ISA CsCAN Interface Card
Products Specifications and Installation Data

1   DESCRIPTION

The ISA Interface Cards HE200CGM500 (CGM500) and HE200CGM502 (CGM502) are CsCAN network gateways used with CsCAN PC Interface Products (CGM**5xx**). The CGM500 is a single channel gateway and the CGM502 is a dual channel gateway.

2   SPECIFICATIONS

CAN bus specifies that a separate power supply be used to power the CAN bus transceivers. The power supply should meet the following specifications: The CGM500/502 board does <u>not</u> supply power to the CAN bus.

Table 1 –Power Specifications	
Specification	**Parameter**
Output Voltage	+24 VDC ± 1%
Output Current	16 Amps maximum
Load Regulation	± 0.3%
Line Regulation	± 0.3%
Ripple	250 mV p-p, maximum
Turn On time	250 milliseconds max (to within 5% of final value)
Isolation	Output must be isolated from AC & Chassis ground

Power must be distributed according to CAN Bus specifications. Few problems are introduced in small networks consisting of just a few nodes with a small trunk length, but if more than 10 nodes are required, or the trunk length is more than 100 feet, some care should be taken to insure that network power distribution meets CAN Bus specifications.

CAN Bus allows for the use of multiple power supplies on one network. The requirements and locations of multiple power supplies is determined by the number and type of nodes on the line and the gage and length of the trunk wiring used. Installations longer than about 300 feet should consider the use of multiple power supplies.

3   INSTALLATION

Before installing the CGM500/502, the board must be properly configured by setting jumpers and DIP switches as follows.

3.1   Jumpers (Refer to Figure 1.)

a. JP1 does <u>not</u> have jumpers installed. JP1 is the ISA Bus Interrupt Select jumper. The CGM500/502 board does <u>not</u> use bus interrupts.

b. JP2 has a wire-wrap installed between pins 1 and 3.

c. If installed, JP3 has a wire-wrap installed between pins 1 and 3.

d. JP4 has all three jumpers installed.
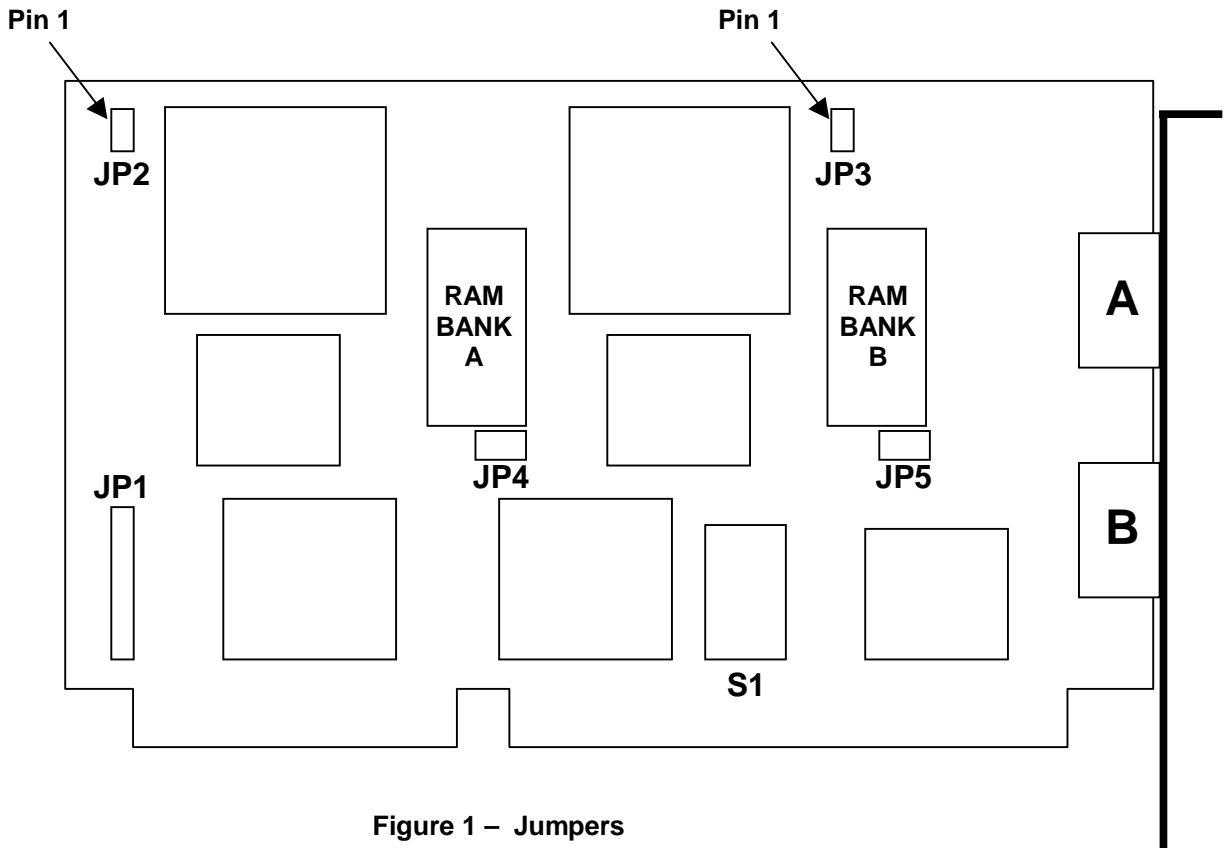
e. If installed, JP5 has all three jumpers installed.

Figure 1 – Jumpers

3.2   DIP Switches (Refer to Figure 2.)

S1 is a 7-position DIP switch, which determines the ISA bus address for the two 1Kx8 dual-port-RAM chips (Bank A and B) on the CGM502 board. If the single-channel board CGM500 is installed, only Bank A is present.

The memory bank can be located on any 2K-byte boundary within the upper 256K of the lower megabyte of the PC's memory (segment addresses 0xC000 – 0xFF80). Thus, there are 128 different possible memory locations for the memory bank.

The 7 DIP switch positions form a 7-bit binary number from 0 to 127, which represents one of the possible 128 address locations for the memory bank.

The following shows the binary segment address for the memory bank:

```
11xx xxxx x000 0000
        where "xx xxxx x" represents the DIP switch settings for switches 1 through 7,
        respectively.
```

A closed switch is a '1' while an open switch is a '0'. The factory default setting places the memory bank at segment address 0xD000:

Closed, ON, or '1'
Open, OFF, or '0'
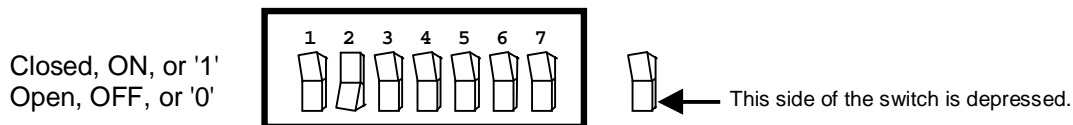
This side of the switch is depressed.

Figure 2 – CGM500 Dip Switches

These switch settings make the binary segment address 11**01 0000 0**000 0000. The values entered by the switch S1 are indicated in bold.

The following tables indicate the possible DIP-switch settings and associated segment addresses. (Refer to Figure 2 to determine how to read the switches.)

Segment Address	DIP Switch (S1) Setting						
	1	2	3	4	5	6	7
C000	0	0	0	0	0	0	0
C080	0	0	0	0	0	0	1
C100	0	0	0	0	0	1	0
C180	0	0	0	0	0	1	1
C200	0	0	0	0	1	0	0
C280	0	0	0	0	1	0	1
C300	0	0	0	0	1	1	0
C380	0	0	0	0	1	1	1
C400	0	0	0	1	0	0	0
C480	0	0	0	1	0	0	1
C500	0	0	0	1	0	1	0
C580	0	0	0	1	0	1	1
C600	0	0	0	1	1	0	0
C680	0	0	0	1	1	0	1
C700	0	0	0	1	1	1	0
C780	0	0	0	1	1	1	1

Segment Address	DIP Switch (S1) Setting						
	1	2	3	4	5	6	7
C800	0	0	1	0	0	0	0
C880	0	0	1	0	0	0	1
C900	0	0	1	0	0	1	0
C980	0	0	1	0	0	1	1
CA00	0	0	1	0	1	0	0
CA80	0	0	1	0	1	0	1
CB00	0	0	1	0	1	1	0
CB80	0	0	1	0	1	1	1
CC00	0	0	1	1	0	0	0
CC80	0	0	1	1	0	0	1
CD00	0	0	1	1	0	1	0
CD80	0	0	1	1	0	1	1
CE00	0	0	1	1	1	0	0
CE80	0	0	1	1	1	0	1
CF00	0	0	1	1	1	1	0
CF80	0	0	1	1	1	1	1

Segment Address	DIP Switch (S1) Setting							
	1	2	3	4	5	6	7	
D000	0	1	0	0	0	0	0	Factory Default
D080	0	1	0	0	0	0	1	
D100	0	1	0	0	0	1	0	
D180	0	1	0	0	0	1	1	
D200	0	1	0	0	1	0	0	
D280	0	1	0	0	1	0	1	
D300	0	1	0	0	1	1	0	
D380	0	1	0	0	1	1	1	
D400	0	1	0	1	0	0	0	
D480	0	1	0	1	0	0	1	
D500	0	1	0	1	0	1	0	
D580	0	1	0	1	0	1	1	
D600	0	1	0	1	1	0	0	
D680	0	1	0	1	1	0	1	
D700	0	1	0	1	1	1	0	
D780	0	1	0	1	1	1	1	

Segment Address	DIP Switch (S1) Setting						
	1	2	3	4	5	6	7
D800	0	1	1	0	0	0	0
D880	0	1	1	0	0	0	1
D900	0	1	1	0	0	1	0
D980	0	1	1	0	0	1	1
DA00	0	1	1	0	1	0	0
DA80	0	1	1	0	1	0	1
DB00	0	1	1	0	1	1	0
DB80	0	1	1	0	1	1	1
DC00	0	1	1	1	0	0	0
DC80	0	1	1	1	0	0	1
DD00	0	1	1	1	0	1	0
DD80	0	1	1	1	0	1	1
DE00	0	1	1	1	1	0	0
DE80	0	1	1	1	1	0	1
DF00	0	1	1	1	1	1	0
DF80	0	1	1	1	1	1	1

Segment Address	DIP Switch (S1) Setting						
	1	2	3	4	5	6	7
E000	1	0	0	0	0	0	0
E080	1	0	0	0	0	0	1
E100	1	0	0	0	0	1	0
E180	1	0	0	0	0	1	1
E200	1	0	0	0	1	0	0
E280	1	0	0	0	1	0	1
E300	1	0	0	0	1	1	0
E380	1	0	0	0	1	1	1
E400	1	0	0	1	0	0	0
E480	1	0	0	1	0	0	1
E500	1	0	0	1	0	1	0
E580	1	0	0	1	0	1	1
E600	1	0	0	1	1	0	0
E680	1	0	0	1	1	0	1
E700	1	0	0	1	1	1	0
E780	1	0	0	1	1	1	1

Segment Address	DIP Switch (S1) Setting						
	1	2	3	4	5	6	7
E800	1	0	1	0	0	0	0
E880	1	0	1	0	0	0	1
E900	1	0	1	0	0	1	0
E980	1	0	1	0	0	1	1
EA00	1	0	1	0	1	0	0
EA80	1	0	1	0	1	0	1
EB00	1	0	1	0	1	1	0
EB80	1	0	1	0	1	1	1
EC00	1	0	1	1	0	0	0
EC80	1	0	1	1	0	0	1
ED00	1	0	1	1	0	1	0
ED80	1	0	1	1	0	1	1
EE00	1	0	1	1	1	0	0
EE80	1	0	1	1	1	0	1
EF00	1	0	1	1	1	1	0
EF80	1	0	1	1	1	1	1

Segment Address	DIP Switch (S1) Setting						
	1	2	3	4	5	6	7
F000	1	1	0	0	0	0	0
F080	1	1	0	0	0	0	1
F100	1	1	0	0	0	1	0
F180	1	1	0	0	0	1	1
F200	1	1	0	0	1	0	0
F280	1	1	0	0	1	0	1
F300	1	1	0	0	1	1	0
F380	1	1	0	0	1	1	1
F400	1	1	0	1	0	0	0
F480	1	1	0	1	0	0	1
F500	1	1	0	1	0	1	0
F580	1	1	0	1	0	1	1
F600	1	1	0	1	1	0	0
F680	1	1	0	1	1	0	1
F700	1	1	0	1	1	1	0
F780	1	1	0	1	1	1	1

Segment Address	DIP Switch (S1) Setting						
	1	2	3	4	5	6	7
F800	1	1	1	0	0	0	0
F880	1	1	1	0	0	0	1
F900	1	1	1	0	0	1	0
F980	1	1	1	0	0	1	1
FA00	1	1	1	0	1	0	0
FA80	1	1	1	0	1	0	1
FB00	1	1	1	0	1	1	0
FB80	1	1	1	0	1	1	1
FC00	1	1	1	1	0	0	0
FC80	1	1	1	1	0	0	1
FD00	1	1	1	1	0	1	0
FD80	1	1	1	1	0	1	1
FE00	1	1	1	1	1	0	0
FE80	1	1	1	1	1	0	1
FF00	1	1	1	1	1	1	0
FF80	1	1	1	1	1	1	1

After verifying the jumper and DIP switch settings, CGM500/502 can be placed in an available PC ISA slot by following the adapter board installation instructions provided with the PC.

3.3   Precautions to Ensure Maximum Noise Immunity

The following precautions need to be observed during installation to ensure maximum noise immunity:

a. Make sure the CGM500/502's I/O bracket makes good electrical contact with the PC's chassis.

b. Always use the proper hold-down screw to secure the I/O bracket to the chassis.

c. After board installation, reinstall the PC's cover using *all* of the proper fastener hardware.

d. Connect the PC's power supply to a grounded electrical outlet.

3.4   CsCAN Network Connection

The following diagram shows how to properly wire multiple nodes together on the CsCAN Network:
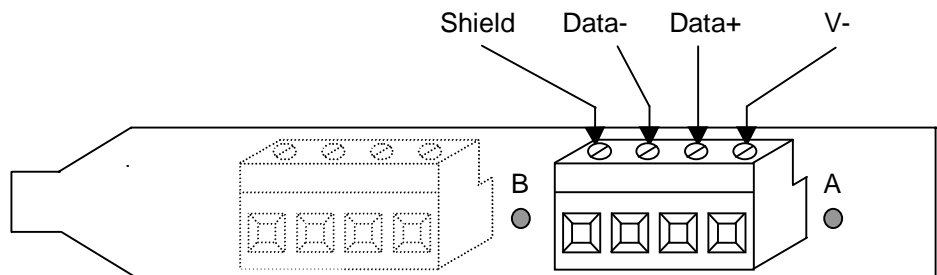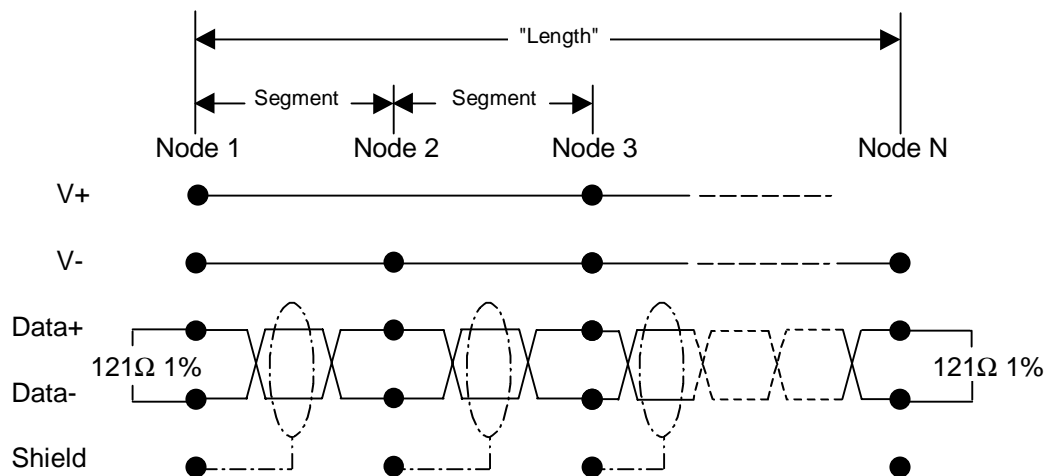

Figure 3 - Connector

Figure 4 - CsCAN Wiring

In the case where a node requires a 5-wire interface (i.e., OCS100 or OCS200), the V+ wire is left disconnected from the CGM500/502 connector. If the CGM500/502 node is *not* at the end of the trunk or drop, the V+ wire needs to "jump around" the missing connection on the CGM500/502 board.

The two nodes at the physical endpoints should have 121Ω 1% terminating resistors connected across terminals `Data+` and `Data-`. Termination must be placed at the *ends* of the network - <u>not</u> in the middle. *Only* those two units at the ends of the network are to be terminated. If the length of the network (cable distance between the two terminating resistors) is less than 100 feet, 120Ω 5% resistors can be used.

The shield connection is connected to the shield terminal connector *at one end of the cable segment only*.

A CsCAN Network without repeaters must be limited to no more than 64 nodes with a maximum network size (cable length) of 1500 cable feet. Networks with more than 64 nodes *must* use a repeater (Horner Electric HE200CGM100). The CAN Repeater can also be used to extend the size (distance) of the networks with fewer than 64 nodes to an additional 1500 feet of cable.

Up to three (3) CAN Repeaters may be used to extend the size of the network to 6,000 cable feet and 253 nodes.

4   SAFETY

All applicable codes and standards need to be followed in the installation of this product.

5   TECHNICAL ASSISTANCE

For user manual updates, contact Horner APG, Technical Support Division, at (317) 916-4274 or visit our web site at www.heapg.com.

NOTES