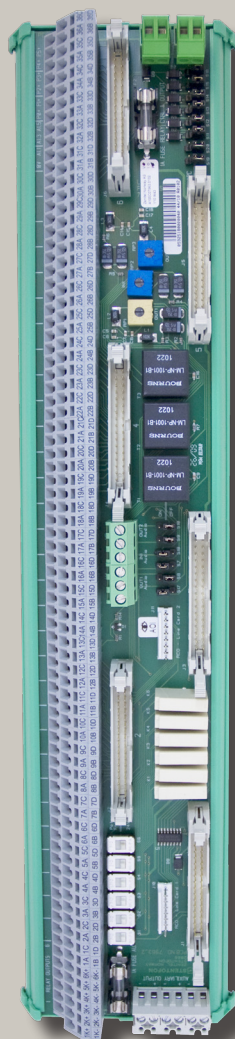


Line Connection Module

LCM



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1 Introduction

1.1 About this Document

The scope of this document is to provide a system description of the Line Connection Module (LCM), part number 1009950100, and relevant information on module features, typical configurations, simplified wiring, and technical specifications.

This manual contains a step-by-step interconnection procedure and describes the hardware requirements and special terminal configuration programming for the module. The programming of standard features for the LCM is also described.

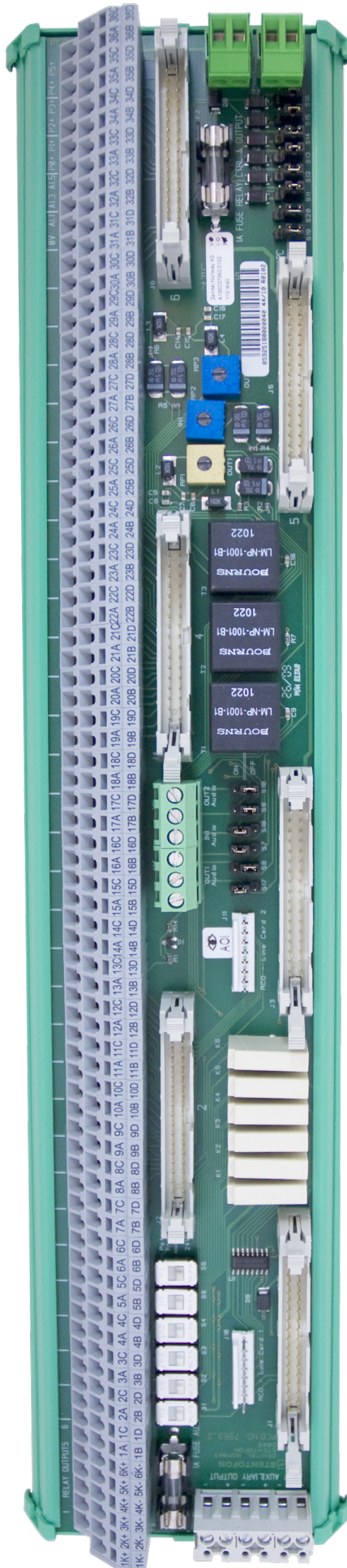
1.2 Revision Information

Rev.	Date	Author	Comments
1.0	2009-10-02	TH/JF	Published
2.0	2010-11-24	HKL	Revised aux output connections, spring lock terminals, AlphaCom XE

1.3 Related Documentation

Doc. no.	Documentation
A100K10805	AlphaCom XE Installation, Configuration & Operation
A100K10647	ACM Family System Manual
A100K10430	ACM-M-A-V2 ACM Telephone System

2 General Description



The Line Connection Module (LCM) is used for external connections for the AlphaCom XE / ACM exchanges with any mix of ASLT, ATLB and ATLB12 boards.

The LCM can be used in all STENTOFON AlphaCom XE7, XE20 and XE26 servers/exchanges. LCM is normally not used with AlphaCom XE7 as this exchange has line connections on the backplane.

One module serves 6 subscriber boards (36 intercom stations). Up to 3 modules may be needed in a fully equipped XE26 exchange.

The module must be mounted on DIN rails on the exchange termination field and connected to the exchange according to the project configuration.

The LCM board will substitute:

- 6 x Line Termination boards (1009930200)
- Power Distribution board (1009970101)
- MRBD, Relay board with 6 RCO relays (1009970200 or VA-502)
- FBSAR, Filter and Speech Adapter board with 2 audio outputs, 1 audio input and PTT relay if these functions are used (1009505000 or VA-503)

Each LCM board has connectors for:

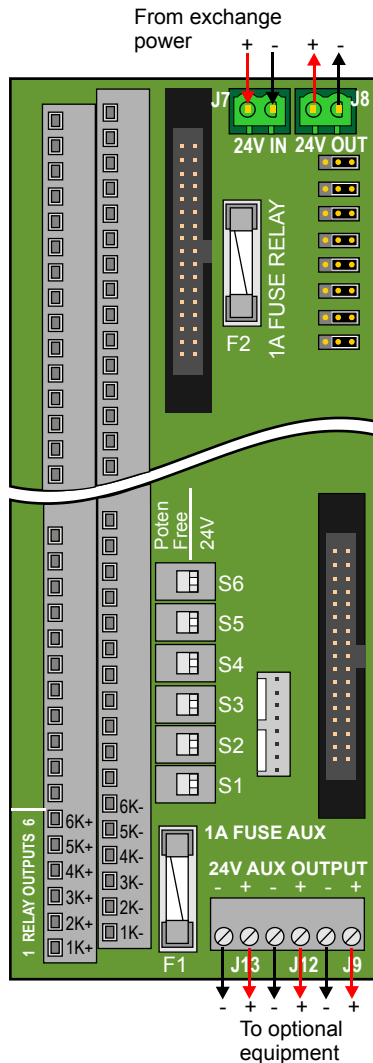
- **24 VDC Power**
 - Input
 - Output
 - 3 x fused outputs
 - 6 x fused relay controlled RCO outputs (switch selection)
- **Line points**

All subscriber line connections are made to the LCM board. Any mix of ASLT and ATLB12 boards may be used.

 - Max. 36 analog intercom stations with 6 x ASLT boards
 - Max. 72 analog telephone lines with 6 X ATLB12 boards
 - Max. 60 analog telephone lines with 5 x ATLB12 boards
 - + max. 5 intercom stations on 1 x ASLT board +1 intercom station as PA monitor when used with Public Address amplifier.
- **RCO**
 - 1 x relay contact for PA control
 - 5 x relay contacts, potential free or +24 V (switch selection)
- **RCI ¹⁾**
 - 6 x closing contact inputs referred to 0 V.
- **PA/GA or radio input ¹⁾**
 - 6 x potential free 600 ohm, 0 dB lines
- **Radio / Walkie-Talkie interface ¹⁾**
 - Potential free adjustable audio in and out
 - RCO relay can be used for PTT control
- **PA audio output**
 - Audio output for PA with monitor intercom station in parallel

¹⁾ Needs APC board, not used in AlphaCom XE7

3 Connections



3.1 Power Supply

The electronic circuits on the LCM board are powered by 24 VDC from the exchange. The power is connected to terminal J7.

- Use 2.5 mm² cables.

24 VDC is available on the unfused terminal J8 as well as the three terminals J9, J12, and J13 fused by 1A (F1). These are used for distributing 24 VDC to other equipment.

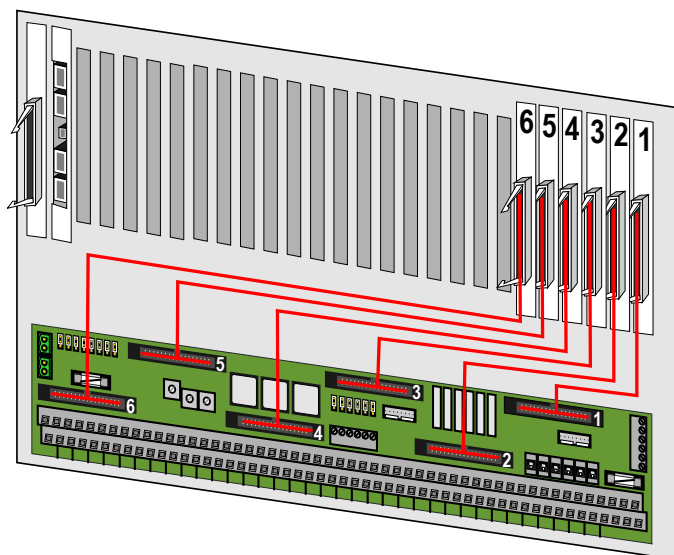
The six RCO relays can deliver 24 VDC on terminals 1K to 6K if selected by on-board switches S1 to S6. The relay control and output power is fused by 1A (F2).

3.2 Subscriber Lines

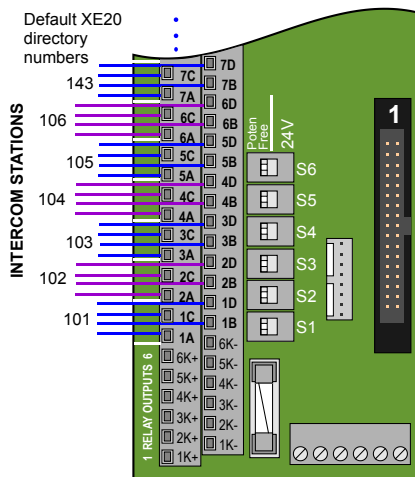
3.2.1 AlphaCom XE20/XE26

Each Subscriber Line board has its interface through an ASLT Filter board accessed at the rear of the cabinet. The filter board is delivered with a flat connection cable.

- 1.5 m flat ASLT connection cable with filter board (1009501011)
- 3 m flat ASLT connection cable with filter board (1009501014)
- Use the flat cables to interconnect the filter boards with the 34-pin line connectors on the LCM board according to the table below.
- If there are more than 6 line boards, one or two LCMs must be added.



LCM		XE20	XE26
Module	Connector	Board no.	Board no.
1	1	1	1
	2	8	2
	3	9	3
	4	10	4
	5	11	5
	6	12	6
2	1	13	7
	2	14	8
	3	15	9
	4	16	10
	5	17	11
	6	18	12
3	1		13
	2		14
	3		15
	4		16
	5		17
	6		18



Subscriber lines connection

The subscriber lines are connected to corresponding terminals on the Line Connection Module board.

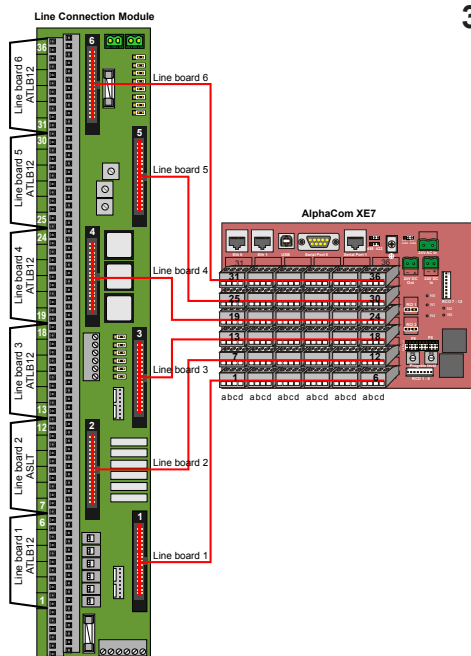
All terminals are labeled, starting from 1A, 1B, 1C and 1D. The four intercom line wires are connected according to the table below.

The directory number on each physical number is system default and may be changed during AlphaPro programming.

- Be sure all 8 jumpers S11-S16 + S19-S20 are set to the *Lines* position if the functions associated with the APC card are not used (see section 3.7). In APC position, terminals 31-36 will not be used for subscriber lines.

① **Note that line board positions 2-7 are not used in AlphaCom XE20. Physical numbers 7-42 are hence missing.**

LCM	Module 1				Module 2				Module 3			
A/B/C/D	XE20		XE7 and XE26		XE20		XE26		XE20		XE26	
Terminal No.	Dir. No.	Phys. No.	Dir. No.	Phys. No.	Dir. No.	Phys. No.	Dir. No.	Phys. No.	Dir. No.	Phys. No.	Dir. No.	Phys. No.
1	101	1	101	1	173	73	137	37			173	73
2	102	2	102	2	174	74	138	38			174	74
3	103	3	103	3	175	75	139	39			175	75
4	104	4	104	4	176	76	140	40			176	76
5	105	5	105	5	177	77	141	41			177	77
6	106	6	106	6	178	78	142	42			178	78
7	143	43	107	7	179	79	143	43			179	79
8	144	44	108	8	180	80	144	44			180	80
9	145	45	109	9	181	81	145	45			181	81
10	146	46	110	10	182	82	146	46			182	82
11	147	47	111	11	183	83	147	47			183	83
12	148	48	112	12	184	84	148	48			184	84
13	149	49	113	13	185	85	149	49			185	85
14	150	50	114	14	186	86	150	50			186	86
15	151	51	115	15	187	87	151	51			187	87
16	152	52	116	16	188	88	152	52			188	88
17	153	53	117	17	189	89	153	53			189	89
18	154	54	118	18	190	90	154	54			190	90
19	155	55	119	19	191	91	155	55			191	91
20	156	56	120	20	192	92	156	56			192	92
21	157	57	121	21	193	93	157	57			193	93
22	158	58	122	22	194	94	158	58			194	94
23	159	59	123	23	195	95	159	59			195	95
24	160	60	124	24	196	96	160	60			196	96
25	161	61	125	25	197	97	161	61			197	97
26	162	62	126	26	198	98	162	62			198	98
27	163	63	127	27	199	99	163	63			199	99
28	164	64	128	28	200	100	164	64			200	100
29	165	65	129	29	201	101	165	65			201	101
30	166	66	130	30	202	102	166	66			202	102
31	167	67	131	31	203	103	167	67			203	103
32	168	68	132	32	204	104	168	68			204	104
33	169	69	133	33	205	105	169	69			205	105
34	170	70	134	34	206	106	170	70			206	106
35	171	71	135	35	207	107	171	71			207	107
36	172	72	136	36	208	108	172	72			208	108



3.2.2 AlphaCom XE7

The line outputs from the XE7 exchange backplane are routed to the LCM through six 17-pair flat cables with six 4-pole plug-in screw terminals at the exchange end and a 34-pole connector at the LCM end. Note that these cable are not available from Zenitel and must be manufactured locally.

The subscriber lines are connected to corresponding terminals on the Line Connection Module board. See module 1 in the table on page 6.

3.2.3 Telephone line connections

Each ATLB12 Subscriber Line Board serves 12 analog telephones.

All terminals are labeled, starting at 1A, 1B, 1C, and 1D. The first telephone line pair is connected to 1A/B, the next to 1C/D and so on up to 36C/D if all lines in the module are used.

The relationship between telephones terminals, directory numbers and physical numbers on the first module is shown in the table below. Note that the physical numbers on the last six terminals on each line board are in the 277 - 385 range for 3 modules.

In the example below, line board 2 is the ASLT for 6 intercoms.

Line Board 1 Telephones			Line Board 2 Intercom			Line Board 3 Telephones		
Term. No.	Dir. No.	Phys. No.	Term. No.	Dir. No.	Phys. No.	Term. No.	Dir. No.	Phys. No.
1A/B	101	1	7A/B/ C/D	113	7	13A/B	119	13
1C/D	102	2				13C/D	120	14
2A/B	103	3	8A/B/ C/D	114	8	14A/B	121	15
2C/D	104	4				14C/D	122	16
3A/B	105	5	9A/B/ C/D	115	9	15A/B	123	17
3C/D	106	6				15C/D	124	18
4A/B	107	277	10A/B/ C/D	116	10	16A/B	125	289
4C/D	108	278				16C/D	126	290
5A/B	109	279	11A/B/ C/D	117	11	17A/B	127	291
5C/D	110	280				17C/D	128	292
6A/B	111	281	12A/B/ C/D	118	12	18A/B	129	293
6C/D	112	282				18C/D	130	294
Line Board 4 Telephones			Line Board 5 Telephones			Line Board 6 Telephones		
Term. No.	Dir. No.	Phys No.	Term. No.	Dir. No.	Phys No.	Term. No.	Dir. No.	Phys No.
19A/B	131	19	25A/B	143	25	31A/B	155	31
19C/D	132	20	25C/D	144	26	31C/D	156	32
20A/B	133	21	26A/B	145	27	32A/B	157	33
20C/D	134	22	26C/D	146	28	32C/D	158	34
21A/B	135	23	27A/B	147	29	33A/B	159	35
21C/D	136	24	27C/D	148	30	33C/D	160	36
22A/B	137	295	28A/B	149	301	34A/B	161	307
22C/D	138	296	28C/D	150	302	34C/D	162	308
23A/B	139	297	29A/B	151	303	35A/B	163	309
23C/D	140	298	29C/D	152	304	35C/D	164	310
24A/B	141	299	30A/B	153	304	36A/B	165	311
24C/D	142	300	30C/D	154	306	36C/D	166	312

3.2.4 Line cables

The subscriber line cable must be an approved cable type with 0.5 mm² twisted pairs.

The installation may require a cable with an outer-braided tinned copper screen. The screen must be interconnected in junction boxes and grounded to a common ground point in the system rack only.

3.3 Remote Control Outputs - RCO

3.3.1 RCO 1 - 6

All RCO functions are programmed in AlphaPro.

There are outputs from 6 RCO relays which can be programmed to operate external features like extra signal devices in noisy areas.

The RCO signals are taken from Line Board 1.

The outputs are individually selected to be a potential free relay dry contact or +24 V. The selection is made by the switches S1 – S6. S1 is related to RCO1 and so on.

The devices are connected to the RELAY OUTPUT terminals labeled 1K+/1K- to 6K+/6K-.

RCO 1 on 1K is reserved for PA all-call activation. Switch S1 must then be in the *Poten Free* position.

The relay contacts are rated to maximum 5 A / 30 VDC or 250 VAC resistive load. The internal +24 V is protected by a 1 A slow-blow fuse, F2.

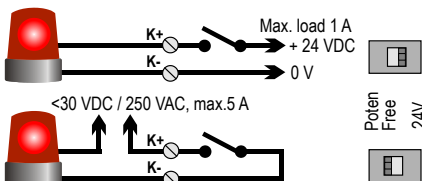
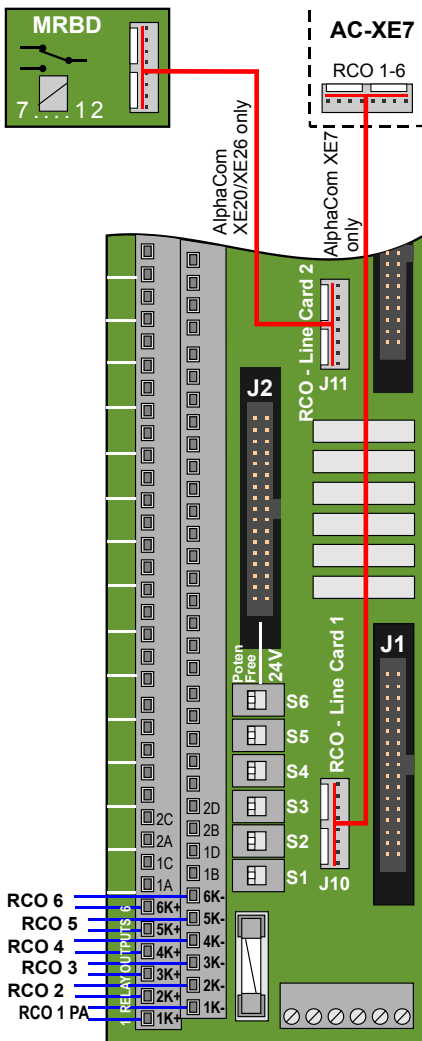
AlphaCom XE20/XE26

The RCO signals from line board 1 are included in the ribbon cable between card slot 1 in the exchange and J1 on the LCM.

The 8-pin connector J10 labeled *RCO - Line Card 1* is not used in combination with AlphaCom XE20/XE26.

AlphaCom XE7

There is a separate 8-wire cable between the *RCO1-6* connector on the XE7 exchange backplane and the *RCO - Line Card 1* connector J10 on the LCM.



3.3.2 RCO 7 - 12

It is possible to use six additional RCOs by connecting an MRBD relay board.

AlphaCom XE20/XE26

The RCO signals from line board 2 are included in the ribbon cable between card slot 2 in XE26 or slot 8 in XE20 and J2 on the LCM.

The MRBD relay board is connected to the 8-pin connector J11 labeled *RCO - Line Card 2*.

AlphaCom XE7

The MRBD relay board must be connected to the 8-pin connector *RCO 7-12* connector on the XE7 backplane. (The *RCO - Line Card 2* connector on the LCM board can not be used).

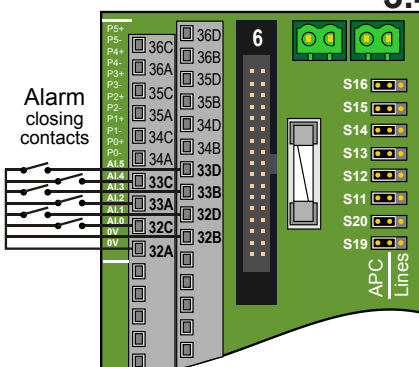
3.4 Remote Control Inputs - RCI

This option requires the use of an APC - Program & Clock board, see section 4.2.

AlphaCom XE20/XE26

Note that using the RCI option will reduce the line capacity on the LCM by 6 subscribers on line board no. 6.

- Connect an interface cable between the APC filter board (card position 26) and the last line board connector (J6) on the LCM. If there are more than one LCM, use the last module.
- Set all 8 jumpers S11-16 + S19-20 to the APC position.



- Connect the remote closing contacts to spring lock terminals AI.0 - AI.5 (32C - 33D); common 0 V is available on 32A and 32B.
- The feature programming is performed in AlphaPro.

AlphaCom XE7

The XE7 exchange has no option for the APC card.

- There are two RCI inputs on the XE7 backplane, RCI1 and RCI2.

3.5 Public Address Connection

The description below refers to the SPA-V2 public address system. See the *SPA manual A100K10369* for further details. Other amplifiers may be connected in a similar way. The line input should be balanced, accepting 0.5 - 1.5 Vrms (0dB) signal over 47 K ohm.

The second intercom subscriber line on line board 2 (physical no. 8 in XE7 and XE26, and physical no. 44 in XE20) is used as audio interface to the PA amplifier. The audio out from this line can be routed through a filter and volume control to plug J15, *Audio Out2* by setting jumper S18 to *ON*.

It is possible to connect an intercom station to the same line (line connection point 8) for use as a PA monitor.

 **Do NOT connect an amplifier to line point 8A/B as the 40 kHz signal carrier may seriously damage the equipment!**

SPA-V2 does not have any dedicated input for AlphaCom audio. Several solutions are possible where two alternatives are normally used.

Alternative 1 – connect to X11, PABX

or X12, *PABX with recall* if X11 is already used.

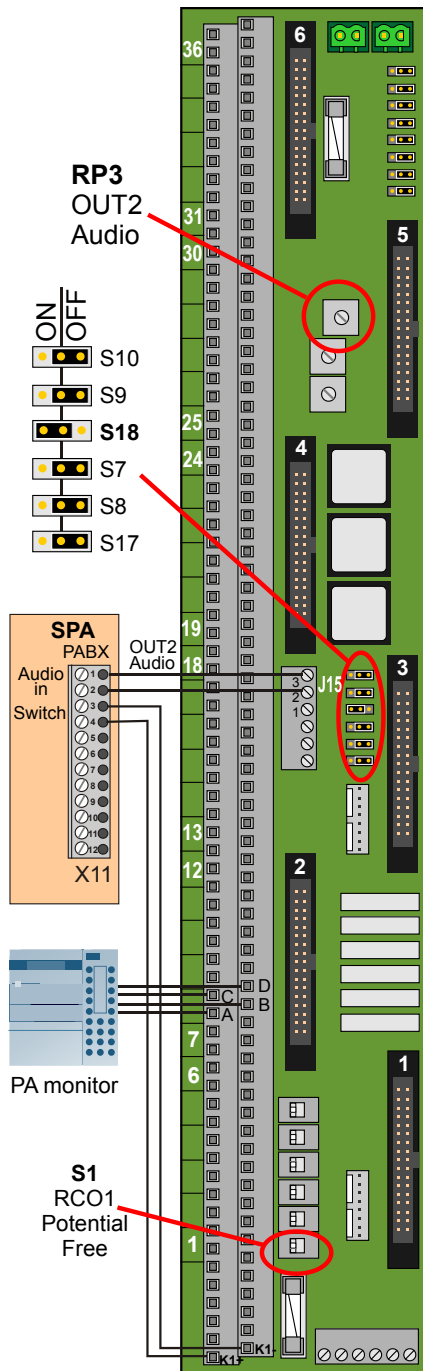
- Used when AlphaCom call shall have lower priority than dedicated PA microphones.
- Preferred solution for analog exchanges with one-way audio announcements.

Alternative 2 – connect to X7, *Talk-Back*.

- Normally not used unless AlphaCom announcements must have highest priority.
- Preferred solution for digital exchanges with two-way audio.

3.5.1 PA amplifier with chime / without PA monitor

- Connect a screened, twisted pair cable between pins 2/3 on terminal J15, *Out2 Audio* on the LCM and pins 1/2 on terminal X11, (X12) on the SPA-TERM board which is connected to the CALL input in the PA amplifier. Connect the cable screen to system ground.
- Connect cables between terminals 1K+/1K- on the LCM and pin 3/4 on terminal X11 (X12) on the SPA-TERM board (the PRIORITY terminal in the PA amplifier). This will initiate a chime signal in front of a call. The CHIME switch in the PA amplifier must be *ON*.
- Set switch S18 to *ON* to activate the audio filter
- Set switch S9 to *ON* to simulate audio-out load when monitor station is missing
- Set switch S10 to *ON* to simulate audio-in load when monitor station is missing
- Leave switches S7, S8, and S17 *OFF*.
- Set volume control RP3, *OUT2*, to the mid position. **This must be readjusted to 1 ± 0.5 Vrms during live test**
- Set switch S1 to the *Poten Free* position for chime activation.



3.5.2 Intercom station as PA monitor

- Connect the PA amplifier and chime relay as described above.
- Connect an intercom station to line point 8A/B/C/D
- Set switch S18 to *ON* to activate the audio filter
- Leave all other switches at *OFF*

PA on OUT2 Audio	STATION	CONNECT TO	S9	S10	S18
NO	Normal	8A/B/C/D	NA	OFF	OFF
YES	NO	-	ON	ON	ON
YES	PA Monitor	8A/B/C/D	OFF	OFF	ON

3.5.3 Zone selection

Normally, only one common zone is used. This All-Call is initiated by dialling 84. (See section 3.5).

In maritime environments, Public Address is often divided into 4 zones. Each zone can be selected by dialling 85, 86, 87 or 88. Only one zone can be selected for each announcement.

Four RCO relay outputs are used to select the zones:

- Zone 1 RCO2 terminal 2K+/-
- Zone 2 RCO3 terminal 3K+/-
- Zone 3 RCO4 terminal 4K+/-
- Zone 4 RCO5 terminal 5K+/-

- Set switches S2, S3, S4, and S5 to *Poten Free*.

3.6 Radio / Walkie-Talkie Interface

A two-way radio or Walkie-Talkie can be connected as part of the intercom system.

The first intercom subscriber line on line board 2 (physical no. 7 in XE7 and XE26, and physical no. 43 in XE20) is used as the audio interface to the radio. The audio in and out from this line can be routed through filters and volume controls to connector J14/1-2 (*IN1 Audio* and J14/3-J15/1, *OUT1 Audio* by setting jumper S7 and S17 to ON.

The RCO6 output may be used as a PTT control.

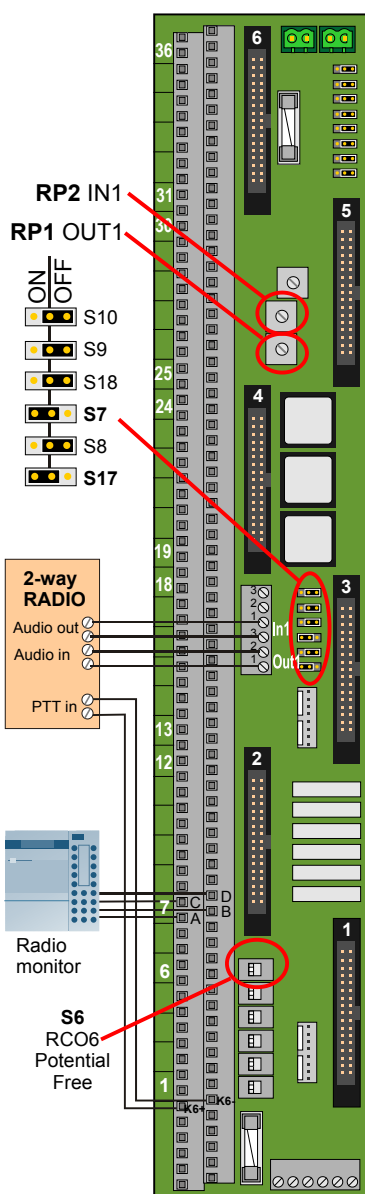
It is possible to connect an intercom station to the same line (line connection point 7A/B/C/D on the terminal strip) for use as a radio conversation monitor.

Do NOT connect an amplifier to line point 8A/B as the 40 kHz signal carrier may seriously damage the equipment!

The Radio or Walkie-Talkie is reached by dialling its directory number. The default directory numbers in the various AlphaCom systems are:

AlphaCom XE7: 113
AlphaCom XE20: 143
AlphaCom XE26: 107

- Connect a screened, twisted-pair cable between pins 1/2 on terminal J14, *OUT1 Audio* on the LCM and the radio input terminal. Connect the cable screen to system ground.
- Connect a screened, twisted pair cable between pin 3 on terminal J14/ pin1 on terminal J15, *OUT1 Audio* on the LCM and the radio input terminal. Connect the cable screen to system ground.
- Connect cables between terminals 6K+/6K- on the LCM and the PTT terminal on the radio.
- Set switch S7 to *ON* to activate the audio input filter.



- ### 3.6.1 Intercom station as radio monitor

- | RADIO Audio | STATION | CONNECT TO | S8 | S7 | S17 |
|-------------|---------|------------|-----|-----|-----|
| NO | Normal | 7A/B/C/D | OFF | OFF | OFF |
| IN | NO | - | ON | ON | OFF |
| OUT | NO | - | ON | ON | ON |
| IN + OUT | NO | - | ON | ON | ON |
| IN | Monitor | 7A/B/C/D | OFF | ON | OFF |
| OUT | Monitor | 7A/B/C/D | OFF | OFF | ON |
| IN + OUT | Monitor | 7A/B/C/D | OFF | ON | ON |

The diagram illustrates the APC Line connector, which is a 36-pin D-sub connector. The pins are organized into two rows of 18 pins each. The top row (pins 1-18) is labeled with signal types and pin numbers: P5 (S), P4 (S), P3 (S), P2 (S), P1 (S), P0 (S), PS+ (P), PS- (P), P4+ (P), P4- (P), P3+ (P), P3- (P), P2+ (P), P2- (P), P1+ (P), P1- (P), P0+ (P), and P0- (P). The bottom row (pins 19-36) is labeled with pin numbers: 36D, 36B, 35D, 35B, 34D, 34B, 33D, 33B, 32D, 32B, 31D, 31B, 30D, 30B, 29D, 29B, 28D, and 28B. The connector is shown with a green PCB and a black plastic housing. The APC Lines logo is visible in the bottom right corner.

Note that using the Audio channel option will reduce the line capacity by 6 subscribers on line board no. 6.

- 11

4.1 Specifications

Mechanical

Finish: PCB mounted on a DIN rail adaptor
Connectors: Spring lock terminals for external connections
Dimensions: H = 400 mm, W = 85 mm, D = 67 mm
Weight: 785 g
Temp. range: 0 to +35 °C
Humidity: 10% to 90% RH

Electrical

Working: 24 VDC input
Ext. equipment: 24 VDC output, not fused
24 VDC output, fused 1AT
RCO relay out: 24 VDC fused 1AT

Connects to any mix of feature cards

ASLT: Subscriber Line Board, 6 intercom lines
ATLB: Subscriber Line Board, 6 analog telephones
ATLB12: Subscriber Line Board, 12 analog telephones
APC: Program & Clock Board

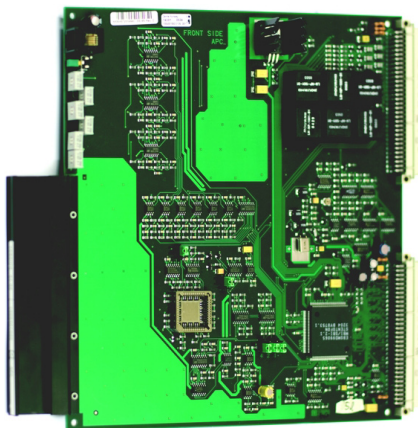
Capacity

ASLT: maximum 36 intercom lines
ATLB: maximum 36 telephone lines
ATLB12: maximum 72 telephone lines
RCO: 6 NO relay contacts or 24 VDC
6 outputs for MRBD Relay Board connections
RCI: 6 alarm inputs, referred to 0 V (Needs APC board)

Audio interface

PA/radio: 6 potential-free 600 ohm 0 dB inputs
(Needs APC board)
1 adjustable potential-free 600 ohm 0 dB output
Walkie-Talkie: 1 potential-free 600 ohm 0 dB input (Needs APC board)
1 adjustable potential-free 600 ohm 0 dB output

4.2 Program & Clock Board - APC



The APC Board (1009301000) is used in AlphaCom XE20 and XE26 to control the backplane board clocking. It also controls the speed of the fans.

This board must be installed in the last board position, i.e. 26.

It contains circuitry for 6 audio program feed channels with galvanic isolation. Each channel has separate input level controls.

The card has 6 RCI alarm inputs which can be used for programmed actions. The inputs accept a closing contact referred to ground.

A reset button is used to reset and restart the entire exchange. The reset LED on the AMC-IP board will turn red during reset.

An APC Connection Kit (1009503000) is required to connect alarm and audio sources. The kit contains a filter board, a connection board, and an interface cable.

Further information is found in the datasheet A100K10011.

AlphaCom XE7

AlphaCom XE7 does not have an APC board.

The control clock and reset functions are integrated into the exchange backplane.

Two program inputs and two RCI inputs are also available on the XE7 backplane.

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