C-IPC Expansion VMC 052
(C-IPC VARAN Manager Client 052)

Versatile **A**utomation **R**andom **A**ccess **N**etwork

2 x VARAN Out (VARAN-Manager)
1 x VARAN In (VARAN-Client)

With this expansion card, the C-IPC can be expanded by a VARAN Manager with 2 VARAN Out ports. In addition, this expansion for the C-IPC can also be integrated into a primary VARAN tree as a VARAN client in order to construct a multi-manager system.

This special designed allows easy mounting and fixation.

The cover and mounting accessories are included with delivery of the card!

Technical Data

Performance data

Internal memory	16 Mbit SPI-Flash (W25P16)	
Interfaces	2 x VARAN-Out (VARAN-Manager) (RJ45) 1 x VARAN-In (VARAN-Client) (RJ45) (maximum length: 100 m)	
Status display	Green: Link	Yellow: Active
Connection to peripheral device	Over SO-DIMM socket PCI bus	

Electrical requirements

Internal supply voltage	Typically +5V DC (provided over the SO-DIMM socket)	
Current consumption	Minimum 300mA	Maximum 600mA

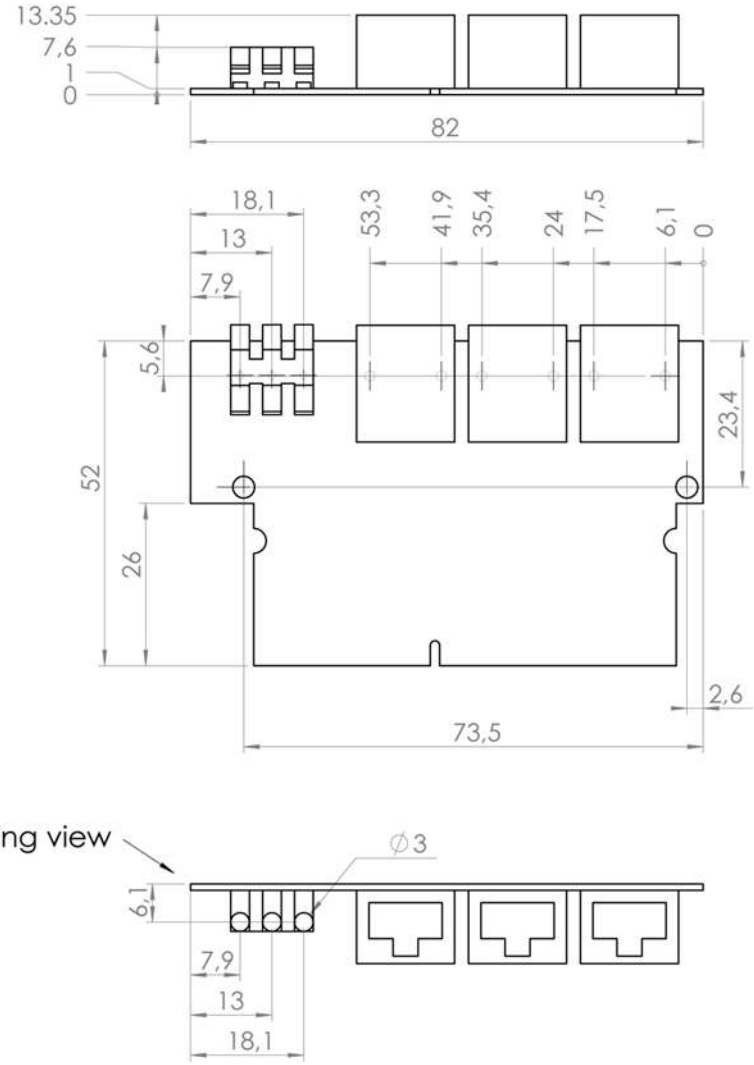
Miscellaneous

Article number	01-465-052
Hardware version	1.x

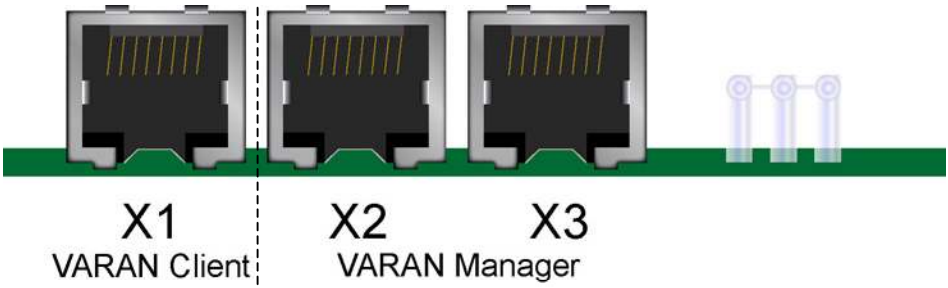
Environmental conditions

Storage temperature	-20 – +85℃
Operating temperature	0 – +60℃
Humidity	0 – 95%, uncondensed
EMV stability	According to EN 50082 part 2 (Industry area)

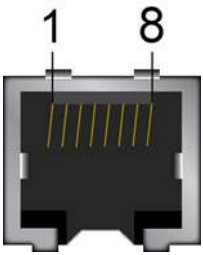
Mechanical dimensions



Connector layout

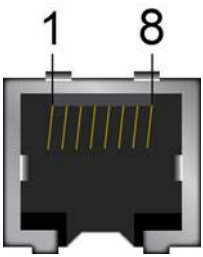


X1: VARAN-In (VARAN-Client) (8-pin RJ45)



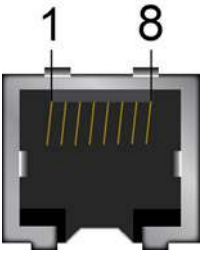
Pin	Function
1	TX/RX+
2	TX/RX–
3	RX/TX+
4	Not assigned
5	Not assigned
6	RX/TX–
7	GND
8	GND

X2: VARAN-Out 1 (VARAN-Manager) (8-pin RJ45))



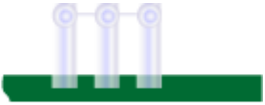
Pin	Function
1	TX/RX+
2	TX/RX–
3	RX/TX+
4	Not assigned
5	Not assigned
6	RX/TX–
7	GND
8	GND

X3: VARAN-Out 2 (VARAN-Manager) (8-pin RJ45)



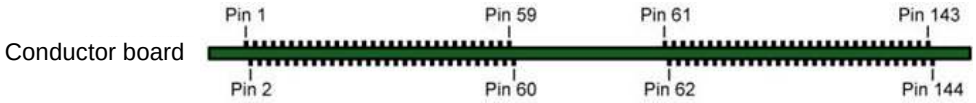
Pin	Function
1	TX/RX+
2	TX/RX–
3	RX/TX+
4	Not assigned
5	Not assigned
6	RX/TX–
7	GND
8	GND

Optical fibers: 3 x two colored LED



Led	Color	Function
1	Yellow	Active VARAN-In
2	Yellow	Active VARAN-Out1
3	Yellow	Active VARAN-Out2
1	Green	Link VARAN-In
2	Green	Link VARAN-Out1
3	Green	Link VARAN-Out2

X4: SO-DIMM (144-pole)



Pin	PCI bus	Pin	PCI bus	Pin	PCI bus
1	GND	49	\SERR	97	\INIT / \DIR *
2	GND	50	\PERR	98	\ERR / \HDSEL *
3	CLK2	51	\TRDY	99	GND
4	CLK3 *	52	\DEVSEL	100	GND
5	GND	53	\STOP	101	PD6 / \MOT0 *
6	GND	54	\IRDY	102	PD7 / DRV0 *
7	\REQ1	55	\RESET	103	PD4 / \DSKCHG *
8	\GNT1	56	\FRAME	104	PD5 / RES *
9	\REQ2 *	57	IRQ_W *	105	PD2 / \WP *
10	\GNT2 *	58	IRQ_X	106	PD3 / \RDATA *
11	AD00	59	IRQ_Y *	107	PD0 / \INDEX *
12	AD01	60	IRQ_Z *	108	PD1 / \TRKO *
13	AD02	61	GND	109	GND
14	AD03	62	GND	110	GND
15	AD04	63	GND	111	\AFD / DENSEL*
16	AD05	64	GND	112	GND
17	AD06	65	GND	113	LPT / \FLPY *
18	AD07	66	GND	114	\STB / RES *
19	AD08	67	EWP14	115	Soldering pad
20	AD09	68	EWP15	116	I2C_CLK_DVI
21	AD10	69	EWP12	117	Soldering pad
22	AD11	70	EWP13	118	I2C_DAT_DVI
23	AD12	71	EWP10	119	GND
24	AD13	72	EWP11	120	GND
25	AD14	73	EWP09	121	GND
26	AD15	74	GND	122	GND
27	AD16	75	EWP07	123	\RESPER_X *
28	AD17	76	EWP08	124	GND
29	AD18	77	EWP05	125	+5V *
30	AD19	78	EWP06	126	+5V *
31	AD20	79	EWP04	127	+5V *
32	AD21	80	GND	128	+5V *
33	AD22	81	EWP02	129	+5V *
34	AD23	82	EWP03	130	+5V *
35	AD24	83	EWP00	131	+5V *
36	AD25	84	EWP01	132	+5V *
37	AD26	85	GND	133	+3V3
38	AD27	86	GND	134	+3V3
39	AD28	87	GND	135	+3V3
40	AD29	88	GND	136	+3V3
41	AD30	89	GND	137	+3V3
42	AD31	90	GND	138	+3V3
43	\CBE0	91	GND	139	+3V3
44	IDSEL*	92	\SLCT / \WGATE *	140	+3V3
45	\CBE2	93	PE / \WDATA *	141	GND
46	\CBE1	94	\BUSY / MOT1*	142	GND
47	PAR	95	\ACK / DRV1 *	143	GND
48	\CBE3	96	\SLIN / \STEP *	144	GND

*** THESE SIGNALS ARE NOT IMPLEMENTED ON THE VMC 052 (only on the C-IPC).**

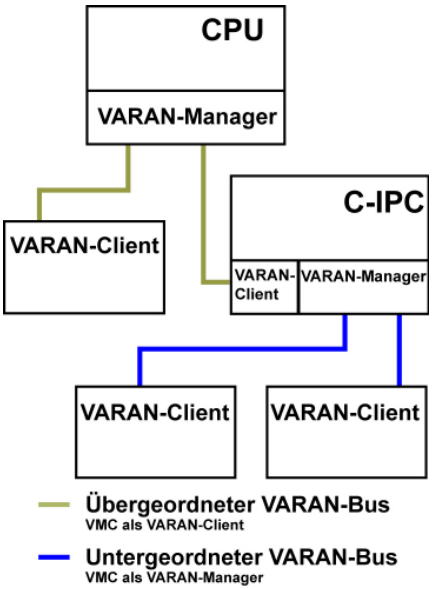
Detailed Description

General

The VMC 052 offers the option to construct a multi-manager VARAN system to, for example, synchronized different machines to on another.

The VMC 052 appears in the primary VARAN tree as a normal VARAN client.
With the two VARAN Out ports, the VMC 052 can be used as normal VARAN Managers.

A combination of several VMC 052's in a multi-manager system, whether connected in series or parallel, is possible.



Synchronization with a primary VARAN bus system

The VMC 052 is an independent manager. As soon as the isochronous bus cycle is started in the primary VARAN system, the VMC 052 hardware classes ensure that the VMC 052 is synchronized with the primary system.

CAUTION!
In a VARAN system with a VMC 052 as the manager, all nodes must support VARAN protocol version V1.4.0 since individual clients can be asynchronous to the manager.

Synchronous exchange buffer

The synchronous exchange buffer (1 kbyte) ensures that data exchange between the two bus systems is possible through the isochronous bus cycle without the danger of inconsistent data.

Asynchronous exchange buffer

The synchronous exchange buffer (1 kbyte) ensures that data exchange between the two bus systems is possible through asynchronous access without the danger of inconsistent data.

DirectAccess exchange buffer

The DirectAccess exchange buffer (1 kbyte) ensures that data exchange between the two bus systems is possible through direct access without the danger of inconsistent data. Access from the primary VARAN bus triggers an IRQ in the C-IPC with the VMC 052, in order to retrieve the data as fast as possible.

VARAN transmits ETHERNET (VtE)

The VARAN bus offers the possibility to transmit Ethernet packets using VtE. Several VARAN Clients have an Ethernet port. The incoming Ethernet packets are, similar to using a HUB, distributed to all other Ethernet ports within a VARAN tree and the VARAN Manager (and therewith the CPU).

With the **VMC052**, Ethernet packets are not only distributed within the VARAN tree with VtE, Ethernet packets are also forwarded or accepted in the primary VARAN bus.

The primary VARAN manager then redistributes these with VtE to all Ethernet ports in its tree and to its CPU.
Ethernet data therefore can also be exchanged between the primary CPU and the secondary C-IPC with the VMC052.

More information on the VARAN bus can be found in the VARAN bus specifications!

Inserting/Removing the expansion card

When inserting the expansion card, the following process must be followed.

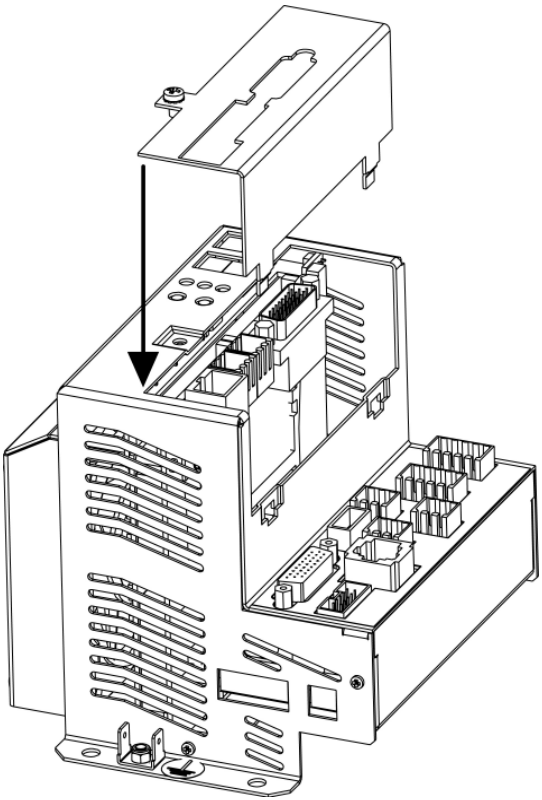
- The card must first be placed in the SO-DIMM socket **on an angle**.
- Next, press the card into the holders.
- And then using the M2x4 bolts, screw the card to the C-IPC.

Removing the card is done in reverse order:

- Unscrew the card from the C-IPC.
- Then it must be **pulled forward** to spring the holders.
- Finally, the card can be taken out of the SO-DIMM socket.

Mounting the housing cover

The cover is placed vertically on the C-IPC, the prongs inserted in the openings provided and then screwed down.



VARAN Recommended Shielding

The VARAN real-time Ethernet bus system offers robust performance in harsh industrial environments. Through the use of IEEE 802.3 standard Ethernet physics, the potential between an Ethernet line and sending/receiving components is kept separate. The VARAN Manager resends messages to a bus participant immediately when an error occurs. It is principally recommended that the shielding guidelines below be followed.

For applications in which the bus line is run outside the control cabinet, correct shielding is required. This is especially important, if due to physical requirements, the bus lines must be placed next to sources of strong electromagnetic noise. It is recommended that whenever possible, to avoid wiring VARAN-Bus lines parallel to power cables.

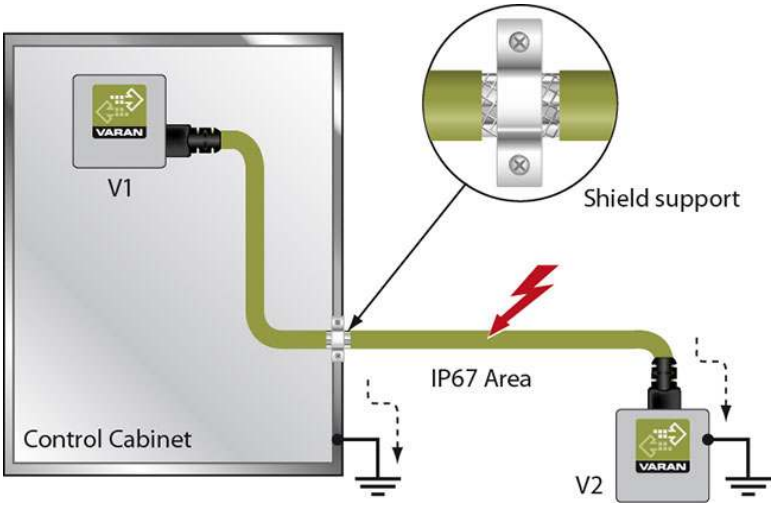
SIGMATEK recommends the use of **CAT5e** industrial Ethernet bus lines.

For the shielding variants, an S-FTP bus line is recommended, which is a symmetric, multi-wire cable with unshielded pairs. For the total shielding, a combination of foil and braiding is used; it is recommended that an unvarnished variant be used.

The VARAN cable must be secured at a distance of 20 cm from the connector for protection against vibration!

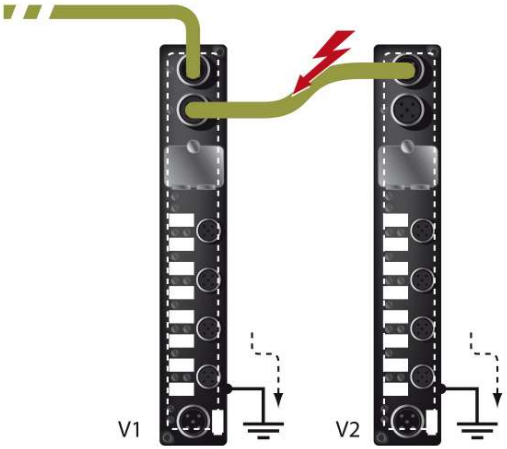
1. Wiring from the Control Cabinet to an External VARAN Component

If the Ethernet lines are connected from a VARAN component to a VARAN node outside the control cabinet, the shielding should be placed at the entry point to the control cabinet housing. All noise can then be deflected from the electronic components before reaching the module.



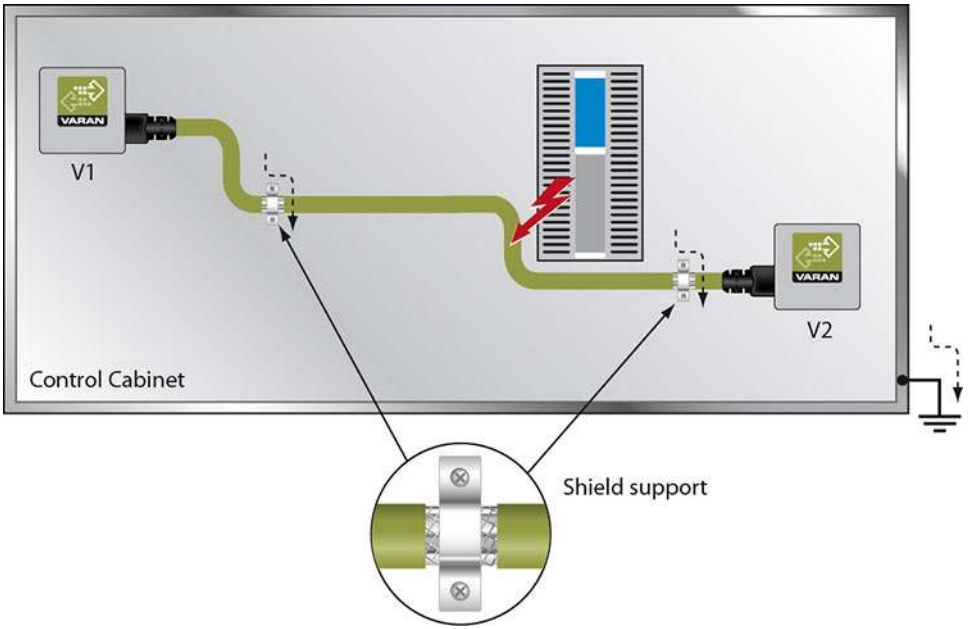
2. Wiring Outside of the Control Cabinet

If a VARAN bus cable must be placed outside of the control cabinet only, no additional shield connection is required. This requires that only IP67 modules and connectors be used. These components are very robust and noise resistant. The shielding for all sockets in IP67 modules are internally connected to common bus or electrically connected to the housing, whereby the deflection of voltage spikes does not flow through the electronics.



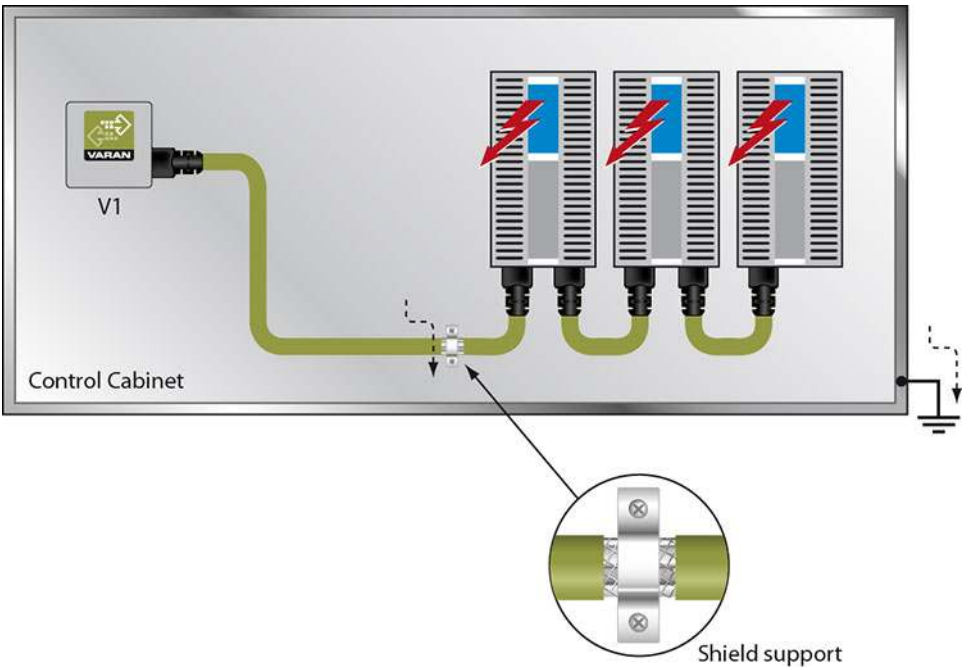
3. Shielding for Wiring Within the Control Cabinet

Sources of strong electromagnetic noise located within the control cabinet (drives, Transformers, etc.) can induce interference in a VARAN bus line. Spike voltages are deflected over the metallic housing of a RJ45 connector. Noise is conducted through the control cabinet housing without further action from the electronic components To eliminate sources of noise during data transfer, it is recommended that the shielding from all electronic components be connected within the control cabinet.



4. Connecting Noise-Generating Components

With the connection of power components that generate strong electromagnetic noise, it is also critical to ensure correct shielding. The shielding should be placed before a power component (or a group thereof).



5. Shielding Between Two Control Cabinets

If two control cabinets must be connected over a VARAN bus, it is recommended that the shielding be located at the entry points to both cabinets. Noise can thereby be kept from reaching the electronics within the control cabinet.