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Alphasoft Pty Ltd

LANDING CALL SERVER - LCS
version 18 Nov 2013

The Alphasoft Landing Call Server/Splitter (LCS) allows the efficient interoperation of the new and existing lifts during the modernisation of a bank of lifts. The LCS is installed between the landing buttons and the old and new group controllers. It latches landing calls, makes an evaluation of which group (old or new) is best able to handle the call and passes the call to the selected group and cancels the call indication when appropriate.

The LCS is applicable to any lift modernisation, where the building is kept operational during the install.

Operation summary

Three Alpha-6 enclosures are provided. The MAIN enclosure is responsible for primary call allocation and is connected to the existing landing call buttons and indication lamps via parallel IO circuits and optionally to the new lift controllers via a serial link.

The other enclosures, AUX OLD and AUX NEW, serves as IO slaves. It places calls on, and gets call cancellation information from, the old/new lift systems, via parallel IO circuits. It is serially linked to the MAIN enclosure, by a high speed RS485 communications line. Optionally the AUX enclosure can get status and position information from the existing lifts to improve the allocation efficiency. This information is typically comes from parallel signals likely to be available to drive car position indicators or serially on compatible systems such as EPL/Kone Progressive Logic and Thyssen TCM CAN bus. Calls are placed by pulsing a relay which simulates a landing button press to the group controllers.

The active part of the LCS is the ARM CPU board, an AS710, in the MAIN enclosure. The LCS software is a combination of GTOS system software, Despatch32 our standard group control application, and interface units to the IO slaves.

Typical Sequence of Operation

A call request button is pressed.
The call splitter latches the call indication output.
The estimated time to handle the call on the new system is calculated. If the time is less than some, tuneable, threshold value the call is given to the new lift system. Otherwise the call is given to the old system by pulsing the call output relay. The call is presumed to be cancelled when the old group controller drops the call indication drive, sensed by the corresponding call input in the AUX panel. The average waiting time for these calls can be used to adjust the pass-over threshold time to dynamically balance the systems.

Typical Installation and Startup

Locate the landing call button and indication signal wiring in the motor room. By measurement or inspection of the drawings, determine whether they are switched to positive or negative. If the buttons are connected to the negative side of the power supply, they are negative signals. Positive signals require the use of AS630 input boards and negative signals require AS635 boards. The input boards have an on threshold of 18V and an off threshold of 12V and a maximum input voltage of 120V DC or 240V AC making them suitable for old 120V relay and bulb systems and more modern 24V LED systems. Some serial systems and self latching 'touch buttons' can be handled with additional additional hardware.

NOTE. Switch off the LCS enclosures before inserting or removing any plug in board to avoid damage to the 5V logic bus boards.

Remove all plug-in boards from the two LCS enclosures and mount them near the existing group controller.

Run a wire for each landing circuit to the existing landing wires. Typically this means 2 wires (up and down) for each enclosure, for each floor. These are terminated in the LCS enclosures. The power feed for the indication supply needs to be bussed to one side of each relay output. The power return needs to go to the common return terminal 'COM' of each input board.

Connect the landing circuit wires to the existing landing button connections. This is most easily done with 'Scotch locks' where an insulation displacement connector is crimped over the existing wire to connect the new LCS wire to it. Connect the MAIN wires to the button (field) side and the AUX wires to the controller side. (The original wire is later cut to enable LCS operation.) Alternately plug together screw terminals can be used, allowing the plugs to be joined at any time to run the old group exclusively.

Set the address switches('ID') and plug in the LCS input boards (AS630/5). At this point the existing system is still functioning normally and the active calls can be seen illuminating the input board LEDs. An active call must have a corresponding AS630/5 input LED on, in the MAIN and AUX LCS enclosures. Check that the correct LEDs are illuminated, see Slot B and Slot C input connection table below.

Connect mains power, ~240 VAC, to both enclosures 'A N E' (active, neutral/return, earth/protection ground) terminals.

Configure the CPU boards (AS710) to suit the job. This requires a Windows PC or laptop computer and an ethernet network or a RJ45 cross-over cable.

Insert the CPU board, AS710, into the XXX slot. Switch on the MAIN enclosure power. Check that the CPU is running – the L9 (P3) LED blinks. Check that CAN bus messages are being received correctly.

Connect the RS485 network cable between the MAIN and AUX LCS enclosures using shielded pair cable, to terminals X6, X5, and X7. Install the AUX CPU board and switch on both LCS enclosures. Check that the AUX CPU is running and that messages are being received by the MAIN enclosure, ie the 'OPN' LED toggles every few seconds and when an input or output changes.

At this point the existing system is still functioning normally. If the relay boards were installed now the calls would latch-up because the LCS would turn on the call indication but would never see a cancellation event because the button side and the existing group side are still connected together.

Usually the top few down calls (from level 10 to the top floor) are handled by the last relay boards (AS620) in Slot F. This means that an initial test can be made where only these floors are handled by the LCS. Switch off both LCS enclosures. Take the new lift(s) out of service. Address and install only the Slot F relay boards and cut the existing call circuit cables between the LCS 'scotch lock' taps. Switch on the LCS enclosures. Check that the calls are handled correctly. Place a 10 down call by shorting between F1 and F2 terminals in the MAIN LCS enclosure. This is equivalent to pressing the landing button. The MAIN F1 relay should turn on and stay on, latching the call and driving the call indication lamp. The call will be given to the existing lifts by pulsing the corresponding AUX F1 relay for about a second. The existing system should latch the call and drive the input on, ie the corresponding input LED should light AUX Slot C10. When the existing system answers the call it will turn off the indication turning off AUX C10. The AUX enclosure will inform the MAIN enclosure of this and MAIN will cancel the call and turn off the MAIN F1 relay, extinguishing the landing indication lamp and its input MAIN C10. Check this operation from the landing. If there is a problem just reconnect the existing circuits and switch off the LCS enclosures to restore the existing system till you find the wiring error.

Once successful operation is achieved place the new lift into service and ensure that it answers calls to these top floors.

Finally cut the existing call circuits to the remaining floors and install the remaining relay boards. Check operation.

To get improved allocation efficiency position and status signals may be connected from the existing lifts to AUX Slot A parallel signals or serially.

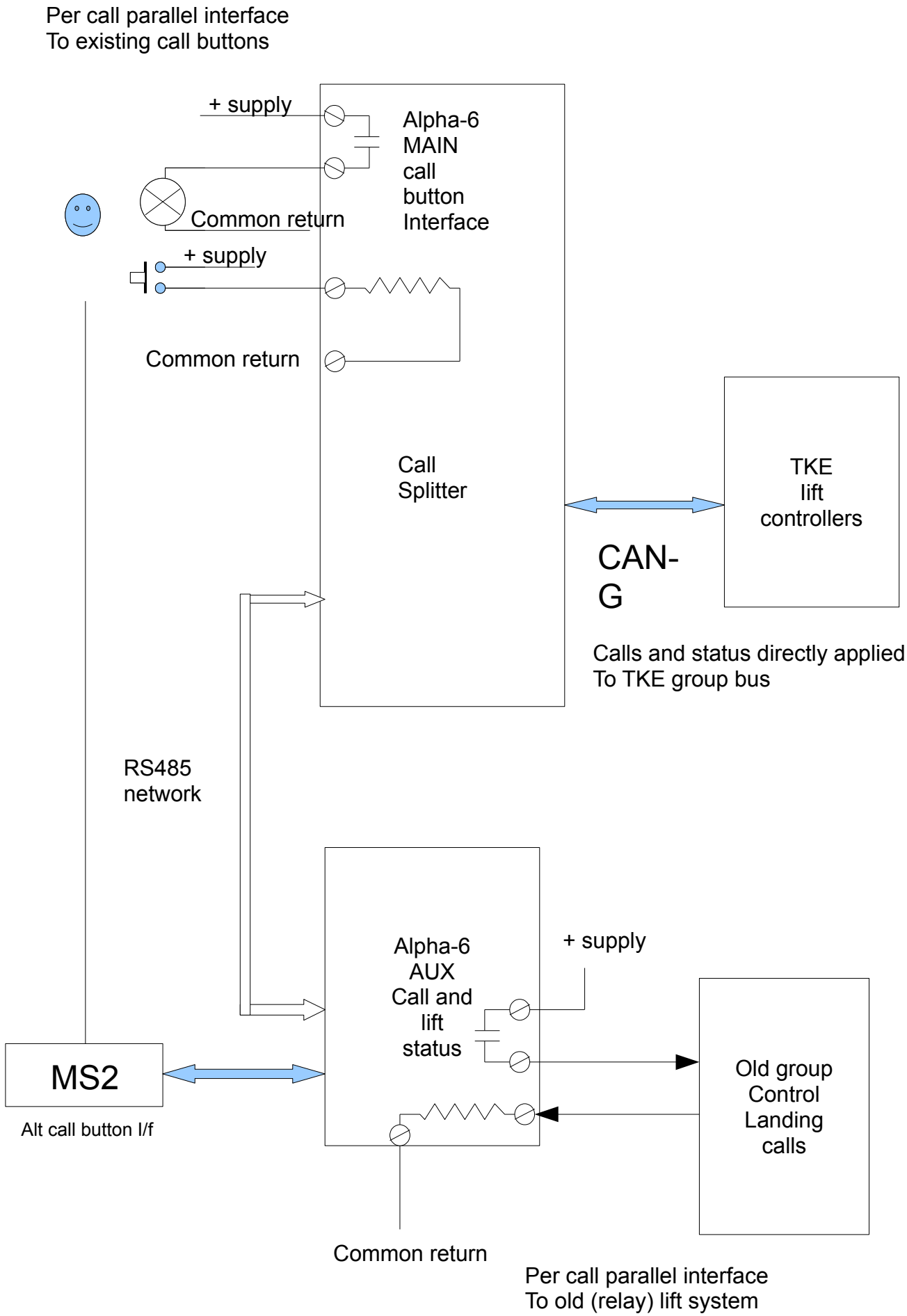
Optionally the lift monitor can be connected to visualise the whole lift system.

Trouble Shooting

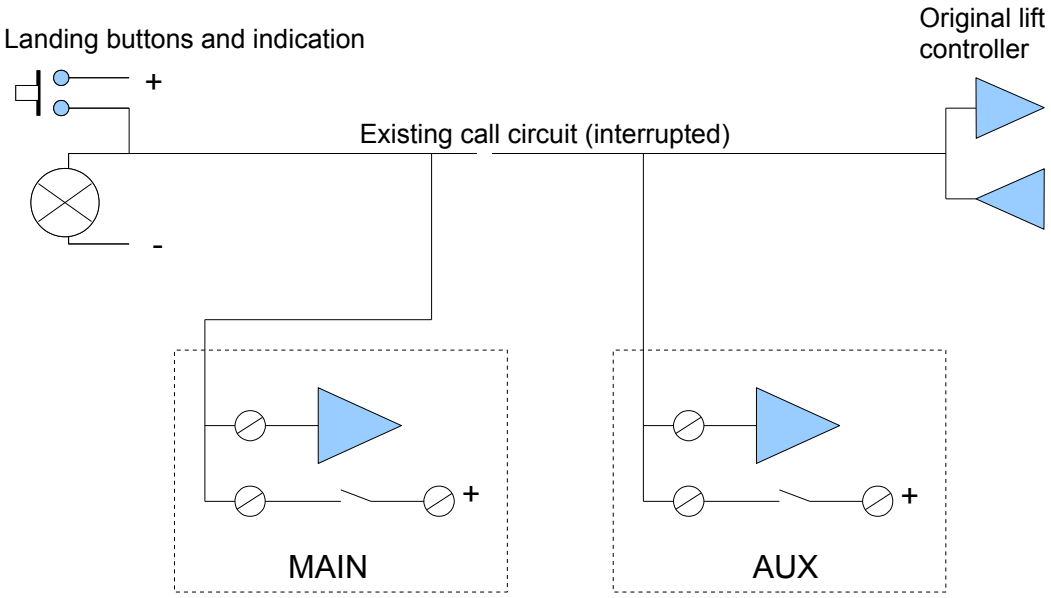
Failure of an existing system can be corrected by 'board jockeying'. The Alpha-6 boards can be quickly replaced by simply unplugging the old board and plugging in a new one. Only 3 types of board are used in a LCS, a CPU AS710, an input board, a AS630/5 and a relay board, a AS620. So it is only necessary to carry these three spare parts. Just switch off the enclosures, remove the old board, copy the address setting to the replacement board and plug it in. Good quality DIN41612 connectors are used throughout. The connection/mother board has been designed without active electronics (just a diode and capacitor) to avoid ever having to replace this board.

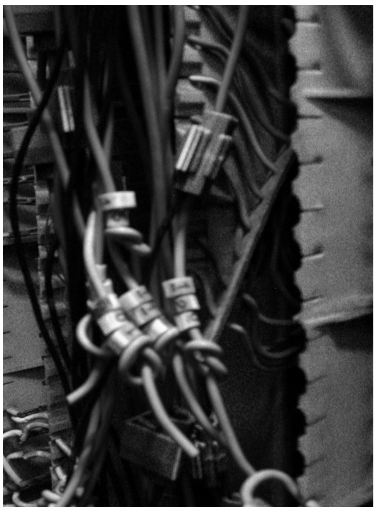
LED indicators are provided on each input and output so activity can be conveniently monitored in the motor room.

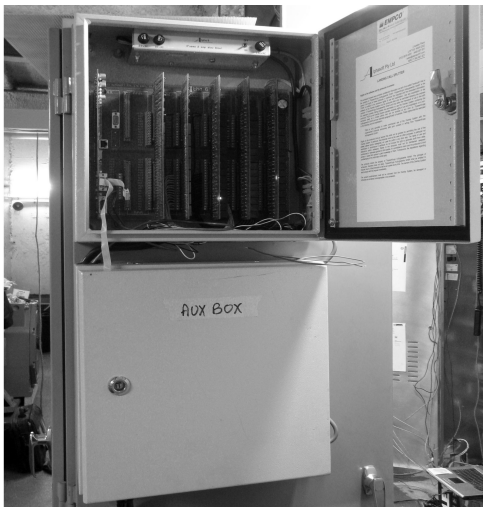
The CPU boards have several LEDS to show their activity, providing an internal view of the system. A lift monitor is available to monitor internal messages.


Per call parallel interface
To existing call buttons
+ supply
Alpha-6
MAIN
call
button
Interface
Common return
+ supply
Common return
Call
Splitter
TKE
lift
controllers
CAN-
G
Calls and status directly applied
To TKE group bus
RS485
network
Alpha-6
AUX
Call and
lift
status
+ supply
MS2
Alt call button I/f
Old group
Control
Landing
calls
Common return
Per call parallel interface
To old (relay) lift system

TYPICAL INSTALLATION







The call splitter panels have been mounted on the end of the existing 'Progressive Logic' controller. The existing call circuits has been cut, numbered, and tied off (light wires). Black wires have been crimp connected onto each end and go to the MAIN or AUX splitter panels. The MAIN panel is open (above) and has 2 calls latched, ie 2 relay LEDs showing.

SYSTEM IO SUMMARY

MAIN Allocation and Hall Call Button Interface box

SLOT	board	Description	Levels
XXX	AS710	CPU, new group serial interface	
AAA			
BBB	AS630/5	Up button inputs	1-24
CCC	AS630/5	Down buttons	2-25
DDD	AS620	Up call indication	1-16
EEE	AS620	Up/Down call indication	17-24/2-9
FFF	AS620	Down call indication	10-25

AUX OLD and NEW System Call Drive Interface box

SLOT	board	Description	Levels
XXX	AS710	CPU	
AAA	AS630/5	Lift position, status and direction for 4 lifts	
BBB	AS630/5	Up button inputs	1-24
CCC	AS630/5	Down buttons inputs	2-25
DDD	AS620	Up call indication	1-16
EEE	AS620	Up/Down call indication	17-24/2-9
FFF	AS620	Down call indication	10-25

Note AS630 input boards are required for positive driven signals and all the following information is written for these boards.

If negative signals are used then AS635 input boards (common positive) are required and all the positive and negative indications in this data must be reversed.

Miscellaneous connections

	Serial Link	Protocol	A / hi	B / low	0V / shield
	RS485 net	Alpha-net to all 3 enclosures	X6	X5	X7
	Ethernet/IP optional	10BASE-T 100BASE-TX IEEE-802.3	U7 RJ45 Cat-5		
	A	Power active	240 VAC		
	N	Power neutral	return		
	E	Protection earth	ground		

LED indication

LED	
L1 - L4	Serial new lift message received
BLU	Input change seen
OPN	Net message received from other enclosure
ACC	On if MAIN, off if AUX enclosure (based on Slot AAA board present)
FLT	No communications from Aux box or Aux lifts not cancelling calls.

SLOT AAA AUX OLD or NEW Input Map = 1
Most connections are optional AUX Lift Status inputs for the old lifts.
Board must be present.

Input Number	Lift	ID	Description
COM			Lift supply negative return
32	4	nOOS	Not out of service, ie energised when lift is in automatic service.
31	4	DNA	Down preferred direction (arrow)
30	4	CDL	Door is fully closed
29	4	P4	Binary lift position, most significant bit
28	4	P3	
27	4	P2	
26	4	P1	
25	4	P0	Binary lift position, least significant bit
24	3	nOOS	Not out of service, ie energised when lift is in automatic service.
23	3	DNA	Down preferred direction (arrow)
22	3	CDL	Door is fully closed
21	3	P4	Binary lift position, most significant bit
20	3	P3	
19	3	P2	
18	3	P1	
17	3	P0	Binary lift position, least significant bit
16	2	nOOS	Not out of service, ie energised when lift is in automatic service.
15	2	DNA	Down preferred direction (arrow)
14	2	CDL	Door is fully closed
13	2	P4	Binary lift position, most significant bit
12	2	P3	
11	2	P2	
10	2	P1	
9	2	P0	Binary lift position, least significant bit
8	1	nOOS	Not out of service, ie energised when lift is in automatic service.
7	1	DNA	Down preferred direction (arrow)
6	1	CDL	Door is fully closed
5	1	P4	Binary lift position, most significant bit
4	1	P3	
3	1	P2	
2	1	P1	
1	1	P0	Binary lift position, least significant bit

AUX OLD has logical lifts 1..4 AUX NEW has logical lifts 5..8. Map these to physical lifts using the configuration array 'Aux ID'.

SLOT AAA AUX OLD or NEW Input Map = 2
Most connections are optional AUX Lift Status inputs for the old lifts.
Board must be present.

Input Number	Lift	ID	Description
COM			Lift supply negative return
32	4	nOOS	Not out of service, ie energised when lift is in automatic service.
31	4	UPA	Up preferred direction (arrow)
30	4	DNA	Down preferred direction (arrow)
29	4	CDL	Door is fully closed
28	4	P3	
27	4	P2	
26	4	P1	
25	4	P0	Binary or Gray Code lift position, least significant bit
24	3	nOOS	Not out of service, ie energised when lift is in automatic service.
23	3	UPA	Up preferred direction (arrow)
22	3	DNA	Down preferred direction (arrow)
21	3	CDL	Door is fully closed
20	3	P3	
19	3	P2	
18	3	P1	
17	3	P0	Binary or Gray Code lift position, least significant bit
16	2	nOOS	Not out of service, ie energised when lift is in automatic service.
15	2	UPA	Up preferred direction (arrow)
14	2	DNA	Down preferred direction (arrow)
13	2	CDL	Door is fully closed
12	2	P3	
11	2	P2	
10	2	P1	
9	2	P0	Binary or Gray Code lift position, least significant bit
8	1	nOOS	Not out of service, ie energised when lift is in automatic service.
7	1	UPA	Up preferred direction (arrow)
6	1	DNA	Down preferred direction (arrow)
5	1	CDL	Door is fully closed
4	1	P3	
3	1	P2	
2	1	P1	
1	1	P0	Binary or Gray Code lift position, least significant bit

AUX OLD has logical lifts 1..4 AUX NEW has logical lifts 5..8.

These signals allow a more optimised allocation to be made by giving the LCS the ability to estimate the travel time of the old lifts.

If no inputs are on at the AUX slot AAA, the call server assumes that at least one AUX lift is in service an will allocate calls to it. This was provided as a short cut to allow the system to run without and AUX status wiring. If all AUX lifts may be out of service, eg there is only one AUX lift that can be switched to independent, then having no connections to the AUX sot AAA is not an option. Connect at least the not out of service terminal (A8) to an in service signal, and connect a power feed to an unused input such as A9.

SLOT BBB
MAIN Up Landing button inputs and
AUX Up Landing call status from old group controller.

Input Number	ID	Description
COM	-	Landing supply negative return
32		
31		
30		
29		
28		
27		
26		
25		
24	24U	Twenty fourth top floor up call
23	23U	
22	22U	
21	21U	
20	20U	
19	19U	
18	18U	
17	17U	
16	16U	
15	15U	
14	14U	
13	13U	
12	12U	
11	11U	
10	10U	
9	9U	
8	8U	
7	7U	
6	6U	
5	5U	
4	4U	
3	3U	
2	2U	
1	1U	Bottom floor up call

SLOT CCC
MAIN Up Landing button inputs and
AUX Up Landing call status from old group controller.

Input Number	ID	Description
COM	-	Landing supply negative return
32		
31		
30		
29		
28		
27		
26		
25	25D	Twenty fifth floor down call
24	24D	
23	23D	
22	22D	
21	21D	
20	20D	
19	19D	
18	18D	
17	17D	
16	16D	
15	15D	
14	14D	
13	13D	
12	12D	
11	11D	
10	10D	
9	9D	
8	8D	
7	7D	
6	6D	
5	5D	
4	4D	
3	3D	
2	2D	Second floor down call
1		

SLOT DDD
MAIN Up Landing call indication outputs and
AUX simulated Up call button presses to old group controller.

Input Number	ID	Description
COM		No connection
32	16U	Sixteenth floor up call indication / old system button input
31	16US	Positive landing supply
30	15U	
29	15US	
28	14U	
27	14US	
26	13U	
25	13US	
24	12U	
23	12US	
22	11U	
21	11US	
20	10U	
19	10US	
18	9U	
17	9US	
16	8U	
15	8US	
14	7U	
13	7US	
12	6U	
11	6US	
10	5U	
9	5US	
8	4U	
7	4US	
6	3U	
5	3US	
4	2U	
3	2US	
2	1U	Bottom floor up call indication / old system button input
1	1US	Positive landing supply

SLOT EEE
MAIN Up/Down Landing call indication outputs and
AUX simulated Up/Down call button presses to old group controller.

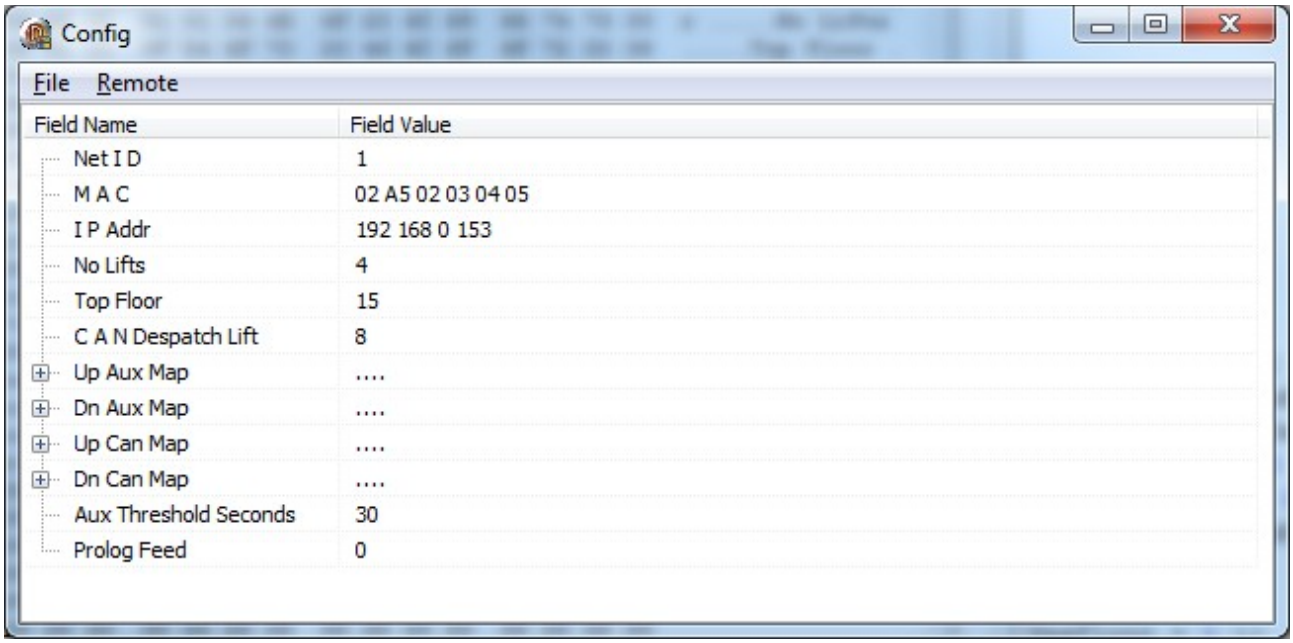
Input Number	ID	Description
COM		No connection
32	9D	Ninth floor down call indication / old system button input
31	9DS	Positive landing supply
30	8D	
29	8DS	
28	7D	
27	7DS	
26	6D	
25	6DS	
24	5D	
23	5DS	
22	4D	
21	4DS	
20	3D	
19	3DS	
18	2D	Second floor down call indication / old system button input
17	2DS	Positive landing supply
16	24U	
15	24US	
14	23U	
13	23US	
12	22U	
11	22US	
10	21U	
9	21US	
8	20U	
7	20US	
6	19U	
5	19US	
4	18U	
3	18US	
2	17U	Seventeenth floor up call indication / old system button input
1	17US	Positive landing supply

SLOT FFF
MAIN Down Landing call indication outputs and
AUX simulated Down call button presses to old group controller.

Input Number	ID	Description
COM		No connection
32	25D	Twenty fifth floor down call indication / old system button input
31	25DS	Positive landing supply
30	24D	
29	24DS	
28	23D	
27	23DS	
26	22D	
25	22DS	
24	21D	
23	21DS	
22	20D	
21	20DS	
20	19D	
19	19DS	
18	18D	
17	18DS	
16	17D	
15	17DS	
14	16D	
13	16DS	
12	15D	
11	15DS	
10	14D	
9	14DS	
8	13D	
7	13DS	
6	12D	
5	12DS	
4	11D	
3	11DS	
2	10D	Tenth floor down call indication / old system button input
1	10DS	Positive landing supply

CPU Configuration

A Win32 configuration tool, Telnet.exe, is available to setup a AS710 CPU board to fit a particular job.
The LCS has a static IP address of 192.168.0.153. Set the laptop to have a compatible static address, eg 192.168.0.100. Connect the ethernet ports using a crossover cable or switch. Run Telnet.exe on the laptop. On the main menu select | Config |. On the Config window select | Remote | Load from remote |. You should see a screen like the following :-

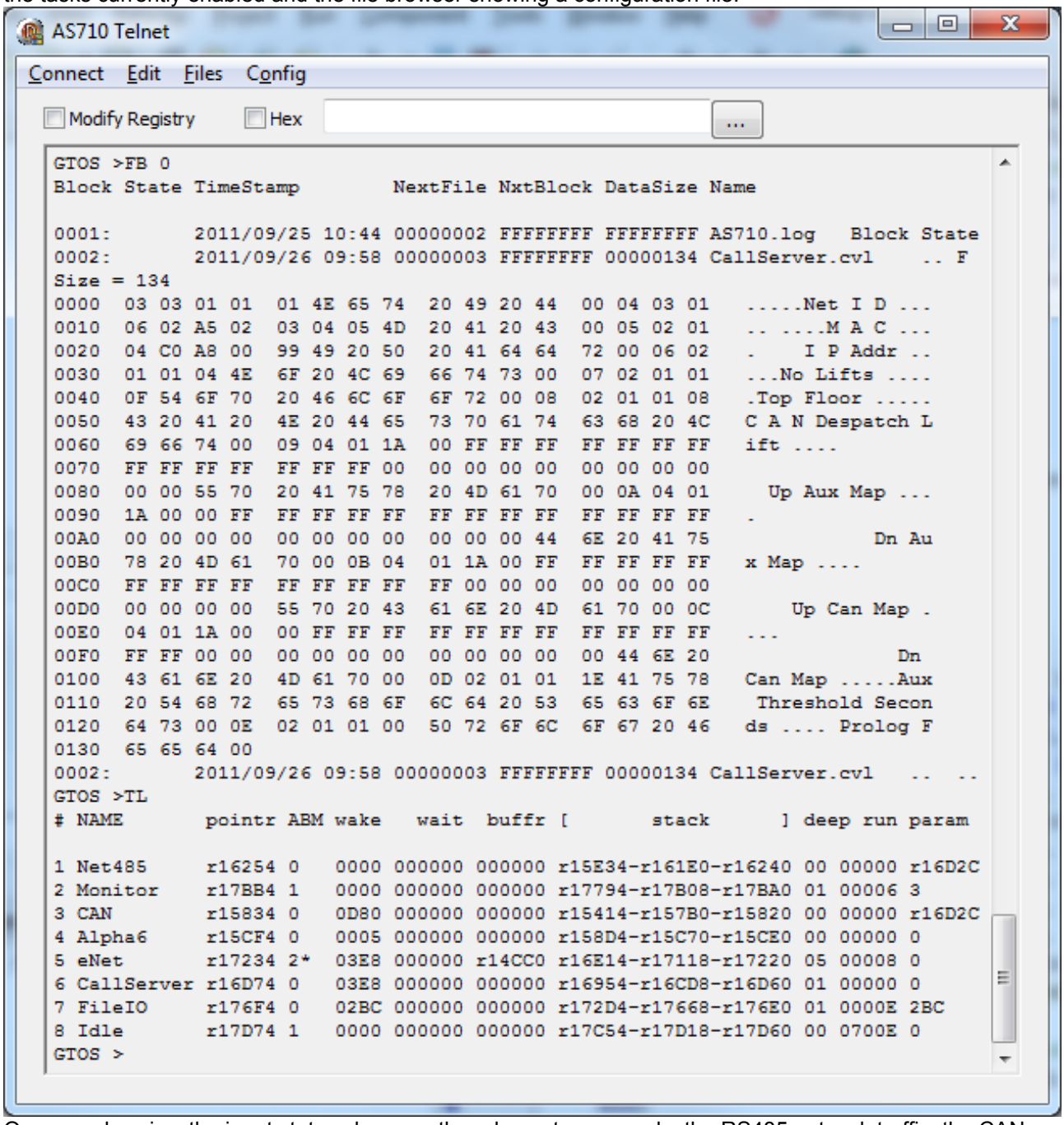


The 'Net ID' must be 1 for the Main LCS box, and 2 for the AUX OLD LCS box and 3 for the AUX NEW box. This is the address used on the RS485 network.
The number of floors and existing lifts can be set.
Any excluded floors can be set in the various 'Map' lists. For example 'Up Map[2]' = '11111110' will prevent lift 1 from being allocated the level 2 up call.
The threshold time is the seconds of expected wait allowed on the new lifts before the call is delegated to the old lifts. This is the time penalty value in seconds, above which a landing call will be handed to the existing group. The configuration file can then be copied back to the LCS CPU and the LCS restarted so the new values will take effect.
Set 'Prolog Feed' to 1 if connecting to the 4800 baud RS485 feed on a EPL/Kone 'Progressive Logic' instead of parallel status signals.
Set 'CAN Despatch Lift' to an id available for optional CAN bus operation of new lifts.
If the 'MLT' parameter is non zero, it is assumed to be the Main Landing Terminal. The up call to this floor will always be sent to both the new and old lifts to improve the up peak demand handling.

Set 'Input Map' = 2 for jobs with auxiliary status wiring with less then 16 floors.
Set 'Gray Code' = 1 for Gray coded position.
After making any changes the file can be stored back to the LCS by selecting | Remote | Save to remote |.
You can save the configuration on the laptop by selecting | File | Save As |.

CPU Monitoring

Various internal values can be viewed on site to aid debugging and development. The example below shows the tasks currently enabled and the file browser showing a configuration file.



One can also view the input status changes, the relay out commands, the RS485 network traffic, the CAN bus traffic, etc, etc.

The Telnet.exe program also supports a mimic view of the lifts by selecting main menu | View.