
DESCRIPTION

This system chassis adds 16 dual Q-Bus slots to an existing LSI-11 system. The jumper cable plugs into a dual slot in the original backplane. No slot is required in the expansion chassis for the jumper cable since it plugs into special connectors (BCV11 compatible) in the rear of the 8LCC card cage. If the 11/A-X is to be used with another Andromeda 8LCC card cage, the 11/A-X is supplied with a cable assembly that uses the expansion port on the first 8LCC rather than a dual width card slot.

Since the 11/A-X does not have a control panel, power is controlled by a switch on the rear of the chassis.

The rear panel provides precut openings for a variety of 25 pin EIA connectors, 40 & 50 line flat cable connectors. There are three versions of the rear panel:

Precut holes: Option #	25 Pin EIA	40 Line Flat	50 Line Flat
-01 (Standard)	4	6	2
-02	8	2	2
-03	12	3	2

SPECIFICATIONS SUBJECT TO CHANGE WITHOUT NOTICE.

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CANOGA PARK, CALIFORNIA 91304 U.S.A.
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TM: DEC and LSI-11 are trademarks of the Digital Equipment Corp.

The 11/M12 is a very compact LSI-11 based computer system. It is intended for applications where a powerful computer is needed within a minimum space.

FEATURES:

- Compact enough to fit in a briefcase:
  13"W x 4"H x 15"D, 22.5 lb.

- DEC LSI-11/23 CPU with Memory Management Unit
  —up to 4-Mbytes of memory addressable

- 256-Kbytes main memory standard

- 10-Mbytes fixed Winchester disk
  —emulates two RL01 devices with other
  emulations available

- 512-Kbytes removable 5¼" floppy disk
  —emulates an RX02 device

- 4-serial interface channels—emulates DLV11,
  RS-232 and 20mA current loop, 50 baud to 19.2 Kbaud

- 5 x 2 Q-Bus card cage—one free slot in standard configuration

- Touch sensitive system control panel—minimum moving parts

- Runs any standard PDP-11 software—RT-11, TSX-Plus, RSX-11M, etc.

DESCRIPTION:

The 11/M12 is an extremely compact, but powerful, desktop computer system. It is small enough to be carried in a briefcase. It needs only the addition of a suitable terminal and software to be solving problems for you. Never before has the computing power of the DEC LSI-11/23 CPU been put into a package this small with enough main memory and mass storage to do useful work. The 11/M12 can be used as the basis for a small timesharing system. Alternatively, it can be the core of a single-user workstation. Its uniquely compact package allows it to be transported to the work location: It is ideal for sales people, engineers or executives who need this kind of computer power away from their office, but cannot be tied to a remote computer through a slow telephone line. When used with a small terminal, only an external AC power source is required.

The 11/M12-W10 incorporates the DEC LSI-11/23 CPU. This processor is a member of the popular DEC PDP-11 family. Thousands of software products are compatible with this family of machines. The 11/23 Memory Management Unit is included. The MMU allows up to 4 million bytes of main memory to be addressed by the CPU. 256 Kbytes of main memory are included in the standard 11/M12 package. By using the spare slot and 256 Kbit, it will be possible to fit a full 4 Mbytes of main memory into the 11/M12 card cage in the forseeable future.

The 10Mbyte, fixed media Winchester disk provides enough storage space for most single-user and small multi-user applications. In the standard configuration, the Winchester disk emulates two RL01 logical devices with 5.12 Mbytes of formatted capacity each. Other emulations are available, including one RL02 device at 10.24 Mbyte or eight RK05 devices at 2.4 Mbytes each. The 5¼" floppy disk drive provides 512 Kbytes of formatted capacity using an RX02 emulation. The floppy disk is used for loading the Winchester disk, backup and data interchange. Both the Winchester and floppy disk are controlled by the Andromeda WDC11 multi-function controller.

Typical Workstation Configuration

Typical Transportable System

A four-channel serial interface card is also part of the standard 1/M12. Each channel emulates a DEC DLV11. RS232 and 20 mA current loop interfaces are available on all four channels. A unique feature of the MSI11 serial interface is the ability to control the data rate of each channel via DIP switches located on the rear connector panel of the computer chassis. Each channel has 16 individually selectable data rates from 50 baud to 19.2 Kbaud. In a single user workstation application, the serial channels might be assigned to a console video terminal, a serial line printer, a letter quality printer, and a modem. A small business time-sharing system might have three video terminals and a printer.

The standard card set (CPU), Memory, Disk Controller and Serial Interface) uses four of the five dual width slots in the Q-Bus card cage. The fifth slot is available for a variety of options. Another memory card or another serial interface card could be added. For special applications, an analog or parallel digital interface would allow connection to external hardware. In an engineering workstation application, a video graphic display controller may be used. The remaining slot could also accommodate another mass storage controller such as an 8″ floppy disk or ¼″ cartridge magnetic tape drive.

Total power available in the 11/M12 Computer as described here is 10A at 5V and 5A at 12V. Unused power available at the empty card slot is 1.5A at 5V and 2.5A at 12V.

Rear view with connector panel in place
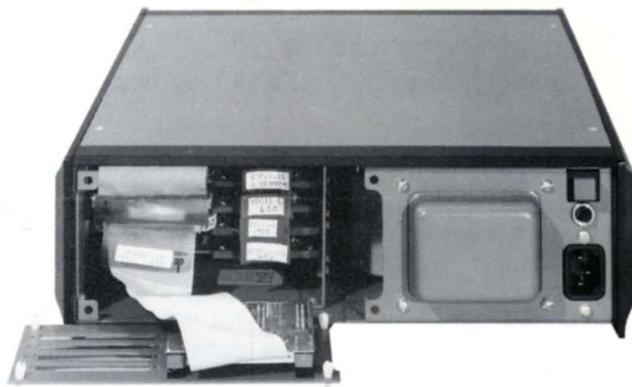
Rear view showing card cage access

TO ORDER:

11/M12-W10: Compact computer system as described above.

11/M12-D2: Compact computer system with LSI-11/2 CPU, 64 Kbytes main memory, 4 serial channels, DMDC11 double density/DMA floppy disk controller, two 5¼″ half-height floppy drives with 819 Kbytes capacity each.

Andromeda also offers a wide selection of compatible software, terminals, printers, and other peripherals.

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9000 ETON AVENUE
CANOGA PARK, CALIFORNIA 91304 U.S.A.
(818) 709-7600   TWX: 910-494-1248

FEATURES

- FUNCTIONAL SUPERSET OF DEC™ ADV11-A
- 16 SINGLE-ENDED OR 8 DIFFERENTIAL INPUT CHANNELS
- 12 BIT RESOLUTION
- ENTIRE DATA ACQUISITION SYSTEM IS A DUAL-WIDTH CARD
- SHIELDED DATA ACQUISITION MODULE
- PLUGS INTO LSI-11 BACKPLANE
- USES STANDARD VOLTAGES (+5, +12)
- UP TO 50 kHz THROUGHPUT RATE
- BURST, AUTO SEQUENCE, AND TRUNCATION MODES FOR MAXIMUM THROUGHPUT
- ON-BOARD 16 WORD FIFO DATA BUFFER
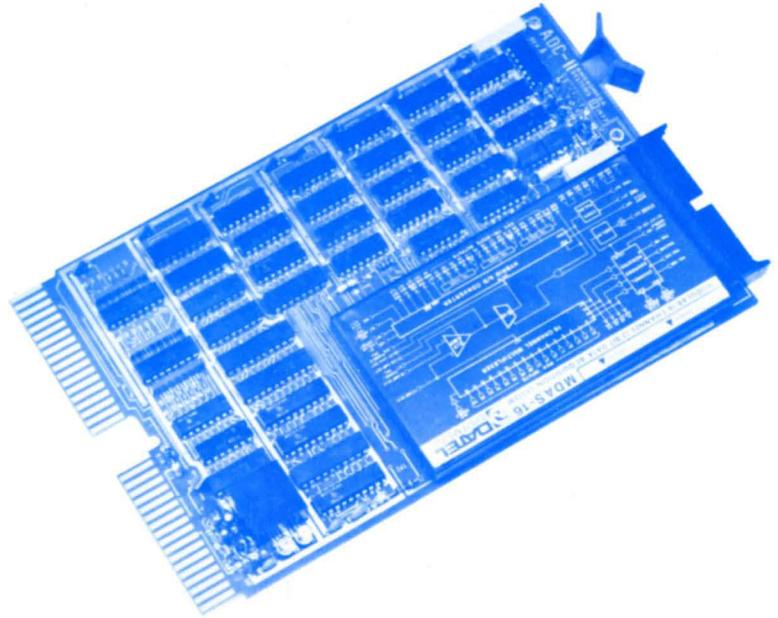
DESCRIPTION

The ADC11 is a compact 16 channel/12 bit data acquisition system housed on a dual-width card that plugs into the LSI-11 backplane. The ADC11 uses the standard voltages available on the backplane. The removable data acquisition module on the ADC11 is housed in a steel case, minimizing EMI.

The ADC11 provides jumper programmable input ranges of 0 to +5V, 0 to +10V, $\pm 2.5V$, $\pm 5V$, and $\pm 10V$. Input configurations are 16 channel single-ended, 16 channel quasi-differential, and 8 channel fully differential (specify fully differential when ordering).

Precision reference voltages of +5.000V and -5.000V and a precision sawtooth of $\pm 5V$ are available at the 40 pin flat cable connector to facilitate user calibration and checkout. Two PIN connectors allow simple connection of the External Strobe and Clock Strobe signals from the PRTC11 Real Time clock.

The ADC11 has data register and command status register mappings identical to the ADV11-A, assuring maximum compatibility with existing DEC software. Unused ADV11 bits are used to control additional functions in the ADC11.

A variety of data acquisition modes not found in the ADV11-A are implemented in the ADC11 providing maximum data throughout through minimum computer attention. These modes are completely programmable:

SEQUENCE MODE: Automatically advances the multiplexer one channel and dignitizes one reading for each conversion strobe.

SEQUENCE/TRUNCATION MODE: Sequentially converts each channel up to a maximum channel number equal to the value stored in the truncation register.

BURST MODE: Once started by a single conversion strobe, converts a selected channel continuously at 20 μs/conversion until the on-board 16 word FIFO is full. (In maintenance mode, conversions occur continuously regardless of the state of the FIFO.)

BURST/SEQUENCE MODE: Once started by a single conversion strobe, converts channels (starting with selected channel) sequentially at 20 μs/conversion until channel 15 is converted or the truncation channel is converted (truncation mode).

SPECIFICATIONS

Compatibility: Superset of DEC ADV11-A (vernier DAC replaced by truncation register)

Power Requirements:
- .9A at +5VDC (TYP)
- .25A at +12VDC (TYP)

LSI-11 Bus Interface: 3 Registers (2 bus addresses)
- Command/Status (Read/Write)
- Data Buffer (Read - Only)
- Truncation Channel (Write - Only)

Register Bit Assignments:

- Command/Status

15	14	13	12	11	10	9	8	7	6	5	4	3	2	1	0
				A/D Channel								ID ENA			GO

Error Interrupt Enable
Error
Sequence Enable
Burst Enable
Done Interrupt Enable
Done
Clock Strobe Enable
External Strobe Enable
Maintenance
Truncation Enable

- Data Buffer

15	14	13	12	11	10	9	8	7	6	5	4	3	2	1	0
NOT USED		ID		A/D DATA											

- Truncation Channel
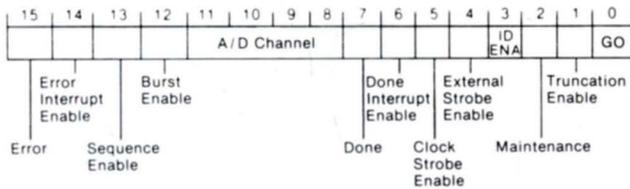
15	14	13	12	11	10	9	8	7	6	5	4	3	2	1	0
NOT USED												Truncation Channel			
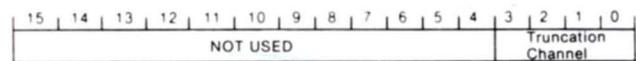
Interrupts: 2, individually vectored:
- Data Ready
- Error

CB11-A CONNECTOR BOX
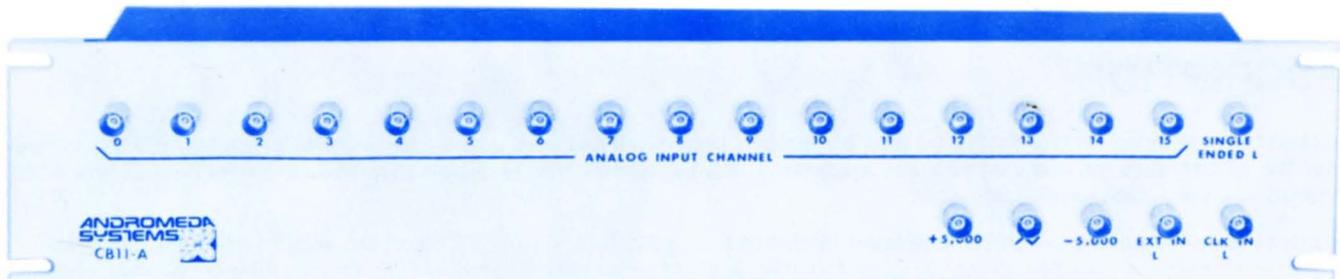
An optional termination box, the CB11-A, provides BNC connectors for all 16 channel inputs as well as 2 external conversion command inputs. The calibration outputs are also brought to BNC connectors. The CB11-A is a 3.5" high rack mountable or free-standing unit. It connects to the ADC11 40 pin external connector with an optional cable.

CB11-A Connector Box (Back View).

TO ORDER

ADC11: Analog to digital converter
ADC11D: ADC11 with 8 differential inputs
CB11-A: Connector box

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CANOGA PARK, CALIFORNIA 91304 U.S.A.
(213) 709-7600   TWX: 910-494-1248

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ANDROMEDA SYSTEMS INC.

DAC11
DIGITAL TO ANALOG CONVERTER

LSI-11™COMPATIBLE

FEATURES

- FUNCTIONAL SUPERSET OF DEC™ AAV11-A
- UP TO 4 D/A CHANNELS
- 12 BIT RESOLUTION
- USES STANDARD VOLTAGES (+5, +12)
- 16 DIGITAL CONTROL OUTPUTS
- 4 ADJUSTABLE PULSE OUTPUTS
- FAST SETTLING: ≤ 3 MICROSECONDS
- REMOTE COMMON MODE SENSING ON EACH CHANNEL
- PLUGS INTO LSI-11 BACKPLANE (DUAL WIDTH)
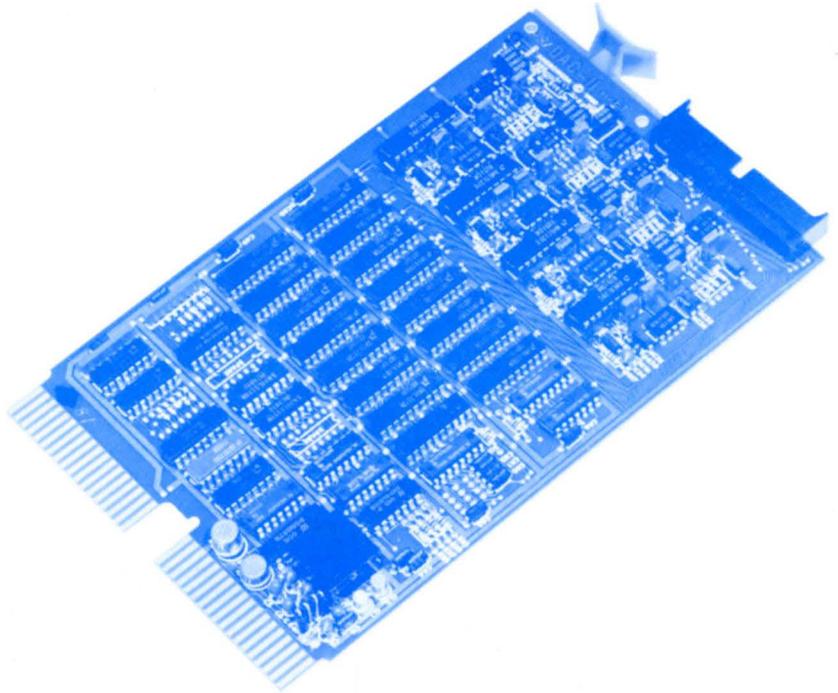
DESCRIPTION

The DAC11 is a 4 channel/12 bit digital to analog converter on a dual-width, Q-bus compatible card. Included on the card is a DC/DC converter to generate ±15 volts for the analog circuitry. Each channel has user selectable output voltage ranges of ±2.5V, ±5V, ±10V, 0 to +5V, and 0 to +10V. Additionally, the complement of each analog output is available on the card. Settling time to 0.01% of full scale is ≤ 3μs for a 10 volt step change.

Each analog output has remote sensing of the load ground potential. This allows ground potential differences between the computer and load to be rejected, assuring 12 bit accuracy at the end of long cables.

Each data channel has 4 TTL compatible outputs for user control functions. These outputs are controlled by the 4 most significant bits of each of the four data registers. Four adjustable one-shots, which may be triggered from a variety of sources, are included for pulse control applications. For complete AAV11-A compatibility, the four least significant bits of the channel 3 data register are also output. Each D/A converter is controlled by the least significant 12 bits of its data register.

FUNCTIONAL BLOCK DIAGRAM
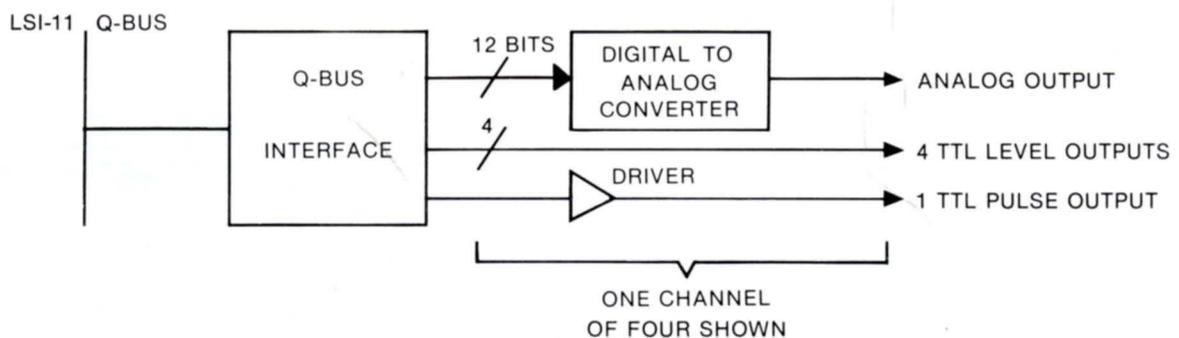
SPECIFICATIONS

Compatibility: Functional superset of the DEC AAV11-A. Extra functions use unassigned bits in the registers and unused pins on the I/0 connector.

Power Requirements:
- .7A at +5VDC (TYP)
- .35A at +12VDC (TYP)

LSI-11 Bus Interface: 4 Registers (Read/Write):
- Channel 0 data
- Channel 1 data
- Channel 2 data
- Channel 3 data

Data register bit assignments:

15	14	13	12	11	10	9	8	7	6	5	4	3	2	1	0
TTL Outputs				DAC Control											
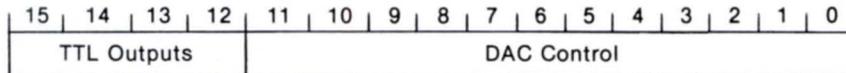
CB11-C CONNECTOR BOX
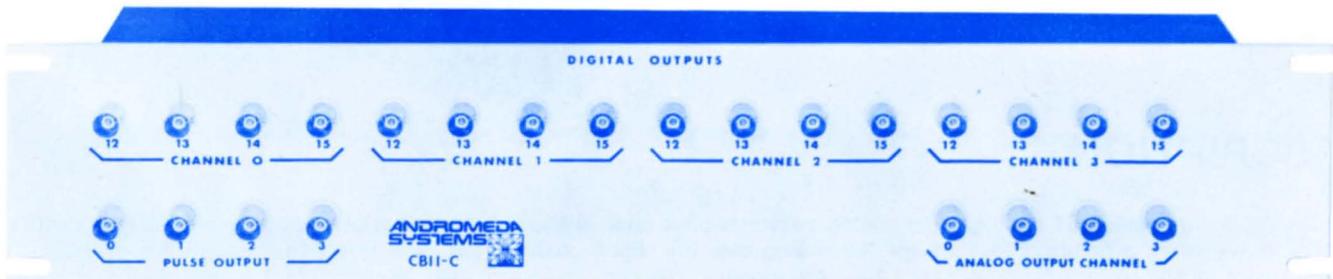
An optional termination box, the CB11-C, provides BNC connectors for the four analog outputs, the 16 digital control outputs and the four pulse outputs. The connector box is 3.5" H and may be rack mounted or free-stand. The CB11-C plugs into the I/0 connector on the DAC11 with an optional cable.
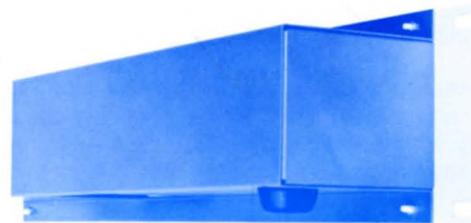
CB11-C   Connector Box (Back View).

TO ORDER

DAC11:	Digital to analog converter, 4 channels
DAC11-A:	DAC11, 1 channel only
DAC11-B:	DAC11, 2 channels only
DAC11-C:	DAC11, 3 channels only
CB11-C:	Connector box
LABEX3:	Driver software for DAC11

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FEATURES:

- Four 16 Bit Registers on one Dual-Width Card
- Inputs Are Assignable at Byte or Bit Level
- 64 Bits Plus Strobes Available on Two Standard 40-Pin Connectors
- Q-Bus Address Is Switch Selectable
- Unique "User Area" for Custom Applications
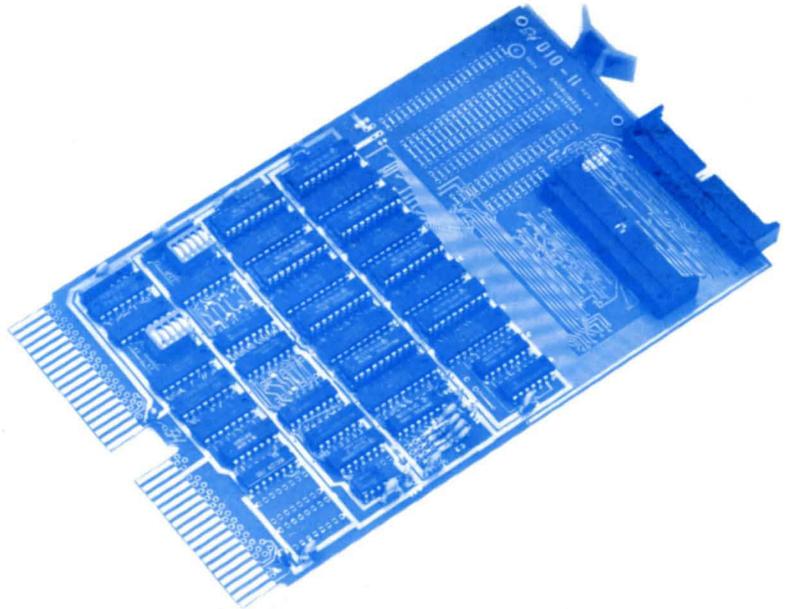
DESCRIPTION:

The DIO11 Digital Input/Output Module is a dual-width module which plugs directly into an LSI-11 computer system. It provides all of the logic necessary to implement four 16 bit registers (designated A, B, C, and D) and interface them to the LSI-11 Q-bus. The 64 bits output by these registers are available on two standard 40 pin connectors. These bits may be converted to inputs by a simple hardware modification requiring no tools.

Four other signals are provided on the output connectors. These are pulses occurring whenever the low byte of any of the registers is loaded. In addition, the DIO11 also contains a unique "user area" on the board, where custom circuitry may be installed. Power (+5v.), all of the LSI-11 bus signals, and the upper 8 bits of register A (along with their corresponding I/O lines) are available for user connection.

The DIO11 uses four contiguous Q-bus locations, one for each register. The address of register A is specified by means of two 5 position DIP switches on the board. This address may be anywhere in the normal LSI-11 peripheral address space (160000-177770).

Once the address of register A has been set, the other registers are addressed as follows:

Register	Address
B	A+2
C	A+4
D	A+6

The registers may be addressed in byte mode. For example, the address of the high byte of register C would be A+5.

There are 8 jumpers near the "user area" labelled A8-A15. These correspond to the upper 8 bits of register A. These may be used as outputs to custom circuitry, or as inputs to the LSI-11 from custom circuitry. Also, by cutting one of the jumpers (on the bottom of the board), custom circuitry may use that I/O line to communicate with whatever peripheral device is on the other end of the 40 line cable.

The two I/O connectors (J1 and J2) are assigned as follows:

J1				J2			
1.	A14	2.	GND	1.	C14	2.	GND
3.	B15	4.	B14	3.	D15	4.	D14
5.	A12	6.	A15	5.	C12	6.	C15
7.	B13	8.	B12	7.	D13	8.	D12
9.	A10	10.	A13	9.	C10	10.	C13
11.	B11	12.	B10	11.	D11	12.	D10
13.	A8	14.	A11	13.	C8	14.	C11
15.	B9	16.	B8	15.	D9	16.	D8
17.	A6	18.	A9	17.	C6	18.	C9
19.	B7	20.	B6	19.	D7	20.	D6
21.	A4	22.	A7	21.	C4	22.	C7
23.	B5	24.	B4	23.	D5	24.	D4
25.	A2	26.	A5	25.	C2	26.	C5
27.	B3	28.	B2	27.	D3	28.	D2
29.	A0	30.	A3	29.	C0	30.	C3
31.	B1	32.	B0	31.	D1	32.	D0
33.	GND	34.	A1	33.	GND	34.	C1
35.	GND	36.	GND	35.	GND	36.	GND
37.	GND	38.	A Pulse	37.	GND	38.	C Pulse
39.	GND	40.	B Pulse	39.	GND	40.	D Pulse

This pinout is identical to the 1664TTL.

The output drivers are standard, Low Power Schottky TTL. High power output drivers may be substituted by the user for the 74LS273 chips supplied, in sockets, with the board. The inputs are standard LSTTL loads (81LS95). Pullup resistors may be substituted for the output drivers, in groups of 8 bits, to change outputs to inputs. If a pull-up resistor isn't needed, inputs can be assigned individually by simply bending a pin on the output driver out of its socket.

Power Requirements: .51A at +5VDC (TYPICAL, all 64 outputs at logic 0)

CB11-X CONNECTOR BOX:
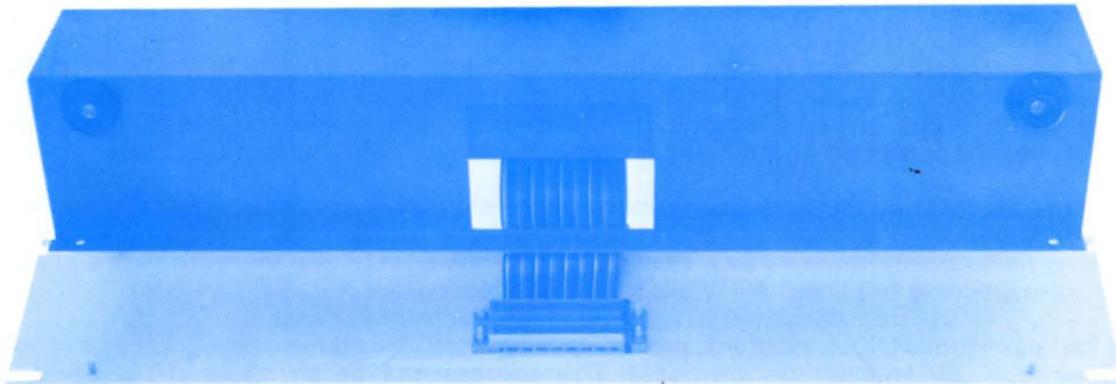
CB11-X Connector Box Exploded (Back View)

An optional termination box, the CB11-X provides a convenient base on which to build custom I/O and indicator panels. The CB11-X is a 3.5" high rack mountable or free-standing unit. The blank front panel is .125" aluminium painted flat white. Two 40 line male cable connectors are mounted on the rear of the panel. Each connector has 18" of color coded flat cable for user connections.
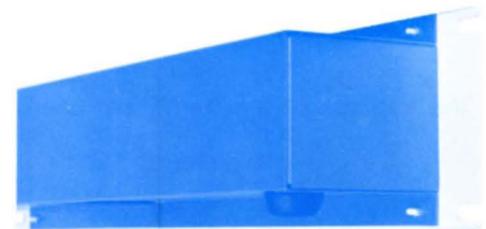
CB11-X Connector Box (Back View)

TO ORDER:

DIO11: 64 Line Digital I/O Module

CB11-X: General Purpose Connector Box

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ANDROMEDA SYSTEMS INC.

FEATURES

- PARALLEL (LAV11-type) INTERFACE
- VERSIONS AVAILABLE FOR:
    - -LA180
    - -CENTRONICS (all types)
    - -HYTYPE II
- COMPATIBLE WITH EXISTING SOFTWARE HANDLERS (LP:)
- INCLUDES 15' CABLE
- DUAL WIDTH CARD
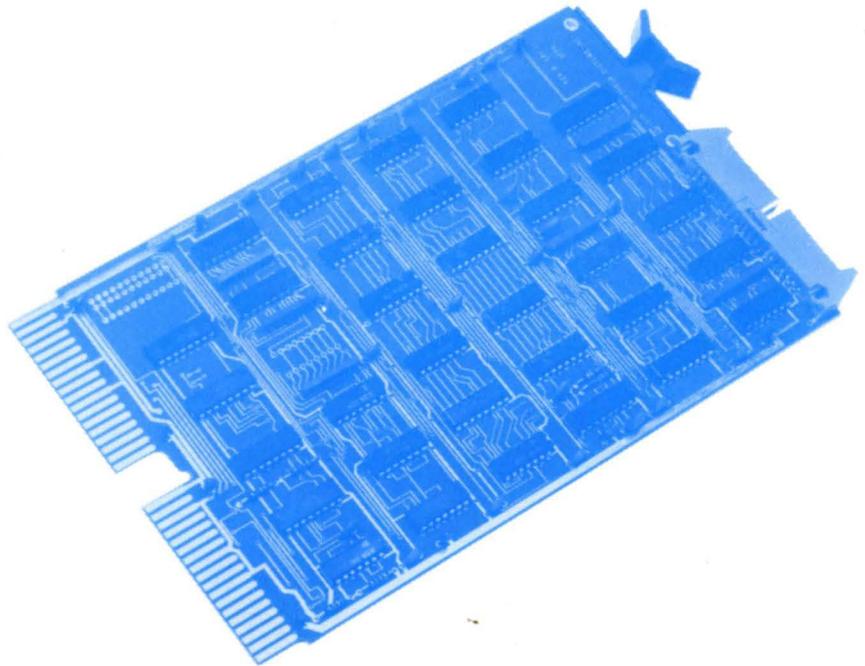
DESCRIPTION

The LPI11 is a Q-Bus compatible interface that allows a user to control a variety of popular printers. The LA180 and Centronics versions of the interface provide a fully parallel 8 bit data path to the printer as well as all necessary control and handshake signals.

The HYTYPE II version of the LPI11 provides additional logic to the basic interface to fully control all of the features of the versatile Diablo printer mechanism. The extra capabilities include an 11 bit wide data path for full spacing control, three different strobes (data, horizontal motion, and vertical motion), as well as a ribbon lift for black/red printing.

The LA180 and Centronics versions (LPI11-A and LPI11-B respectively) are directly compatible with existing DEC software handlers (LP:). The HYTYPE II version (LPI11-C) requires special software to take advantage of the printer features. It should be noted that Centronics-type interfaces are available for most printers. The LPI11-B has been used successfully with Printronix and Teletype Model 40 printers that had a Centronics-type interface.

Each interface card includes a 15 foot cable for direct connection to your printer.

The LPI11 will support any printer with an LA180 (-A) or Centronics (-B) interface. The following compatible printers may be purchased from Andromeda:

CT701   (Centronics 701)

    * 60 CPS - Bidirectional
    * 5x7 Matrix
    * Tractor Feed
    * Vertical Forms Unit (Top of Form, Vertical Tab)
    * 64 Character ASCII Set
    * Programmable Character Elongation
    * Table Top

CT703   (Centronics 703)

    * 180 CPS - Bidirectional
    * 7x7 Matrix
    * Tractor Feed
    * Vertical Forms Unit (Top of Form, Vertical Tab)
    * 96 Character ASCII Set
    * Programmable Character Elongation
    * Table Top

TTM40   (Teletype Model 40 in acoustic enclosure with Centronics
         interface)

    * 300 LPM - Chain Printer
    * Fully Formed, Changeable Character Set
    * Tractor Feed
    * Vertical Forms Unit (Top of Form)
    * 96 Character ASCII Set Standard
    * Floor Standing

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ANDROMEDA SYSTEMS INC.

ADD-ON WINCHESTER DISK SUBSYSTEMS AND COMPLETE LSI-11
COMPUTER SYSTEMS WITH WINCHESTER DISK STORAGE ARE AVAILABLE
IN A CHOICE OF TABLE TOP OR RACK MOUNTABLE CHASSIS.

ADD-ON SUBSYSTEMS
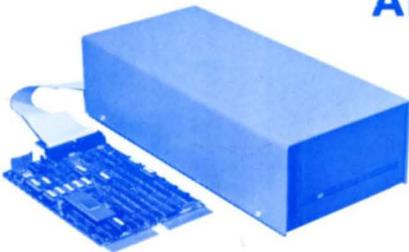
MDS

RDS

WMDS


DFDS

FULL TURNKEY COMPUTER SYSTEMS

11/M1

11/M2

11/B

FEATURES

- Single, dual-width WDC11 controller plugs directly into Q-Bus
- Typical storage capacities from 5-Mbytes to 56-Mbytes, and more
- Emulations of DEC RK05, RL01/02, or RP02 available, 22-bit addressing is supported by all emulations
- Integral floppy disk controller is optional, emulates DEC RX02/03, 8″ media is RX01/02 compatible for program and data interchange
- High speed data transfers: 625 Kbytes per second, peak; 164 Kbytes per second typical using 5-¼″ Winchester disk drives
- Compact table top and 19″ rack mount enclosures

Low Cost Winchester Ad-On Subsystem
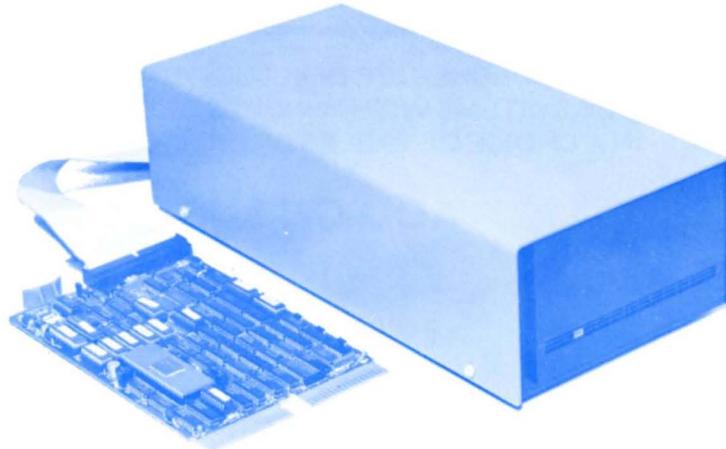
FEATURES

* 5Mb to 56Mb and up
* Standard DEC Emulations Available
  RK05
  RL01/2
  RP02
* Compact Table Top Chassis: 7"W × 4"H × 15"L
* Dual width, WDC11 Controller includes built-in bootstrap and formatting

DESCRIPTION

The MDS family provides a minimum cost solution to the problem of adding fixed media mass storage to an LSI-11/Q-Bus computer system. For a floppy disk based system, the MDS will provide not only increased on-line storage, but major performance improvements as well. Since the WDC11 controller with 5.25" Winchester drive has a data transfer rate over 8 times that of an RX02 floppy (164kb/sec versus 20kb/sec for a single cylinder) you may look forward to significant throughput increases, depending on the application.

The MDS subsystem includes the Single Drive Chassis, 6 foot controller cable, and WDC11 controller. The drive chassis contains the 5.25" Winchester disk drive, power supply, and cooling fan. The compact chassis may be placed next to or on top of the host computer system or hidden away behind it.

TO ORDER:

	Capacity	Available Emulations (specify one)			
MDS-5	5Mb	2 × RK05			
MDS-10	10Mb	4 × RK05	2 × RL01	1 × RL02	
MDS-15	15Mb	6 × RK05			
MDS-20	20Mb	8 × RK05	4 × RL01	2 × RL02	1 × RP02
MDS-35	35Mb	3 × RL02	1 × RP02	2 × RK06	1 × RK07
MDS-56	56Mb	4 × RL02	2 × RP02	4 × RK06	2 × RK07

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ANDROMEDA SYSTEMS INC.

9000 ETON AVENUE
CANOGA PARK, CALIFORNIA 91304 U.S.
(818) 709-7600   TWX: 910-494-1248

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ANDROMEDA SYSTEMS INC.

MEM11
Q-BUS MEMORY

LSI-11™ COMPATIBLE

FEATURES:

- Up to 128K words x 18 bits on one dual-width module
- On-board memory refresh
- Address range is switch selectable
- Standard 18 bit or optional 22 bit address recognition
- Battery backup compatible
- Optional byte parity generation and error detection
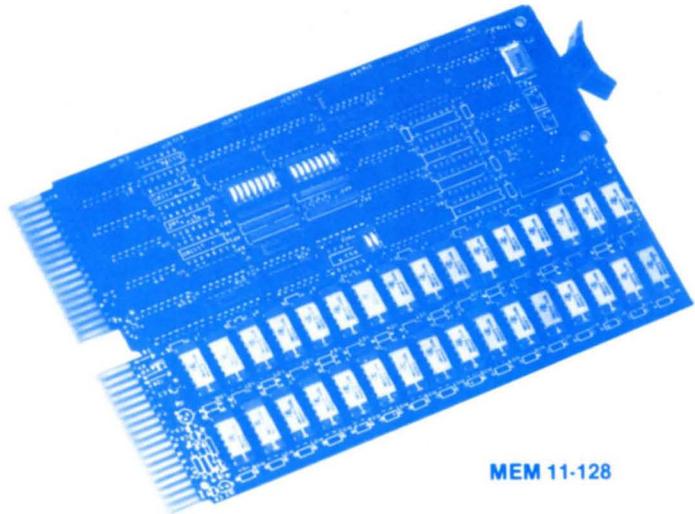
MEM 11-128

DESCRIPTION:

The MEM11 LSI-11 Memory is a dual-width module which plugs directly into an LSI-11 computer system. It provides all of the logic necessary to interface dynamic MOS Random Access Memory (RAM) to the LSI-11 Q-Bus. Using either 4K, 16K, or 64K memory chips, module sizes of 4K, 8K, 16K, 32K, 64K, or 128K words are available. The MEM11 contains on-board memory refresh circuitry. Memory refresh operations are transparent to the user.

The standard MEM11 provides address decoding for 18 address lines (128K words). Since LSI-11/23 processors incorporate 22 address lines, extended 22 bit addressing capability is optionally available. The starting address is switch selectable from 0K to 127K, and the ending address is switch selectable from 1K to 128K, in 1K increments.

LSI-11 systems normally reserve a 4K I/O page at the top of memory for the use of device registers and a bootstrap ROM. On the MEM11, the size of the I/O page (that portion of memory address space to which the MEM11 will not respond) is also switch selectable, from 4K to 1K, in 1K increments.

In addition, memory access time and refresh interval are fully adjustable. Thus, the MEM11 can follow dynamic memory technology as cycle times decrease and refresh intervals increase. With standard 16K chips available now (375 ns cycle time, 2 ms refresh interval), the LSI-11/2 CPU is allowed to run at maximum speed.

The MEM11 may be jumpered to derive its +5 volt and +12 volt power from the battery backup supplies instead of the regular power supplies. This allows data retention in the event of a power failure. Your system must be equipped with battery backup capability.

A byte parity generation and error detection option is also available. The parity implementation is identical to that used on DEC memory boards, and requires a memory parity controller.

The ability to upgrade the MEM11 to use 64K memory chips, faster memory chips, 22 bit addressing, and byte parity generation and error detection, insures that the MEM11 can continue to grow alongside the growing family of LSI-11 processors.

MEM11 FUNCTIONAL BLOCK DIAGRAM
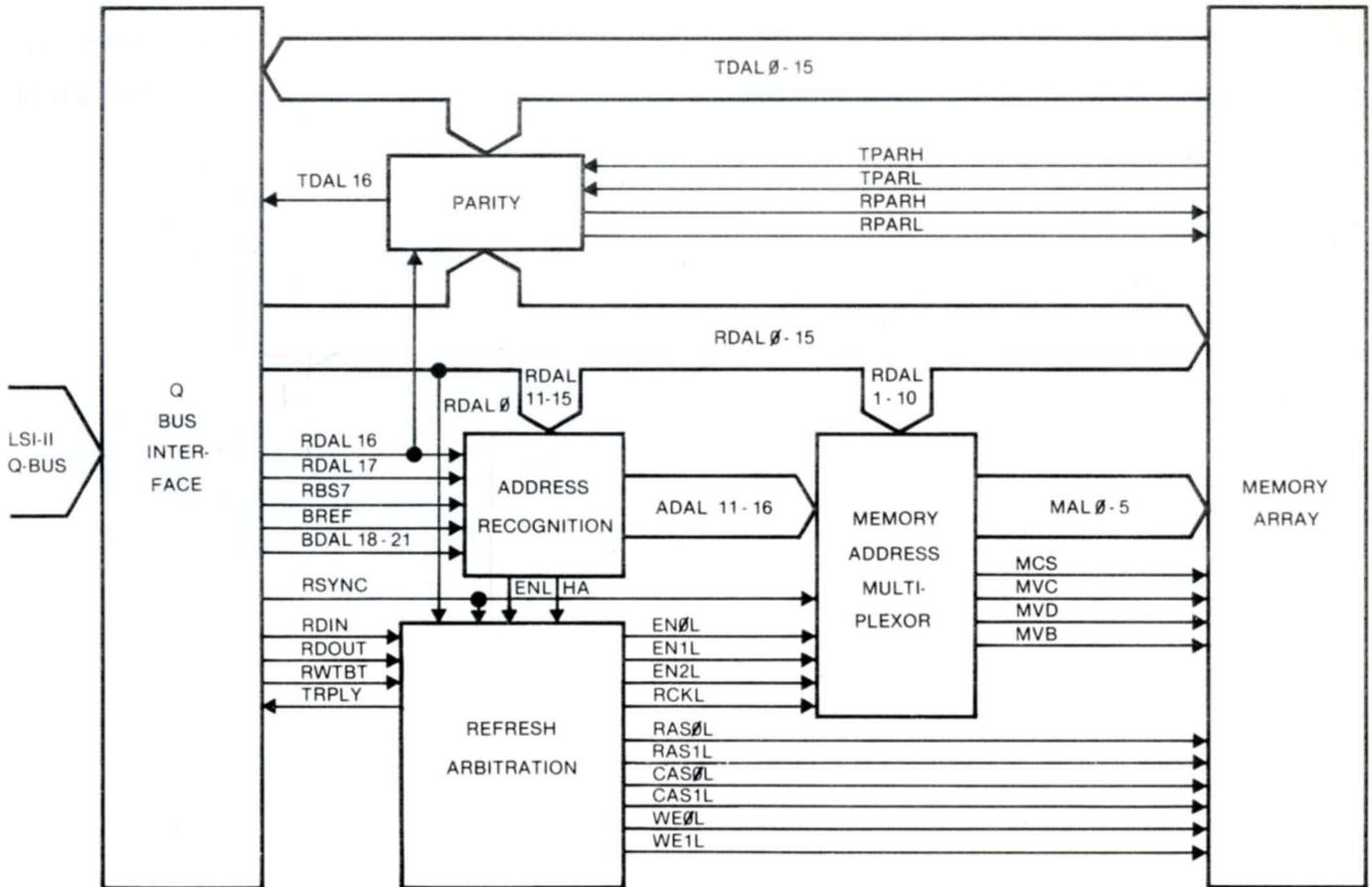
Power requirements (typical, memory intensive program running).

	+5VDC	+12VDC	
MEM11-32	560ma	120ma	4.2W total
MEM11-128	650ma	-0-	3.25W total

TO ORDER:

MEM11-4	4K words x 16 bits (using 4K x 1 memory chips)
MEM11-8	8K words x 16 bits
MEM11-16	16K words x 16 bits (using 16K x 1 memory chips)
MEM11-32	32K words x 16 bits
MEM11-64	64K words x 16 bits (using 64K x 1 memory chips)
MEM11-128	128K words x 16 bits
MEM11-16P	16K words x 18 bits (with parity)
MEM11-32P	32K words x 18 bits (with parity)
MEM11-64P	64K words x 18 bits (with parity)
MEM11-128P	128K words x 18 bits (with parity)

Add "X" to indicate extended (22 bit) addressing.

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ANDROMEDA SYSTEMS INC.

9000 ETON AVENUE
CANOGA PARK, CA 91304

TWX: [910] 494-1248
Ph: [213] 709-7600

ANDROMEDA SYSTEMS INC.

FEATURES

- UP TO 4 ASYCHRONOUS SERIAL INTERFACES ON ONE DUAL WIDTH CARD

- A PARALLEL PRINTER INTERFACE MAY BE SUBSTITUTED FOR ONE OF THE SERIAL CHANNELS

- EACH SERIAL CHANNEL HAS BOTH RS232 AND 20ma CURRENT LOOP AVAILABLE

- 16 DATA RATES FROM 50Bd. TO 19.2KBd. REMOTLELY SELECTABLE

- ALL STANDARD DATA FORMATS: 5-8 DATA BITS, 1, 1.5, OR 2 STOP BITS, EVEN ODD, OR NO PARITY

- INDEPENDENT Q-BUS ADDRESSES FOR EACH CHANNEL AND INDEPENDENT VECTOR ADDRESSES
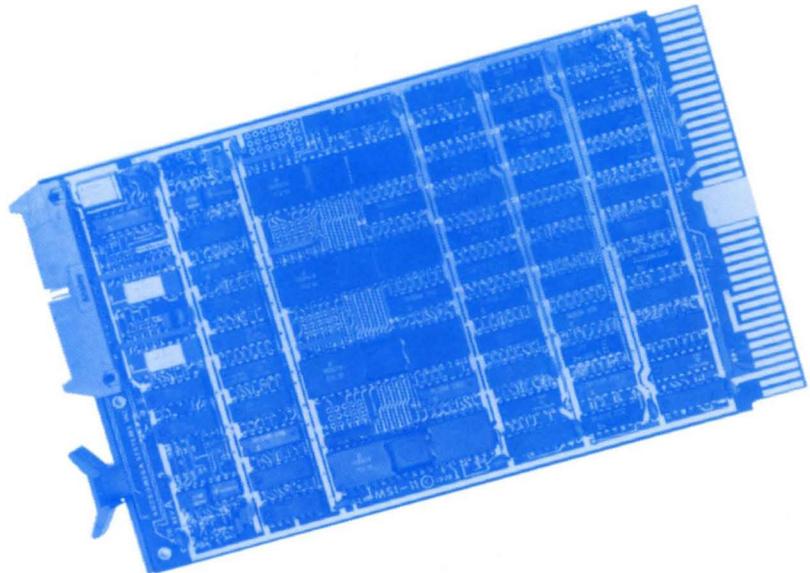
DESCRIPTION

The MSI11 is a dual width card that plugs directly into the LSI-11 Q-Bus. It enables the user to interface up to 4 asynchronous serial lines (or up to 3 serial lines and a parallel printer) to an LSI-11 computer system. Each serial channel is independent in regard to data rate, data format, Q-Bus address, and interrupt vector address. Each channel has its own RS232 and 20ma current loop interfaces. The data rate for each channel may be determined on the card or remotely by jumpers. The 16 data rates are: 50, 75, 110, 134.5, 150, 300, 600, 1200, 1800, 2000, 2400, 3600, 4800, 7200, 9600, and 19200 baud. The data format is selected for each channel by jumpers on the card.

The MSI11 connects to external devices through a 40 pin connector (in serial-only versions, in serial–parallel versions, a 50 pin connector is used) and a variety of adapter cables. The external adapter cables are of two main types, individual and group. The "individual" cable is split into up to 4 groups of 10 lines which run to separate connector assemblies which provide a 25 pin D-type connector, a switch for remote control of the data rate, and jumpers for selecting the "terminal" or "modem" pinout. The "group" cable is simply a connector assembly that mounts the equivalent of up to 4 "individual" connector assemblies on a single, vertical (rather than horizontal) printed circuit board. Both the "individual" and "group" adapter cables provide for a separate printer adapter if the parallel printer interface is used.

The parallel printer interface may be specified in place of one of the serial channels of the MSI11. This interface will talk to LA180 or Centronics type interfaces with the appropriate external cable and jumper configuration on the MSI11 card.

Both the serial and parallel interfaces are compatible with existing software drivers. When ordering, the user must specify the Q-Bus and interrupt vector addresses of the interface channels. These addresses are fixed PROMS on the card. Standard addresses are available at no extra charge. There is one time tooling charge for non-standard addresses.

CMSIB

CMSIA-4

CMSIA-1

CMSIA-2

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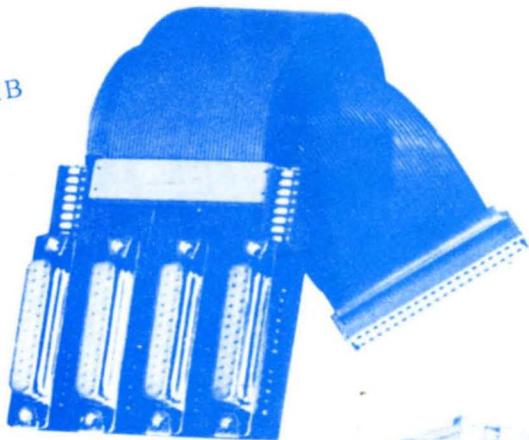
The VDC11 Video Display Controller is a dual-width module which plugs directly into an LSI-11 computer system. To the system, the VDC11 appears to be a standard two-channel serial interface card. It is compatible with existing serial channel software including the DEC console terminal handlers. However, all of the logic neccessary to maintain a medium resolution (512H x 256V) graphics display and a regular serial interface channel is contained on the card. Since the card is microprocessor-based, emulation of many different video display terminals is possible.
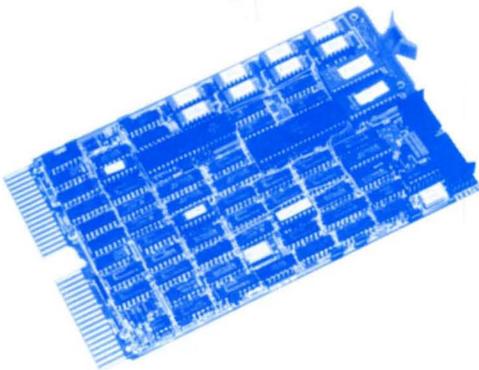
VDC11 Card
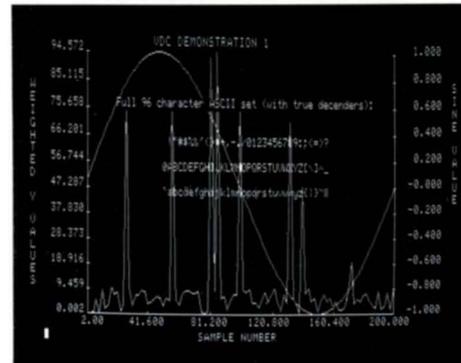
Sample Output

FEATURES OF ALL VDC11 VERSIONS

- Standard 80H x 24V character display
- Full upper and lower case character set (with descenders)
- Three scrolling speeds: fast smooth, slow smooth, and jump
- Upward and downward scrolling
- ASCII parallel or special serial keyboard input
- Can be the LSI-11 console device
- A "VIEW" mode that displays control characters rather than executing them, allows the VDC11 to be used as a serial line analyzer

The graphics display mode allows the VDC11 to function like the Tektronix 4010 vector display terminal. These functions include:

- Vector generation on an apparent 1024H x 780V grid (512H x 256V physical)
- Generation of alphanumeric characters anywhere on the screen (not restricted to the 80H x 24V character spaces)

The VDC11 offers functionality beyond that of the 4010:

- Single point plotting
- Selective erasure of points, vectors and characters
- Readback of the graphics screen for output to a hardcopy device or for further processing or storage
- Single line scrolling and screen synchronization - allows the generation of 'strip chart recorder' type displays
- Display of lower case characters in graphic-alpha mode

The second channel of the VDC11 is a standard RS-232C serial interface. Transmit and receive baud rates are selectable from 50 to 19200 baud. Also, logic to interface an external 'busy' line (DTR) is included, to allow the serial output port to drive a line printer.

The VDC11 board itself will interface to a standard 3-wire direct-drive (horizontal, vertical and video) monitor. A direct-drive to RS170 converter is part of the I/O distribution card, TVDCB, accessory. The keyboard interface will handle a standard ASCII (7 bits plus strobe) TTL parallel keyboard. Special, non-ASCII functions (e.g. CLEAR SCREEN or alternate keypad) are supported in the parallel interface by asserting the 8th bit. The VDC11 also includes the interface for the Andromeda special serial keyboard, KVDCx, accessory. The connection to the monitor and keyboard is through a 20 line port.

In short, the VDC11 provides all of the functionality of a two-channel interface card, a standard video display terminal, and a graphics display controller in the same physical space as the two-channel interface alone.
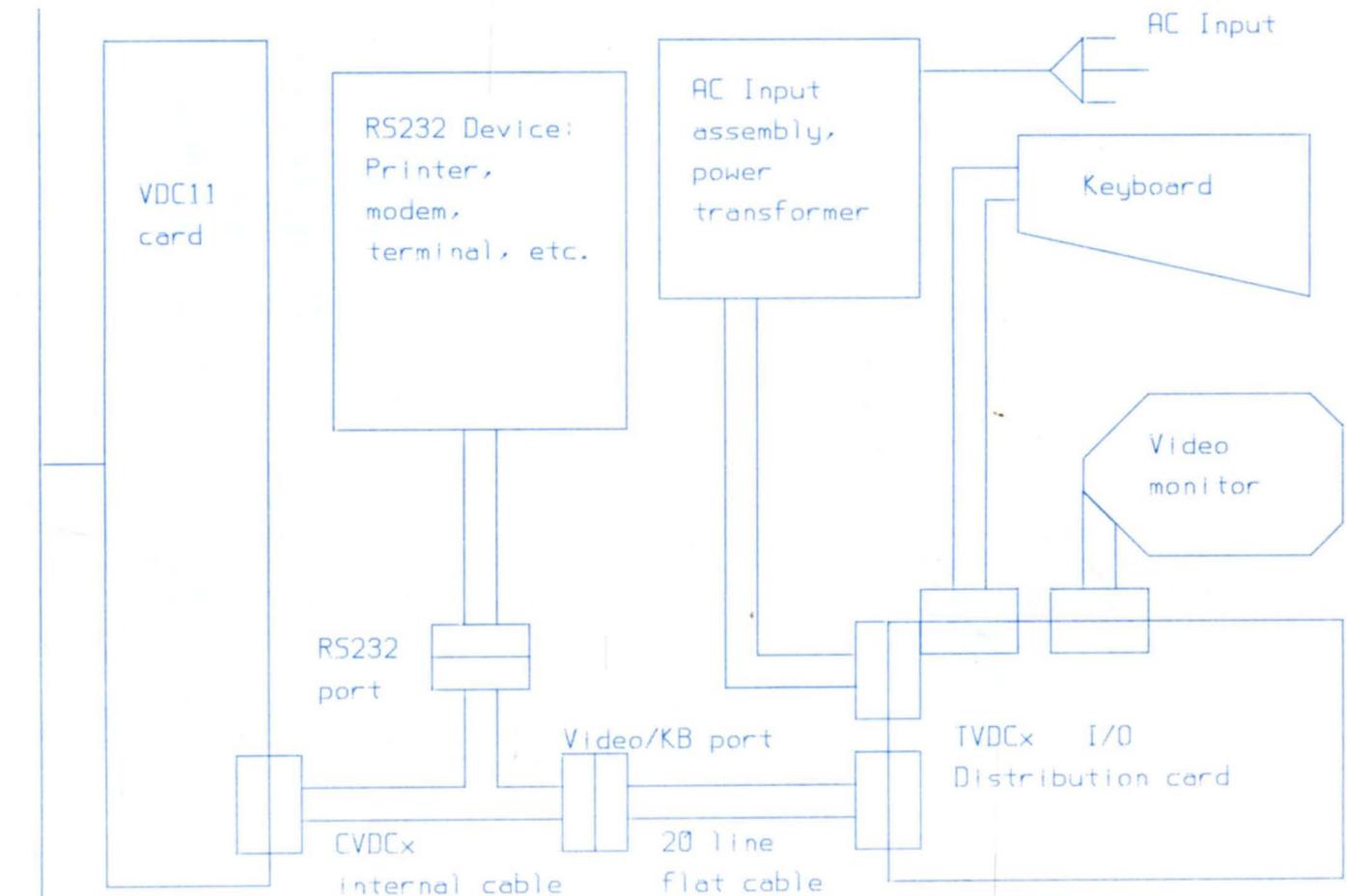
VDC11—Based Terminal Subsystem

There are currently (July 1982) three versions of the VDC11 card offered:

VDC11-A

This card emulates the Lear Siegler ADM-3A in its alpha mode plus many of the features of the ADM-5, as well. In addition to the functions of a plain ASCII terminal, this emulation includes direct cursor addressing, erase to end of line and end of page, and the keyboard interface supports a separate numeric keypad and cursor control keys.

VDC11-B

This version emulates the DEC VT-52 in its alpha mode. All VT-52 functions are emulated, including the special graphics character set (we provide the VT100 character set). The alternate mode for the numeric keypad is supported, thus K52 and any other software that utilizes this mode is compatible. (The special serial keyboard accessory, the KVDCB, provides the EXACT keypad layout found on the VT-52. Many other VT-52 emulating terminals do not, making the use of keypad dependent software difficult.)

VDC11-C

This card is a significant enhancement of the VDC11-B. In addition to the VDC11-B functions, the VDC11-C provides two pages of display memory (useful for animation effects or to switch back and forth between two different displays), a more flexible parallel keyboard interface, a program controllable BEVENT signal source (running at the vertical sync rate of the monitor: 60Hz or 50Hz). Also, the extra serial channel can be the source of a Framing Error Halt signal, interrupts may be requested at level 7, the pulse width of the BELL driving signal has been increased from 200ns to 250ms (this eliminates the need for an external, pulse streching one-shot, to drive the "Bell"). The VDC11-C has 64Kb of on-board RAM compared to 16Kb on the VDC11-A/B; thus the VDC11-C has much more potential for future upgrades than the VDC11-A/B.

This data sheet can only give a taste of the capabilities of the VDC11. The VDC11 User's Manual provides a full description of the functions and specifications of these devices. If you require it, the VDC11 User's Manual will be provided on request.

To Order:

| VDC11-A | Controller board emulates ADM-3A in alpha mode |
| VDC11-B | Controller board emulates VT-52 in alpha mode |
| VDC11-C | Enhancement of VDC11-B: two display pages and more |

The required keyboard encoder for the Andromeda special serial keyboard must be specified at the time of order. Add the suffix /A for the ADM-3A style keyboard or /B for the VT-52 style keyboard. The type of keyboard encoder does not affect the parallel keyboard interface.

New VDC11 versions are introduced from time to time, contact Andromeda if you require functions not available in the current offerings.

The VDC11 board is also available with an attractively packaged 12 inch video monitor and a separate keyboard, the VDT11 series of Video Display Terminals. See the VDT11 data sheet for details.

VDC11 Accessories

A complete line of VDC11 accessories is available. These items allow you to assemble a complete graphic display terminal subsystem.

CVDCA & CVDCB Internal Cables   TVDCB Assembly
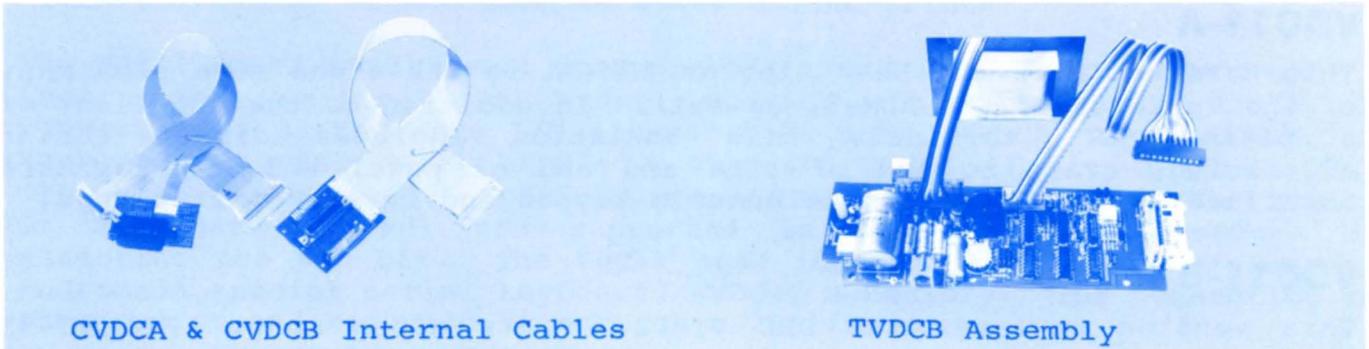
CVDCA   Internal cable, with separate connectors for video/keyboard and RS232 ports

CVDCB   Internal cable, with common assembly for video/keyboard and RS232 ports

C20-F6F   External cable, 20 line flat cable, 6 feet long, female connectors at both ends

TVDCB   Terminal I/O distribution card, contains connectors for 20 line cable from CVDCx, 10 line cable to direct drive video monitor, 4 line cable to special serial keyboard, 20 line cable to parallel keyboard, 2 line cable to RS170 video monitor, plus all necessary power supplies, line receivers, bell, and other circuitry. Includes a custom power transformer, but no other AC input hardware.

TV120   Ball direct drive video monitor, unpackaged

MVDC Monitor   KVDCA & KVDCB Serial Keyboards
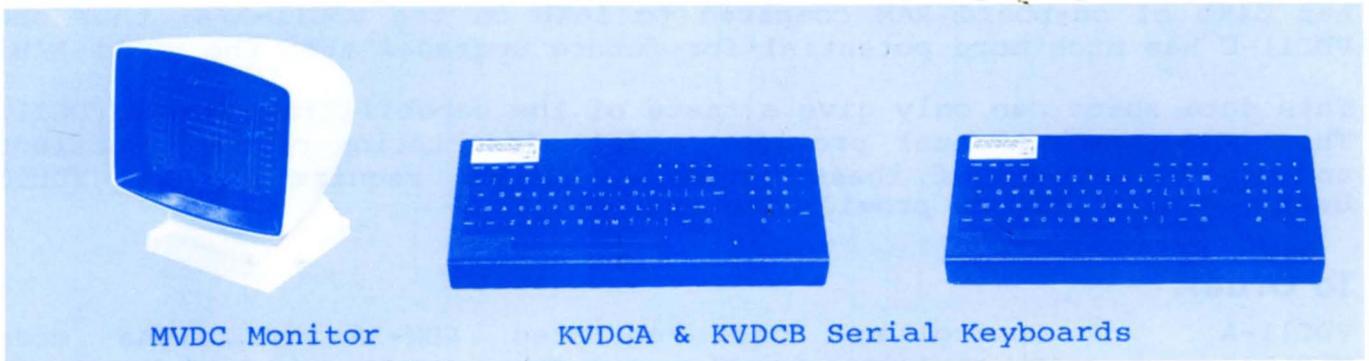
MVDC   Display enclosure containing TV120, TVDCB, AC Power wiring, assembled and tested

KVDCA   Special serial keyboard, ADM 3A style, 6' coiled cord

KVDCB   Special serial keyboard, VT-52 style, 6' coiled cord

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