

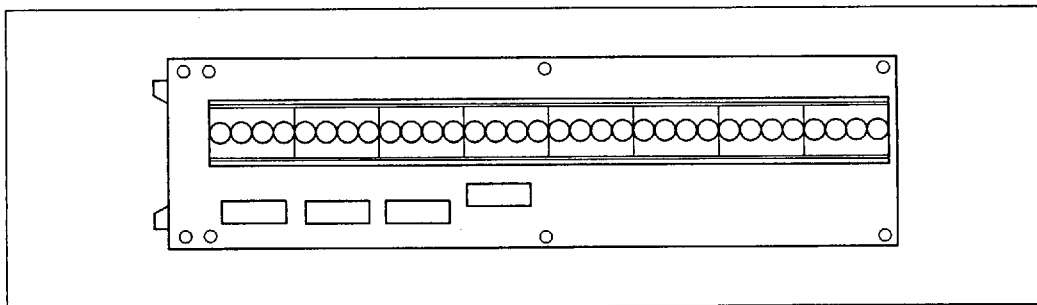
SIEMENS

16 CHARACTER IDA2416-16

32 CHARACTER IDA2416-32

.160" Red, 17 Segment
DL2416 Intelligent Display® Assembly

Intelligent
Display Devices



FEATURES

- .160" Magnified Monolithic Character
- Wide Viewing Angle $\pm 45^\circ$
- Complete Alphanumeric Display Assembly Using the DL2416
 - Built-in Multiplex and LED Drive Circuitry
 - Built-in Memory
 - Built-in Character Generator
- 64 Character ASCII Set
- Direct Access to Each Digit Independently
- Display Blank Function
- Memory Clear Function
- Cursor Function
- 16 or 32 Character Display Length
Custom Lengths by Request (Increments of 4 Characters)
- Single 5.0 Volt Power Supply
- TTL Compatible
- Easily Interfaced to a Microprocessor
- Tri-State or Open Collector Input Circuitry
- Schmitt Trigger Inputs on Control Lines

DESCRIPTION

The IDA2416-16/32 assembly is an extension of the DL2416 Intelligent Display. This assembly provides the designer with circuitry for display maintenance. It also minimizes interaction and interface normally required between the user's system and a multiplexed alphanumeric display.

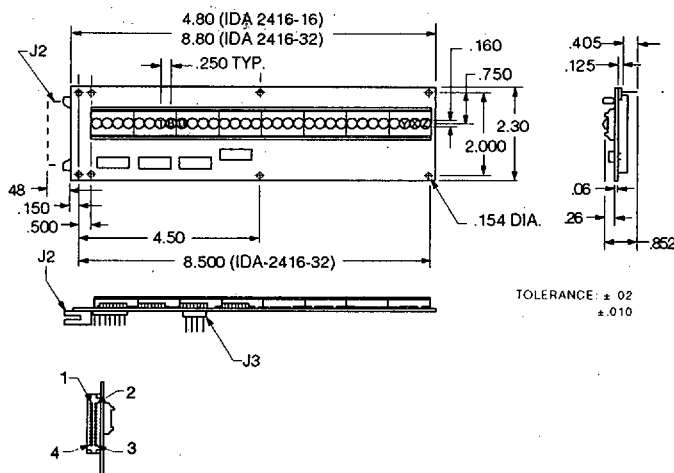
The assembly consists of four/eight DL2416s in a single row, together with decoder and interface buffers on a single printed circuit board. Each DL2416 provides its own memory, ASCII ROM character decoder, multiplexing circuitry, and drivers for the four 17-segment LEDs.

Intelligent Display Assemblies can be used for applications such as data terminals, controllers, instruments, and other products which require an alphanumeric display.

Maximum Ratings

V_{CC}	6.0 V
Voltage, Applied to Any Input	-0.5 to $V_{CC} + 0.5$ Vdc
Operating Temperature	0°C to $+65^\circ\text{C}$
Storage Temperature	-20°C to $+70^\circ\text{C}$
Relative Humidity (non-condensing) at 65°C	85%

Package Dimensions in Inches

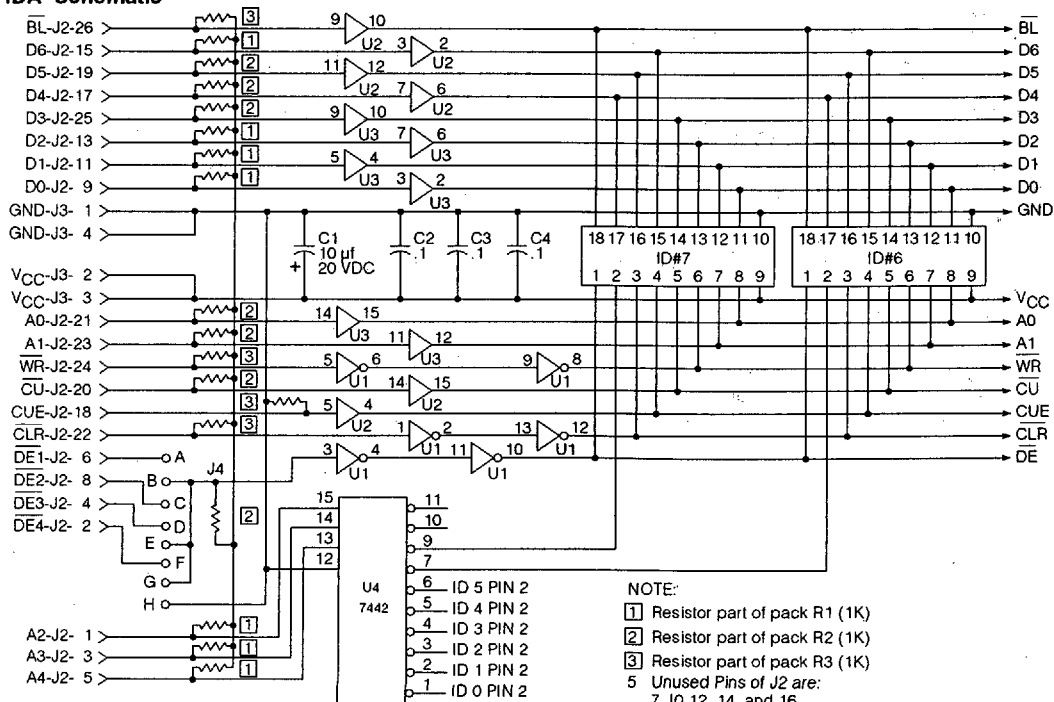


Recommended Mating Connector

Connector	Function	Type	Suggested Manufacturer
J2	Control/Data	26 Pin Ribbon	Berg P/N 65484-011
J3	Power	Amp	Pin P/N 87026-2 Housing P/N 1-87025-3

Pin	Function
J2-1	A2 Address Line
J2-2	DE4 Display Enable
J2-3	A3 Address Line
J2-4	DE3 Display Enable
J2-5	A4 Address Line
J2-6	DE1 Display Enable
J2-7	No Connection
J2-8	DE2 Display Enable
J2-9	D0 Data Line
J2-10	No Connection
J2-11	D1 Data Line
J2-12	No Connection
J2-13	D2 Data Line
J2-14	No Connection
J2-15	D6 Data Line
J2-16	No Connection
J2-17	D4 Data Line
J2-18	Cue Cursor Enable
J2-19	D5 Data Line
J2-20	CU Cursor Select
J2-21	A0 Address Line
J2-22	CLR Clear
J2-23	A1 Address Line
J2-24	WR Write
J2-25	D3 Data Line
J2-26	BL Blanking
J3-1	GND
J3-2	V _{CC}
J3-3	V _{CC}
J3-4	GND

IDA Schematic



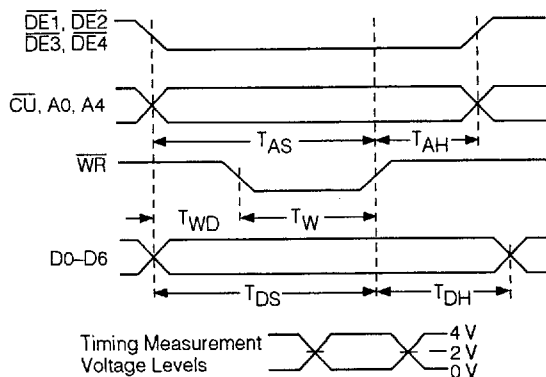
OPTOELECTRONIC CHARACTERISTICS at 25°C

Parameter	Symbol	Min.	Typ.	Max	Units	Conditions
Supply Voltage	V_{CC}	4.75	5.00	5.25	V	
Supply Current-Digit	I_{CC}		25		mA	$V_{CC} = 5\text{ V}$, 8 segments/digit
Supply Current-IDA2416-16	I_{CC}			650	mA	$V_{CC} = 5\text{ V}$, all segments/digit
Supply Current-IDA2416-32	I_{CC}			1250	mA	$V_{CC} = 5\text{ V}$, all segments/digit
Input Voltage-High, all inputs	V_{IH}	3.3			V	$V_{CC} = 5\text{ V}$, $\pm 0.25\text{ V}$
Input Voltage-Low, all inputs	V_{IL}			0.8	V	$V_{CC} = 5\text{ V}$
Input Current-High, all inputs	I_{IH}			40	μA	$V_{CC} = 5.25\text{ V}$, $V_i = 2.4\text{ V}$
Input Current-Low, all inputs	I_{IL}			2.2	mA	$V_{CC} = 5.25\text{ V}$, $V_i = 0.4\text{ V}$
Luminous Intensity, Average/Digit	I_v		0.5		mcd	$V_{CC} = 5\text{ V}$, 8 segments/digit
Peak Emission Wavelength	λ_{peak}		660		nm	
Viewing Angle			± 45		Deg.	Vertical and horizontal from normal to display plane

SWITCHING CHARACTERISTICS @ 5 V

Parameter @+25°C	Symbol	Min.	Unit
Write Pulse	T_W	350	nS
Data Set Up Time	T_{DS}	550	nS
Data Hold Time	T_{DH}	75	nS
Address/DE Setup Time	T_{AS}	550	nS
Address/DE Hold Time	T_{AH}	75	nS
Write Set Up Time	T_{WEI}	200	nS
Clear Time	T_{CLH}	15	mS

TIMING CHARACTERISTICS



System Overview

The IDA2416-16/-32, Intelligent Display Assembly, has 16 or 32 alphanumeric characters and operates from just a +5 V supply. Based on the DL2416, four character Intelligent Display, the IDA2416 adds all the support logic required for direct connection to most microprocessor buses. The system interface takes place through a connector that has the data address lines as well as the control signals needed. Two additional connectors are included on the IDA2416—one for power and ground connections, the other to implement display enable selection.

System Power Requirements

Operating from a single +5 volt power supply, the IDA2416 requires a typical operating current of 450 mA with eight of the segments lit on each character. For the 32 character display, the current increases to 850 mA, typical. For the worst case condition with all segments lit, the 16 character display draws 650 mA and the 32 character requires 1250 mA. With the display blanked, the board circuitry draws about 70 mA.

Display Interface

The display interface on the 26 pin connector consists of seven data lines (D0 to D6), five address lines (A0 to A4), four display enable lines (DE1 to DE4), several unused pins, and various control signals. All address, data, control lines have either pull-up or pull-down 1K ohm resistors.

BL (Blanking, active low): When this line is pulled low, it causes the entire IDA display to go blank without affecting the contents of the display memory on the DL2416s. BL is active regardless of address or display enable lines. A flashing display can be achieved by pulsing this line.

WR (Write, active low): To store a character in the display memory, this line must be pulsed low for a minimum of 350 ns. See Timing Diagram for timing and relationships to other signals. The WR input drives a Schmitt-Trigger.

CUE (Cursor Enable, active high): When high, this line permits the cursor to be displayed, and when brought low, it disables the cursor function without affecting the stored value. CUE is active regardless of address or display enable lines. A flashing cursor can be created by pulsing the CUE line low.

CU (Cursor Select, active low): The cursor function (character with all segments lit) is loaded by selecting the digit address and holding CU true. A "1" on D0 writes the cursor. A "0" on D0 removes the cursor. The change occurs during the next write pulse per the timing diagram.

CLR (Clear, active low): When held low for one display multiplex cycle (see DL 2416 data sheet for more information) of 15 ms, this line will cause all stored characters in the display, except for the cursor, to be cleared. CLR is active regardless of address or display enable lines. The CLR input drives a Schmitt trigger.

DE1 to DE4 (Display Enable, active low): There are four jumper selectable lines, any one of which can be selected to provide one of four board addresses that can be used when multiple IDAs are built into a system. When low, this line enables the selected display to permit data loading. The display enable input drives a schmitt-trigger. Address lines A0 to A4 are set up so that the right most character is the lowest address. The left-most character is the highest address. Data lines are set up so that D0 is the least significant bit and D6 is the most significant bit.

Using the Display Interface

Through the use of memory-mapped I/O techniques, the IDA can be treated almost like a memory location—supply the data, address and proper control signals and the characters appear, with each character location independently addressable. The basic signal flow sequence to load a character would start with the address lines going to the desired address while the CLR and BL lines are high to permit the data to be loaded in and displayed. After the address has stabilized, the data can change to the desired values (including the cursor). After the data has stabilized, the WR pulse is started, and must remain low for at least 350 ns. Signals must be held stable for 75 ns, minimum, after the rising edge of the WR pulse to ensure correct loading, while the addresses must be stable for 650 ns preceding the same rising edge of the WR pulse. See the Timing Diagram.

Enable Selection

For board enable (the DE1 through DE4 lines) the user can choose any one of the four enable signals he has provided on the cable. This signal will be used to provide a master enable to each IDA. All that need be done is to insert the shorting plug in the appropriate position on the pins provided. This allows the user to make the system display the same information on two or more different IDAs or display different information on each of up to four groups of IDAs.