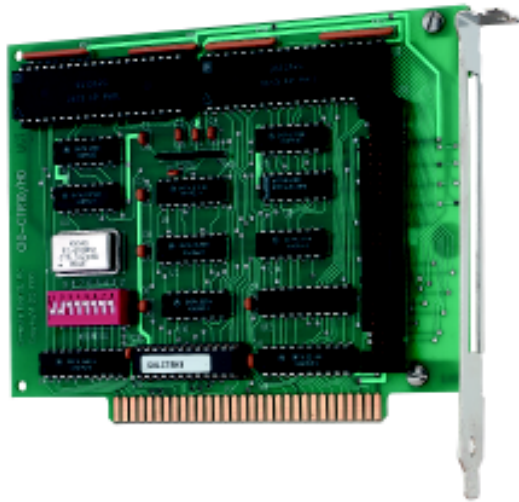


CIO-CTR10HD & CIO-CTR20HD



CIO-CTR10HD

Two 5 Channel 16 Bit Counter/Timers
9513
Up to 7MHz Inputs
10 Counters Total on Board
Programmable Clock Source
Programmable to Interrupt PC 2-7
Single High Density 50 Pin Connector

CIO-CTR20HD

Four 5 Channel 16 Bit Counter/Timers
9513
Up to 7MHz Inputs
20 Counters Total on Board
Programmable Clock Source
Programmable to Interrupt PC 2-7
Two High Density 50 Pin Connectors

DESCRIPTION

The CIO-CTR10HD and CIO-CTR20HD are high performance AM9513 based counter/timer chips and supporting circuitry on a PC/XT/AT/PS30 bus expansion board.

Each AM9513 provides five counters with 16 bit (65,536 count) registers. The 9513 is an extremely powerful and flexible component which is software programmable for event counting, pulse & frequency measurement, alarm comparator and other input functions. As an output device the 9513 can generate frequencies with complex duty cycles and provide one shot and continuous outputs.

High density 50 pin header type connectors each carrying 10 complete sets of counter Gate, Input, Output and counter chip control signals provide for counter intensive applications.

PROGRAMMABLE COUNTER CHAINING

The 9513 counters one through five may be chained via software, enabling a 32, 48, 64 or 80 bit counter to be constructed within the chip. In addition the gate source and gating functions are software programmable and may be reconfigured as counter inputs. Chaining across chips is possible with a single wire allowing the construction of up to 160 bit counters (as a point of interest, at 1MHz, a 160 bit counter would take 4.63×10^{25} years to reach terminal count). The UniversalLibrary is the best choice for programming the CIO-CTR10HD from any DOS or Windows language.

PROGRAMMABLE COUNTER SOURCE

The source of pulses to the 9513 is fully programmable. Three sources are available. These are External, 1MHz or 5MHz. The counter source is controlled by a register at base + 400. The default counter source (power up or reset) is 1MHz, which is

compatible with the original CIO-CTR05.

PROGRAMMABLE INTERRUPT LEVEL

An external interrupt input pin provides access to the personal computer interrupts 2-7. The interrupt selected (or none) is set in the register at Base + 400. Once an interrupt level is selected, a rising edge on the IR INPUT (pin 26) will cause a PC IRQ, which will branch program control to that IRQ handler. Use an interrupt to initiate program execution on terminal count, set off an alarm or reconfigure counters after a prescribed interval.

CABLING & SIGNAL CONNECTION

Counter intensive applications benefit from the 10 counters on a single high density 50 pin connector.

Cabling to the CIO-CTR#0HD is via standard 50 pin header type connectors.

Each cable carries all counter inputs, outputs and gates for two 9513s, the interrupt input, +5 volts and ground.

You may notice two sets of signals with identical names on the diagram to the right. The lower set belongs to the 9513 at base + 0, the upper to base + 2.

GND 50	● ●	49 +5V
FOUT 48	● ●	47 EXT SRC
GND 46	● ●	45 GATE 5
CTR OUT 5 44	● ●	43 CLK IN 5
GND 42	● ●	41 GATE 4
CTR OUT 4 40	● ●	39 CLK IN 4
GND 38	● ●	37 GATE 3
CTR OUT 3 36	● ●	35 CLK IN 3
GND 34	● ●	33 GATE 2
CTR OUT 2 32	● ●	31 CLK IN 2
GND 30	● ●	29 GATE 1
CTR OUT 1 28	● ●	27 CLK IN 1
IR INPUT 26	● ●	25 +5V
GND 24	● ●	23 +5V
FOUT 22	● ●	21 EXT SRC
GND 20	● ●	19 GATE 5
CTR OUT 5 18	● ●	17 CLK IN 5
GND 16	● ●	15 GATE 4
CTR OUT 4 14	● ●	13 CLK IN 4
GND 12	● ●	11 GATE 3
CTR OUT 3 10	● ●	9 CLK IN 3
GND 8	● ●	7 GATE 2
CTR OUT 2 6	● ●	5 CLK IN 2
GND 4	● ●	3 GATE 1
CTR OUT 1 2	● ●	1 CLK IN 1

I/O REGISTER MAP

The I/O registers of the CIO-CTR10HD occupy 4 I/O locations in the PC's I/O address space. The first, or BASE, address is fixed by the base address switch. The CIO-CTR20HD uses 8 I/O addresses.

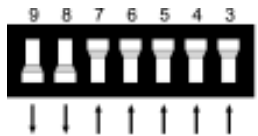
CIO-CTR10HD & 20HD

BASE+0	9513#1 DATA
BASE+1	9513#1 CONTROL
BASE+2	9513#2 DATA
BASE+3	9513#2 CONTROL
BASE+400	CLK Src & IR Sel P1

CIO-CTR20HD Only

BASE+4	9513#3 DATA
BASE+5	9513#3 CONTROL
BASE+6	9513#4 DATA
BASE+7	9513#4 CONTROL
BASE+401	CLK Src & IR Sel P2

Set BASE address by switching inputs to a comparator. Each switch corresponds to one address line on the PC bus. Each switch represents one address weight and weights are added to determine a unique address.



SW	HEX
A9	200
A8	100
A7	80
A6	40
A5	20
A4	10
A3	08

Address 300Hex shown

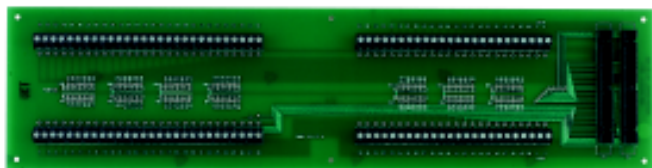
ACCESSORIES

Counters work best when the inputs have sharp, clean edges. Often, the signal source is a button or a switch that bounces or glitches, or the signal may be 0-24V or some voltage higher than TTL levels.

The CIO-TERM100 is a high density screw terminal board designed to accept 12-22 AWG wires to all 100 signals of a CIO-CTR20HD. Some people prefer spade lugs over screw terminals. The CIO-SPADE50 is designed for rugged NEMA cabinet mounting and accepts spade lugs on it's terminals.

For economy of space and funds, the CIO-MINI50 provides 12-22 AWG screw termination of all 50 signals, for one half the cost of larger screw terminal boards.

For high voltage signal conditioning, consider the SSR-RACK24 and 48, solid state relay boards.

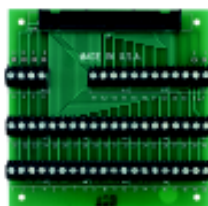


CIO-TERM100



C50FF-2

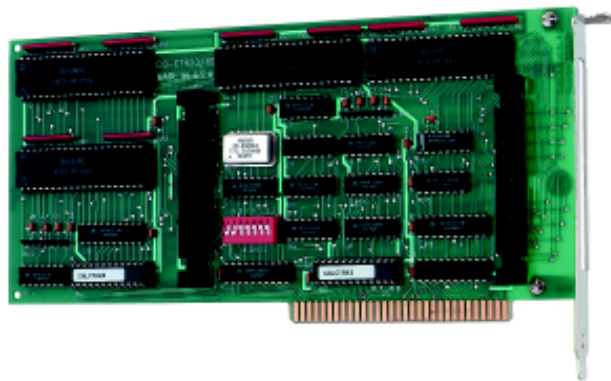
High quality cables can save you hours of valuable time.



CIO-MINI50

CIO-CTR20HD

Four, 5 Channel Counter/Timers



DESCRIPTION

The CIO-CTR20HD is exactly two CIO-CTR10HDs so the block diagram, connector pin-out and programming information apply to both boards. The CIO-CTR20HD has four 9513 counter/timer chip and complete software programmable control over clock source and interrupts. The CIO-CTR20HD is an economical solution for those applications where 20 counters are needed and cost is an issue.

SPECIFICATION

OUT LOW	0.4V max @ 3.2mA
OUT HIGH	2.4V min @ -200uA
INPUT LOW	-0.5V min, 0.8V max
INPUT HIGH	2.0V min, 7.0V max

CIO-CTR#0HD/H50 50 ppm XTAL

Order your CIO-CTR board with the suffix "/H50" and it will arrive with a high accuracy 50 part-per-million XTAL in place of the standard 100 ppm XTAL!

ORDERING INFORMATION

5 Counters (16 bit)	CIO-CTR10HD
Same as above with 50 ppM XTAL	CIO-CTR10HD/H50
10 Counters (16 bit)	CIO-CTR20HD
Same as above with 50ppm XTAL	CIO-CTR20HD/H50
16" X 4" High Density Screw Terminal	CIO-TERM100
4" X 4" Economy Screw Terminal	CIO-MINI50
16" X 4" Spade Lug termination panel	CIO-SPADE50
Cable, 50 Conductor, Female both ends, 2 ft.	C50FF-2
Cable, 50 Conductor, Female, Custom length.	C50FF-##