

Installation Instructions

Model DAC-NET

Digital Audio Card - NETWORK (500-035100 / S24235-B3-A5)

INTRODUCTION

The Model DAC-NET from Siemens Industry, Inc. is the CAN-BUS master for all CAN modules. One DAC-NET is required in each control panel and each transponder. It is the source point for eight digital audio channels and communicates audio data via ASI-BUS to all digital audio cards.

There is one BACnet (Building Automation & Control Network) interface. It communicates all instructions and messages directly with the PMI/PMI-2/PMI-3 (CPC-DAC interface).

It provides network communication (D-NET) between control panels and transponders (nodes). The network can be wired either Class B or Class X. Each DAC-NET occupies one D-NET address. The DAC-NET contains various on board tones and audio messages.

The DAC-NET can contain an optional LPB (Local Page Board) which has to be mounted piggyback. This CAN module has a fixed CAN address (100) and provides two inputs. One is for the microphone located at the LVM and the other connects the internal telephone system. Additionally, the LPB provides one output for the monitor speaker located at the LVM. For more information refer to the LPB Installation Instructions, P/N 315-035200 / A24205-A334-B836.

Features

The D-NET is supervised for open, short and ground fault. Each D-NET input / output is electrically isolated. Wiring can be either Class B or Class X with unshielded twisted pair. The maximum distance between two DAC-NETs is 300m with cat3 cable, 900m with cat5 cable or 700m with cable 1pr. 18B FPLR / 1pr. 16B FPLR / 1pr. 14B FPLR. A maximum wiring length can be up to 10 km throughout the entire network with a maximum of 32 DAC-NET nodes. Up to 99 CAN sub-modules are addressable. The system is able to handle eight independent audio channels. Software updates for μ C and D-NET controller are downloadable. Tones and audio messages are downloadable. Diagnostic LEDs for troubleshooting are located on the front panel of the DAC-NET. Refer to Figure 1.

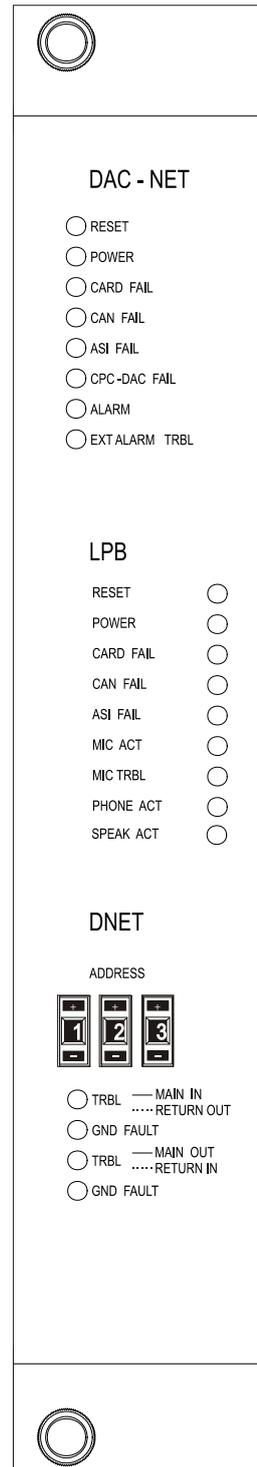


Figure 1
DAC-NET Digital Audio Card - NETWORK

OPERATION

Each DAC-NET occupies one card slot in the CC-5/CC-2 card cage. Only the left connector of the CC-5/CC-2 contains the signals to the CPC-DAC interface. The connection from the PMI/PMI-2/PMI-3 to the CC-5/CC-2, in which the DAC-NET is mounted, must be on the **left side of the CC-5/CC-2**.

D-NET

The D-NET Main In / Return Out and Main Out / Return In are isolated from each other and from the DAC-NET. This allows the use of different power sources with different ground references. The DAC-NET is able to detect ground faults and data faults of each D-NET section. Each DAC-NET sends and receives a data stream consisting of digital audio stream and control data. The baud rate is 1.536 Mbps.

NOTE:

Class B/Style 4 = ULC DCLB

Class X/Style 7 = ULC DCLC

Class B

The node with the lowest node number (master) sends the data stream from Main Out to Main In at the next node. The last node combines Main In with Return Out and returns the data stream back. When the data stream comes back to the node with the lowest node number this node combines Return In with Main Out and sends it to Main In of the next node.

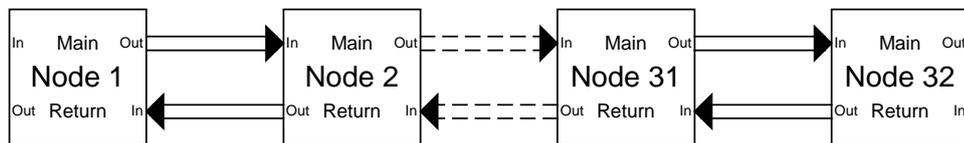


Figure 2
DAC-NET D-NET Class B

In a Class B configuration, two unshielded twisted pairs are required. They can be in one cable.

Class X

In a Class X configuration, the master sends the data stream by using Main Out / Main In in a loop. The Return Out / Return In loop contains only a test data stream for supervision.

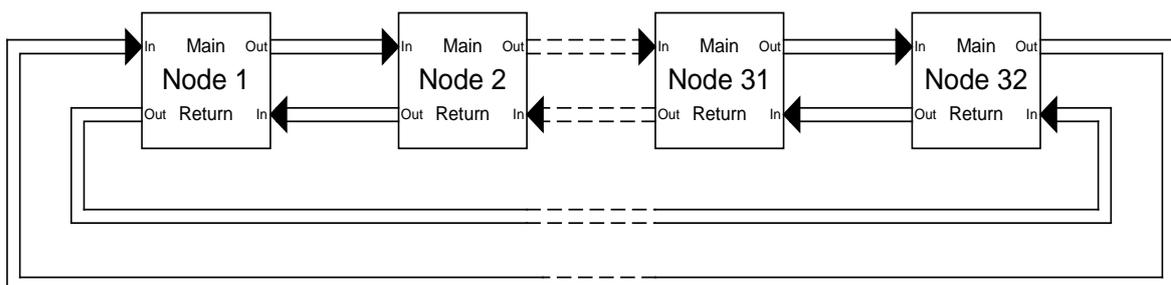


Figure 3
DAC-NET D-NET Class X

Class X Fault Status

If there is a fault in the Main loop, the node before the fault point combines Main In with Return Out. The node after the fault point combines Return In with Main Out. Both loops are combined and the net is still running. In this situation there is no test data stream. After repair D-NET reconfigures automatically. If there is a fault in the Return loop the failure of the test data stream will be detected and notified.

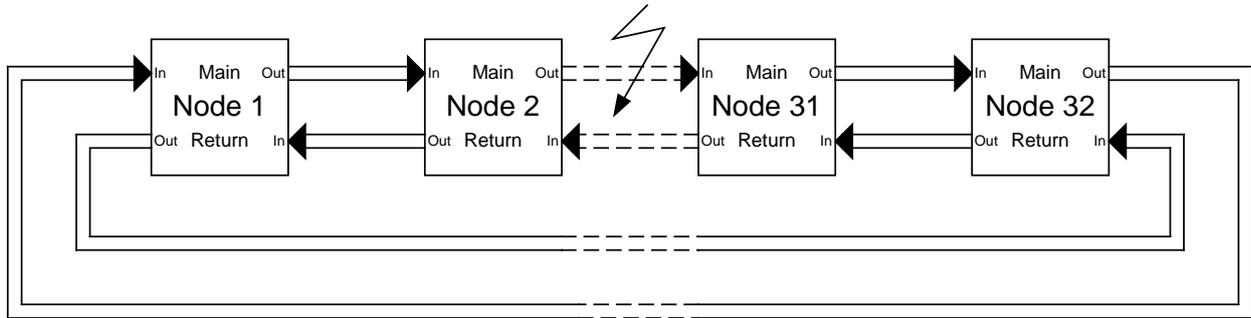


Figure 4
DAC-NET D-NET Class X Fault Status

In Class X configuration, two unshielded twisted pairs between the nodes are required. The connection between Node 1 and Node 32 must be in a separate cable and must not share a conduit with any other cable.

Controls and Indicators

The front panel of the DAC-NET contains one reset switch and seven LEDs for the DAC-NET, and one D-NET address switch and four LEDs for the D-NET. For the optionally mounted LPB, there is one reset switch and eight LEDs as shown in Figure 1.

A reset switch is located on the top of the front panel. Pushing the reset switch re-initializes the DAC-NET operation.

The LEDs follow the reset switch. Their functions are defined as follows:

DAC-NET	POWER	(Green)	Normally ON, When illuminated, indicates that power for the DAC-NET is applied to the card. When blinking twice per second, indicates that the DAC-NET is not configured by ZEUS Tool. When blinking fast, indicates that the DAC-NET gets a SW Update.
	CARD FAIL	(Yellow)	Normally OFF. When illuminated, indicates that the card microprocessor has failed.
	CAN FAIL	(Yellow)	Normally OFF. When illuminated, indicates that the CAN communication has terminated. When blinking twice per second, indicates that no CAN module is connected.

	ASI FAIL	(Yellow)	Normally OFF. When illuminated, indicates that the ASI communication has terminated.
	CPC-DAC FAIL	(Yellow)	Normally OFF. When illuminated, indicates that the communication between PMI/PMI-2/PMI-3 and DAC-NET has terminated.
	ALARM	(Red)	Normally OFF. When illuminated, indicates that the DAC-NET has detected an active alarm.
	EXT ALARM TRBL	(Yellow)	Normally OFF. When illuminated, indicates that the DAC-NET has detected a trouble on the External Alarm input (open circuit or short circuit).
D-NET	TRBL -MAIN IN RETURN OUT	(Yellow)	Normally OFF. When illuminated, indicates that the DAC-NET has detected a trouble on Main In.
	GND FAULT	(Yellow)	Normally OFF. When illuminated, indicates that the DAC-NET has detected a ground fault on one of its field wires before the node.
	TRBL -MAIN OUT RETURN IN	(Yellow)	Normally OFF. When illuminated, indicates that the DAC-NET has detected a trouble on Main Out. When blinking twice per second, indicates that the DAC-NET has detected a trouble on Return In (open circuit, short circuit or data trouble).
	GND FAULT	(Yellow)	Normally OFF. When illuminated, indicates that the DAC-NET has detected a ground fault on one of its field wires after the node.

PRE-INSTALLATION

The following components must be set prior to inserting the card into the CC-5/CC-2:

S4, Test Switch: These switches select programming and test functions. All switches must be set to the OFF position.

S6, Network Address Switch: Set the three-digit D-NET address for the DAC-NET using the three position switch located near the bottom of the front panel. (Refer to Figure 1 for the location of the switch.) The address at the DAC-NET front panel must be the same as the address selected in the Zeus Programming Tool. To increment each digit of the address, press the "+" button above the desired digit; to decrement each digit, press the "-" button below the desired digit. The range of allowable network addresses is from 0 to 9 (left digit) and allowable node addresses is from 1 to 32 (two right digits).

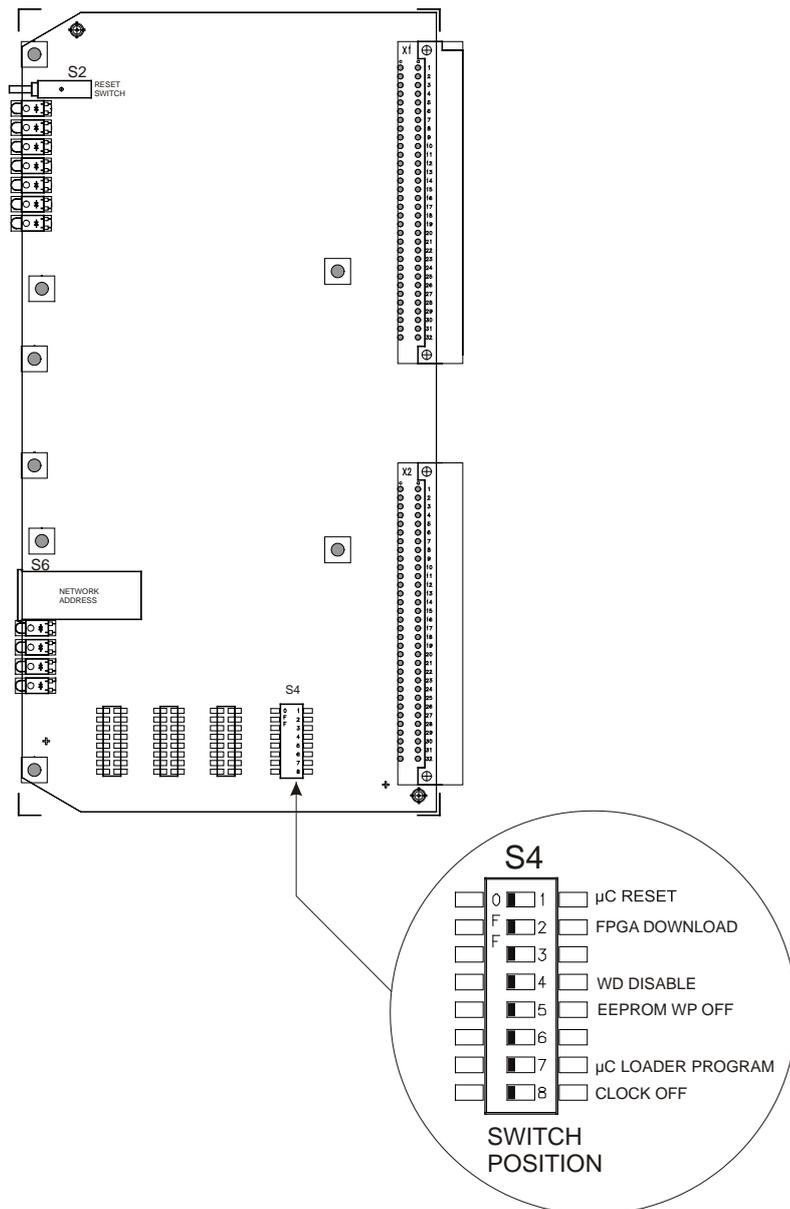


Figure 5
DAC-NET Switch Location



Remove ELECTRICAL POWER prior to working on equipment.

All field wiring of the DAC-NET is connected to the terminal blocks of the CC-5/CC-2 card cage slot in which it is installed.

NOTE: In Canada, ULC S524 requires that all interconnecting data communications links for networks be wired DCLC (Class X) except for dedicated network communication to annunciators.

To Connect External Wiring Lift the white cover on the terminal block

Loosen the screw of the terminal by turning it counterclockwise.

Insert the wire into the side of the terminal block.

Tighten the screw of the terminal block by turning it clockwise.

The DAC-NET supports D-NET Class B (ULC DCLB) and Class X (ULC DCLC) wiring. Check the ZEUS configuration for the proper network.

NOTES

1. Power limited.
2. Use twisted pair
3. 18AWG (Ø 0,5mm) Min. 12 AWG (2,5mm²) Max.
4. The two pairs between the nodes can be in one cable.
5. Max. cable length between DAC-NETs: 300m (38Ω, Ø 0,6mm) (21Ω, Ø 0,8mm) with cat 3 cable as J-Y(ST)Y.
6. Max. cable length between DAC-NETs: 900m (157Ω, Ø 0,51mm) with cat 5 cable as J-02YS(ST)Y.
7. Max. cable length between DAC-NETs: 700m (30 Ω, AWG 18) (19 Ω, AWG 16) (12 Ω, AWG 14) with cable 18B FPLR or 1pr. 16B FPLR or 1pr. 14B FPLR.
8. Distance between the first DAC-NET and last DAC-NET must not exceed wire lengths specified in Notes 5-7.
9. 10km max. total distance around the ring.
10. 32 DAC-NETs Max.
11. Positive or negative ground fault detected at <5k Ω for terminals 1-8.

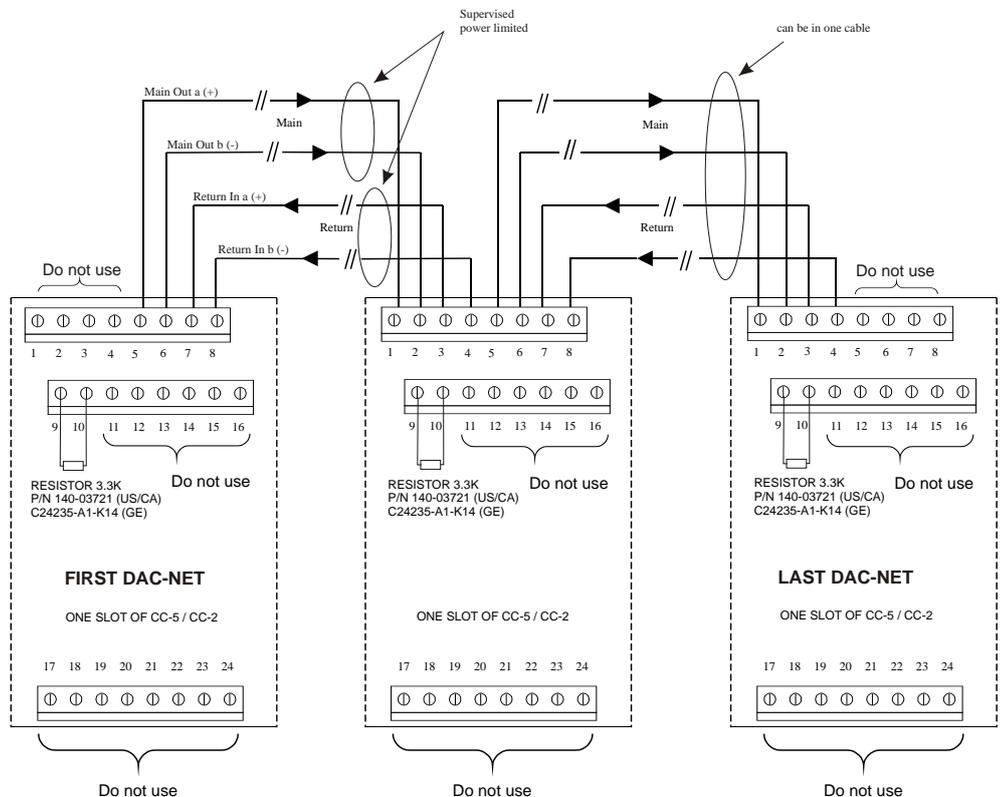


Figure 6
DAC-NET Class B (ULC DCLB) D-NET Wiring

NOTES

1. Power limited.
2. Use twisted pair.
3. Terminate shields at the entrance of the enclosure.
4. 18AWG (Ø 0,5m) Min.
12 AWG (2,5mm²) Max.
5. The two pairs between the nodes can be in one cable.
6. Max. cable length between DAC-NETs: 300m
(38Ω, Ø 0,6mm)
(21Ω, Ø 0,8mm) with cat 3 cable as J-Y(ST)Y.
7. Max. cable length between DAC-NETs: 900m
(157Ω, Ø 0,51mm) with cat 5 cable as J-02YS(ST)Y.
8. Max. cable length between DAC-NETs: 700m
(30 Ω, AWG 18)
(19 Ω, AWG 16)
(12 Ω, AWG 14) with cable 18B FPLR or 1pr. 16B FPLR or 1pr. 14B FPLR.
9. Distance between the first DAC-NET and last DAC-NET must not exceed wire lengths specified in Notes 6-8.
10. 10km max. total distance around the ring.
11. 32 DAC-NETs Max.
12. Positive or negative ground fault detected at <5k Ω for terminals 1-8.

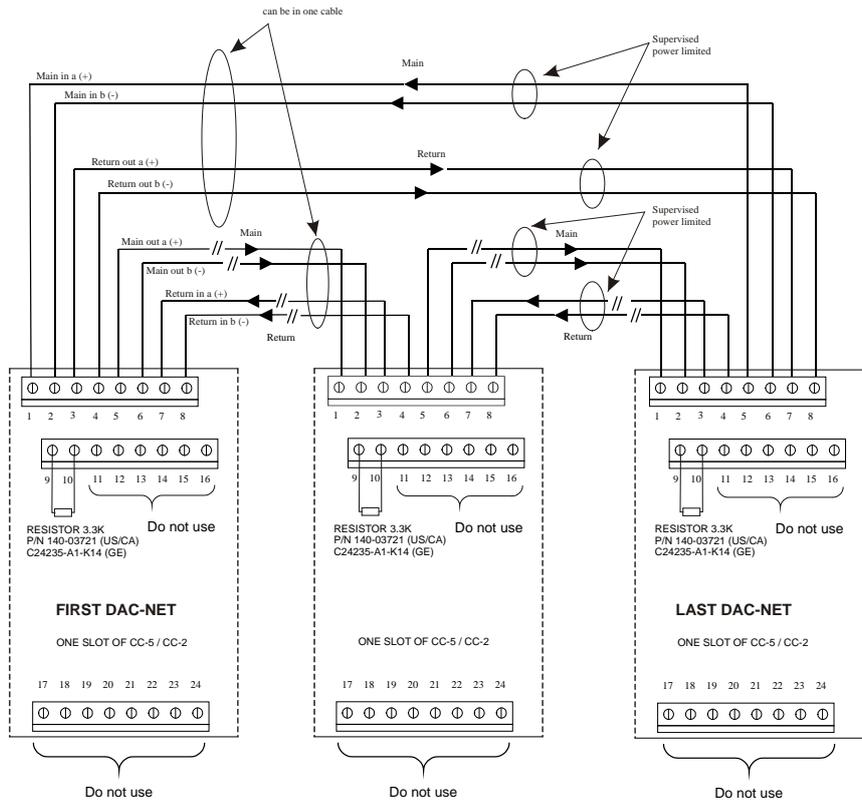


Figure 7
DAC-NET Class X (ULC DCLC) D-NET Wiring



Each connection between two nodes has to be installed in separate cable routes.

All CAN cards and modules must be combined via CAN Bus. The CAN Bus requires a 120 Ohm termination resistor on both ends. Use a CAN terminator at CAN connectors and a termination resistor at screw terminals to fulfill it. They are shipped with DAC-NET. See Figures 9-14.

All digital audio cards and modules must be connected via the ASI-Bus (LPB, AIC, ZAC-40, ZAM-180, XDMC). The ASI-Bus consists of 4 pairs (Part of CC-5). They require four 120 Ohm termination resistors on both ends. Use an ASI terminator at 60-pin connectors to fulfill it. They are shipped with DAC-NET. See Figures 9-14. The PMI/PMI-2/PMI-3 provides ASI termination at one end when used.

The Analog Audio Bus includes three audio signals with a level of 0dBu/+6dBu (LVM microphone, LVM monitor speaker, FMT Phone). The LPB supervises the microphone signal wiring. The supervision requires an EOL resistor 3.3K. The EOL resistor is integrated in the LVM.



If one LVM is mounted, the jumper P7 must be set in position 1 – 2.

LVM default factory setting: Jumper P7 in position 1 – 2

Connecting The Internal CAN, ASI And Analog Audio Bus

CAN BUS

Install the CAN cable into P3 of the CC-5/CC-2 or into P2 of the OCM-16 / SIM-16.

Install the other end of the CAN cable into the first CAN module on the inner door.

Observe the location of the CAN termination devices. Install a CAN terminator in the last CAN module on the inner door. Install the 120 Ohm CAN termination resistor into TB1 10 and 11 on the PSC-12.

ASI BUS with PMI/PMI-2/PMI-3

Install the 60-pin cable into P1 of the CC-5/CC-2.

Install the other end of the 60-pin cable into the PMI on the inner door.

There is no need to install an ASI terminator at the PMI/PMI-2/PMI-3. The PMI/PMI-2/PMI-3 has it already inside. Install an ASI terminator into the 60-pin connector on the PSC-12.

Analog Audio BUS

Install the Analog Audio cable into the 10-pin connector of the PMI/PMI-2/PMI-3.

Install the other end of the Analog Audio cable into one 10-pin connector of the LVM.

If there is a FMT install a further Analog Audio cable into the second 10-pin connector of the LVM and the other end into the FMT.



The DAC-NET must be installed into any open slot of the CC-5/CC-2 which is connected at the left side with the PMI/PMI-2/PMI-3.



Anti-Interference Capacitor:

It is a 6.8 μ F / 100V bipolar capacitor. In every Voice system must be one Anti-Interference Capacitor. It has to be connected between Ground and Earth. This capacitor is necessary to eliminate noise on the speaker lines.

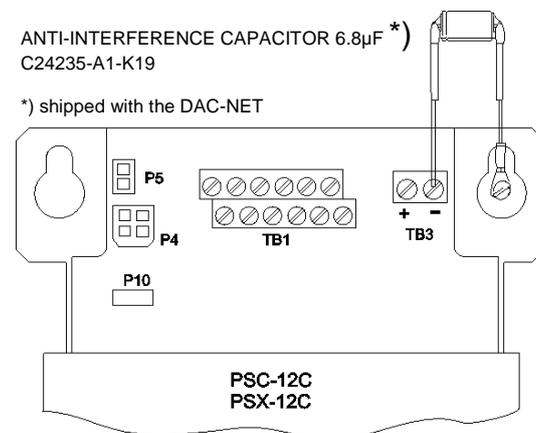


Figure 8
Anti-interference Capacitor

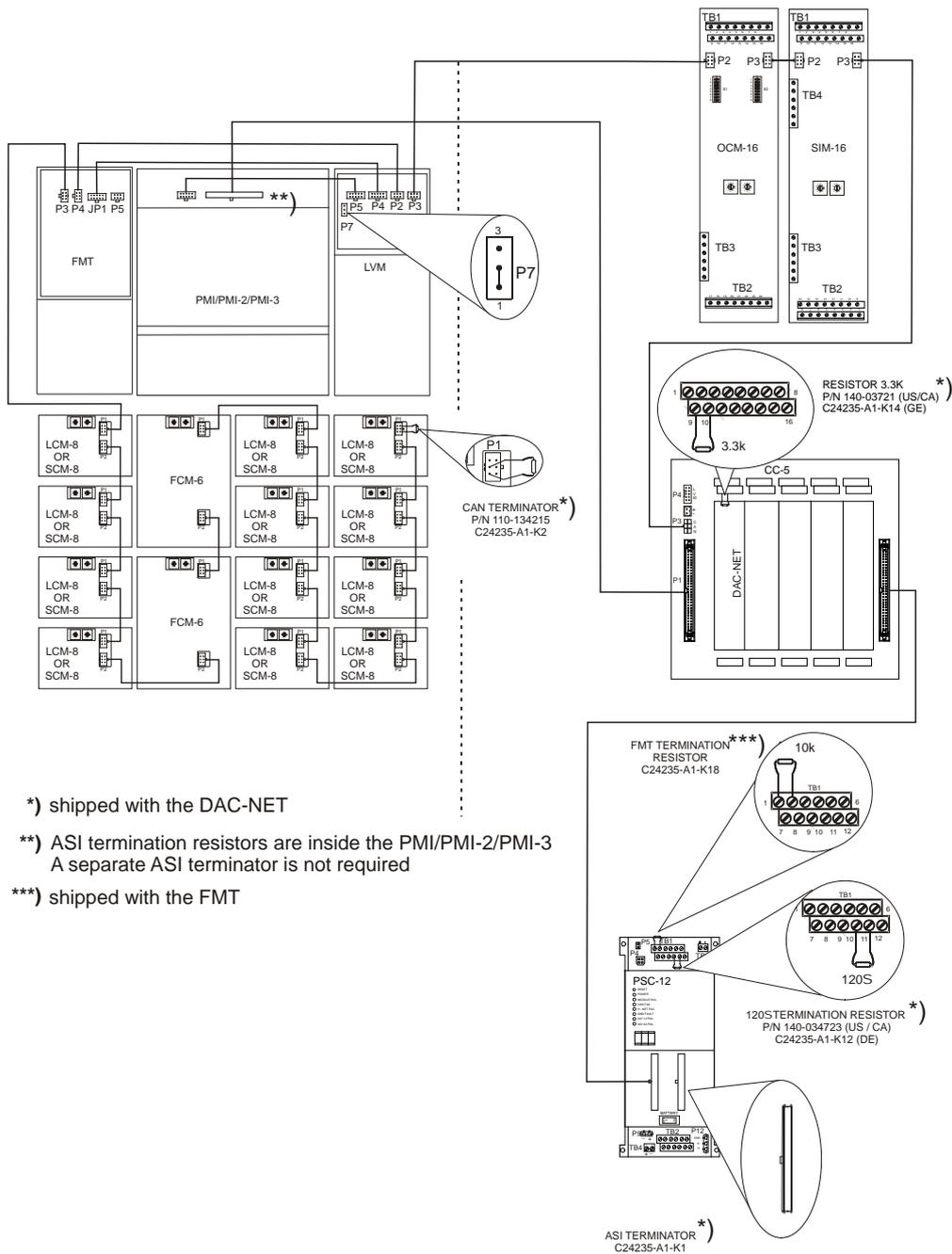


Figure 9
CAN BUS, ASI BUS, Analog Audio BUS Wiring – Single Control Panel with PMI/PMI-2/PMI-3

Connecting The Remote CAN Bus

CAN BUS

Observe the location of the CAN termination devices. Install one CAN terminator in the last CAN module on the inner door. If no CAN modules are installed on the inner door insert the CAN terminator into P3 of the CC-5/CC-

Install the second CAN terminator in the last CAN module in the remote enclosure.

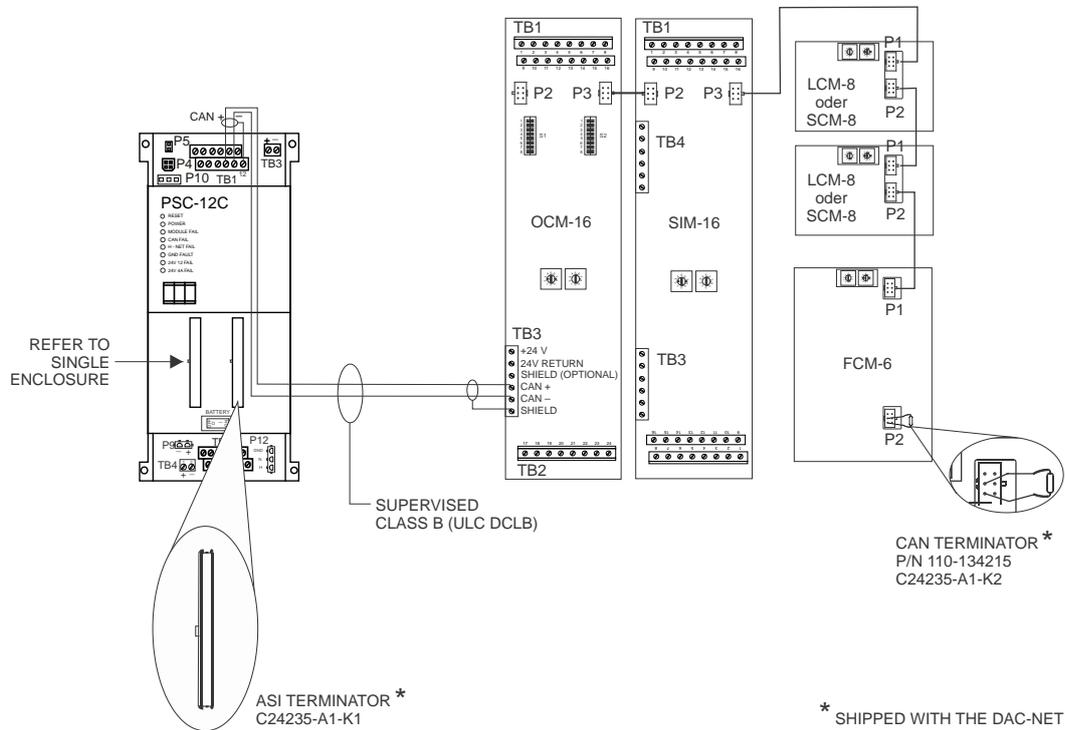


Figure 10
Remote Control Panel with SIM-16 and OCM-16



SIM-16 and OCM-16 have EMC-Protection for CAN Bus and 24V onboard and can be placed remote without using RNI. SCM, LCM and FCM which have no EMC-Protection can be connected to OCM-16 or SIM-16.

RNI is needed for EMC Protection if LVM, and FMT (SCM, LCM and FCM) shall be placed remote.

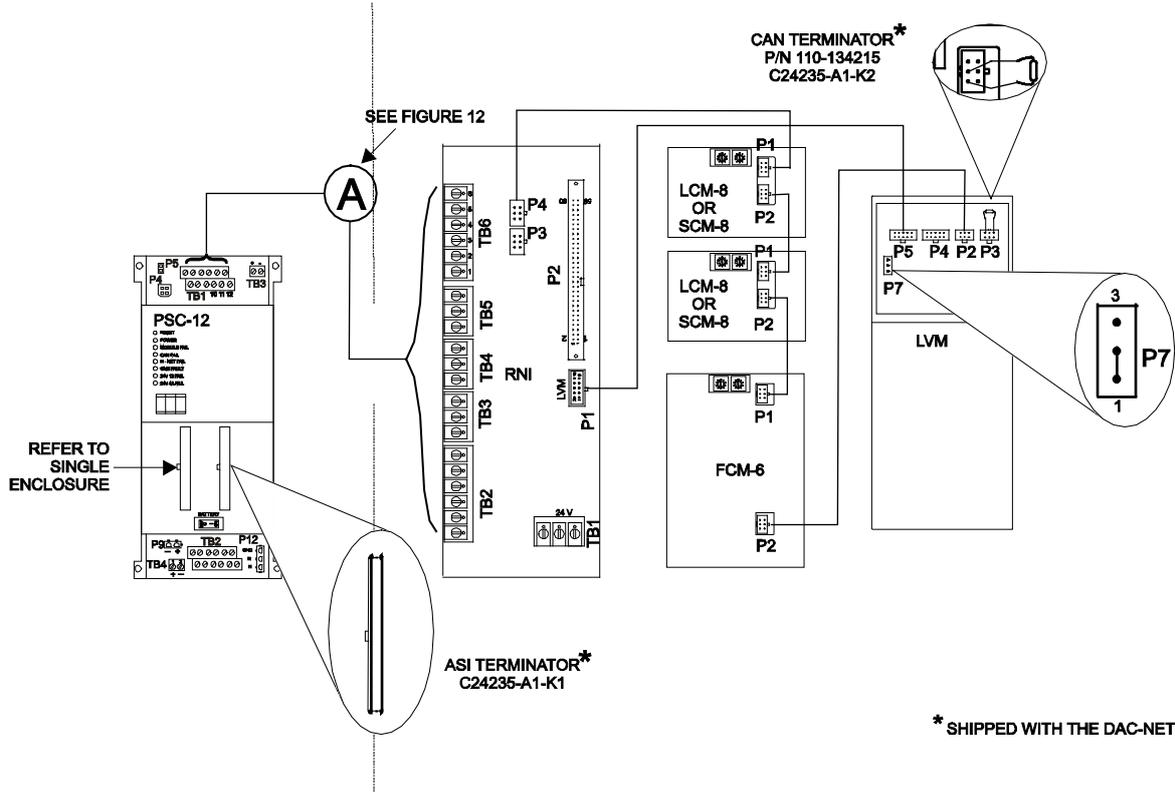
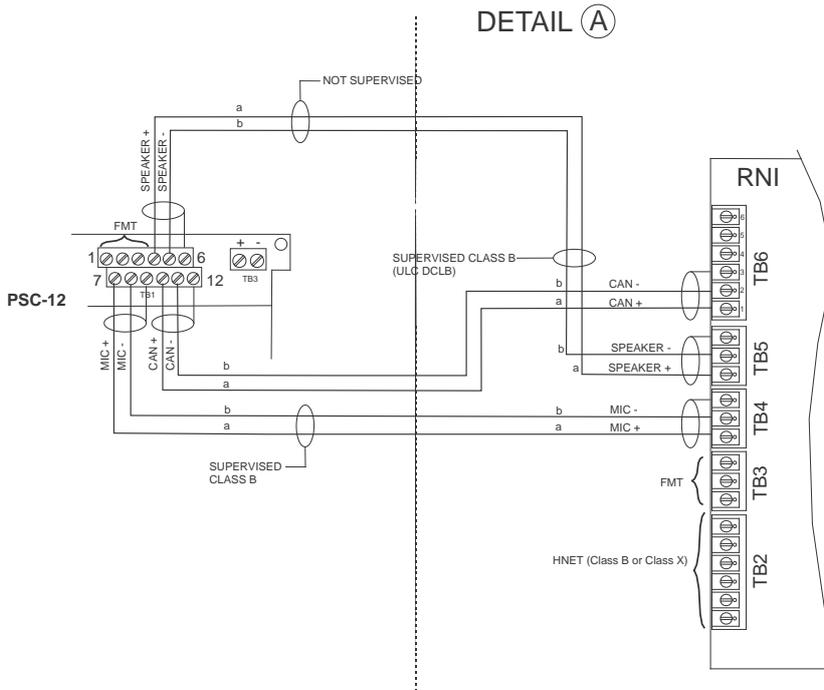


Figure 11
Remote Control Panel with RNI



22 AWG MIN.
12 AWG MAX.
15 Ωs MAX. PER PAIR
USE TWISTED PAIR

Figure 12
Remote Control Panel – Detail A

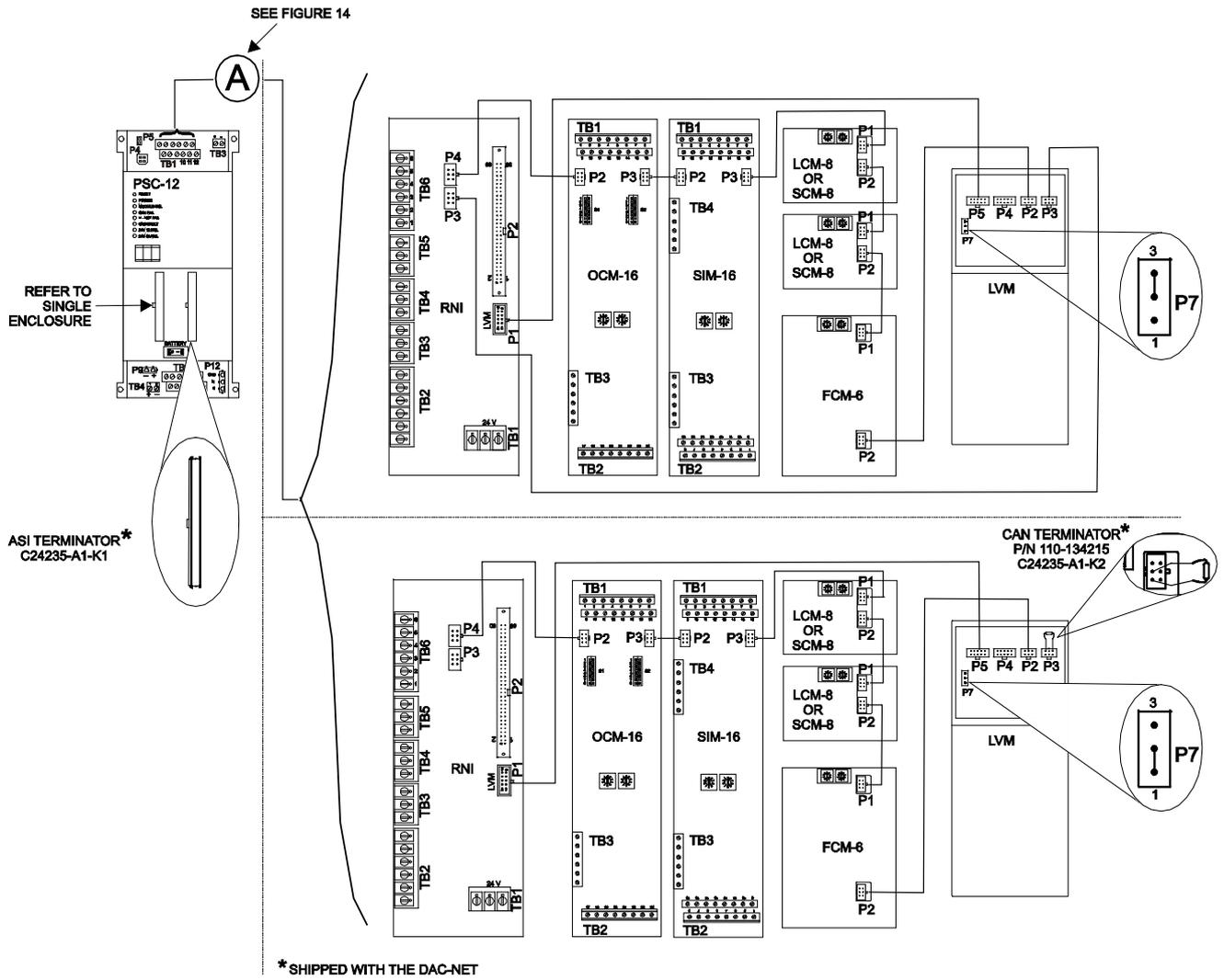
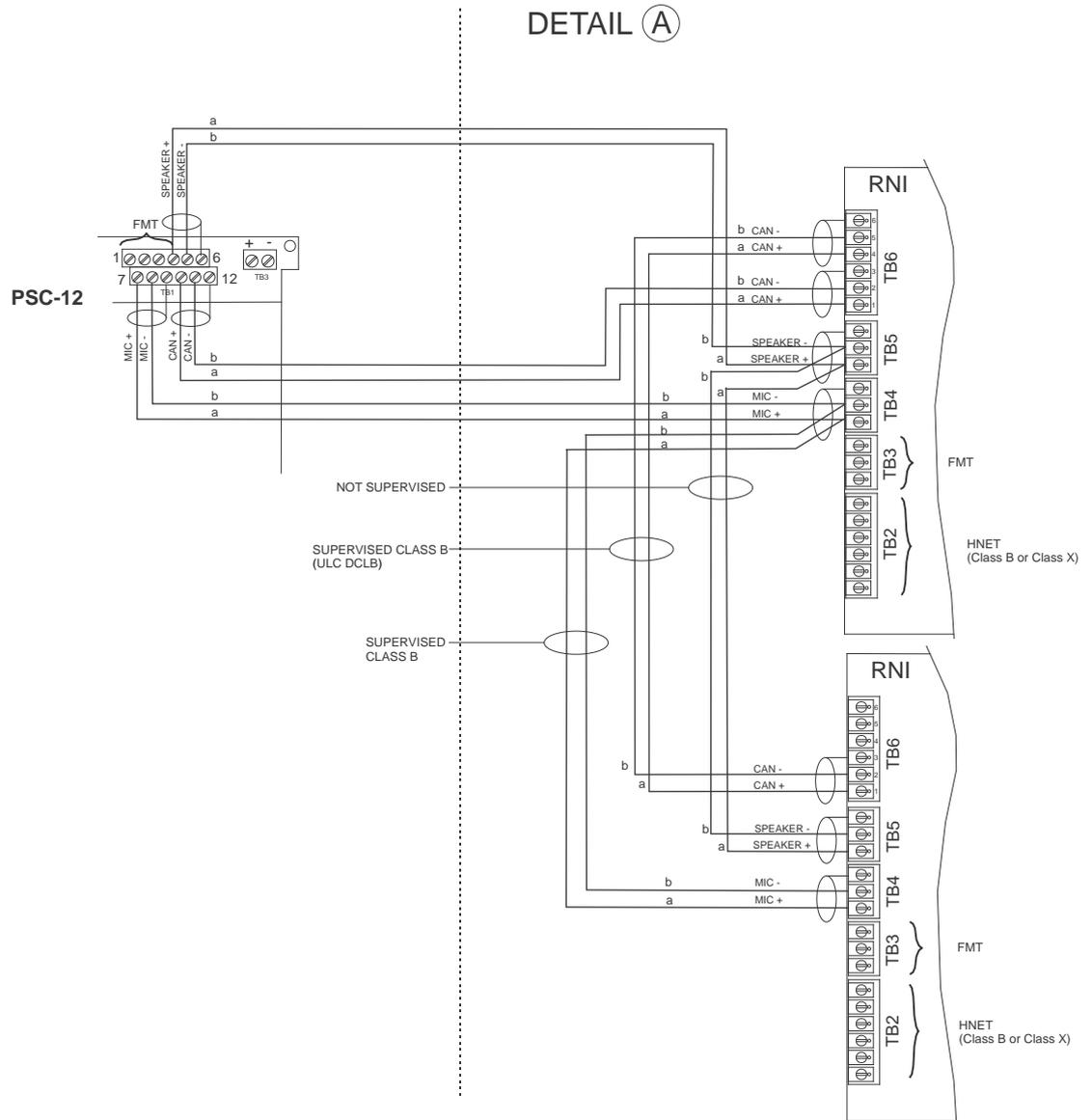


Figure 13
Multiple Remote Control Panels



22 AWG MIN.
12 AWG MAX.
15 Ωs MAX. PER PAIR
USE TWISTED PAIR

Figure 14
Multiple Remote Control Panels – Detail A

ACCESSORY PACK (shipped with DAC-NET)

Item	Part No. SBT Munich	Part No. SBT Florham Park
2 CAN Terminators	C24235-A1-K2	P/N 110-134215
2 ASI Terminator	C24235-A1-K1	Not Available
1 Can Termination Resistor 120 Ohms	C24235-A1-K12	P/N 140-034723
1 External Alarm EOL Resistor 3.3K Ohms	C24235-A1-K14	P/N 140-034721
1 External Alarm Resistor 680 Ohms	C24235-A1-K13	Not Available
1 Anti-Interference Capacitor 6.8 μ F / 100V bipolar	C24235-A1-K19	Not Available

ELECTRICAL RATINGS

Power Consumption DAC-NET	
24V Back Plane Current	230 mA
24V Screw Terminal Current	0
6.2V Back Plane Current	0
24V Standby Current	230 mA

The DAC-NET plugs perpendicularly into one slot in the CC-5/CC-2 cardcage via two 96-pin DIN connectors and can occupy any slot in the cardcage.

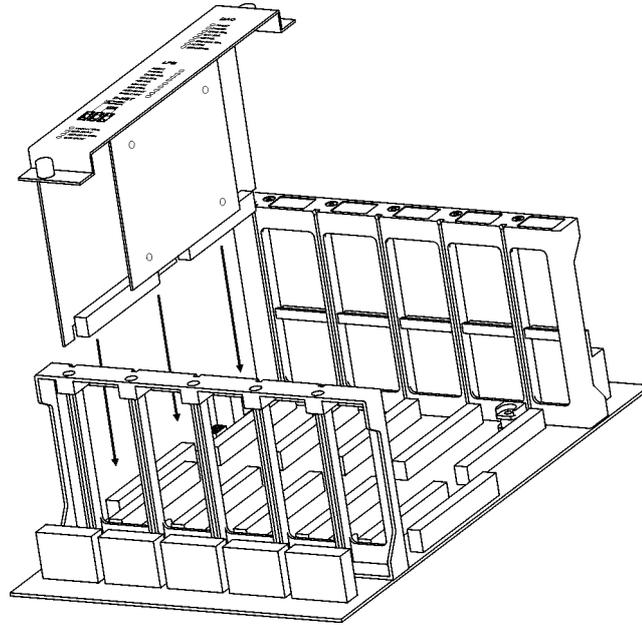


Figure 15
Installing the DAC-NET

Insert the DAC-NET card into the card guides right side up (lettering on the front panel is legible)

Slide the card in until the card edge connectors contact the receptacles on the motherboard.

Verify that the DIN connectors of the card and the card-cage aligned properly. The card can only plug in one direction to the card cage, if it does not align, DO NOT FORCE the card.

Place thumbs on the front panel adjacent to the captive screws and gently apply even pressure on the card until the connectors seat in the receptacles on the motherboard.

Secure with the captive screws.

Power up the system and verify that the DAC-NET power LED turns ON.

Cyber security disclaimer

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It is, however, necessary to implement and maintain a comprehensive, state-of-the-art security concept that is customized to individual security needs. Such a security concept may result in additional site-specific preventive action to ensure that the building comfort, fire safety, security management or physical security system for your site are operated in a secure manner. These measures may include, but are not limited to, separating networks, physically protecting system components, user awareness programs, defense in depth, etc.

For additional information on building technology security and our offerings, contact your Siemens sales or project department. We strongly recommend customers to follow our security advisories, which provide information on the latest security threats, patches and other mitigation measures.

<http://www.siemens.com/cert/en/cert-security-advisories.htm>

For CE applications in E100 systems refer to
Installation Instruction A24205-A334-B844 (English) or A24205-A334-A844 (German)

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