Operation and Maintenance Manual for Konex Network Repeaters (A1592)

Contents

Issue 2: Raised to cover the introduction of the A1592 PCB which replaces the A1474.

Note: The A1592 replacement is totally compatible with the applications covered by its predecessor, A1474. There are minor differences in locations of some of the components but the locations of the main interface connections are identical. Both A1592 and A1474 can be used in all current Global Repeater applications, although the A1474 software family will not be upgraded in line with future A1592 upgrades.
This manual covers both boards and references are typically made to both boards thus:
A1592 [A1474].

If in doubt – contact CEL Customer Support.

General Description

The GLOBAL REPEATER consists of four PCB's and a flexible membrane whose function is to accept and transmit main panel conditions via a serial network link. These PCBs can be combined to provide several variations for differing applications.

Two independent networks currently exist:

1] The Proton network which supports global repeaters, R3 interface repeaters, Proton panels and the network interface for the PC based alarm manager.

2] The Nexus [expanded] network which supports global repeaters, Nexus panels and the network interface for the PC based alarm manager.

The global repeater hardware is common to both networks as is the alarm manager network interface card. Separate versions of software are available for these boards, a version for Proton network applications and a version for Nexus networks.
Up to15 active nodes can be connected on this network.
The network serial connection is RS485.

The repeater component boards are:

A1592 [A1474] – Main control board/display.
A1475 – Interface board/Engineer's keypad/main field terminations.
A1478 – Input/output board.
A1498 – Memory expansion board [for R3 panel network applications].
Global Repeater Membrane – User controls and indications.

The repeater operates at 24 volts DC either provided by the panel it is monitoring or via a local external supply.

The repeater provides LEDs to indicate alarm, fault conditions and user switches for control purposes.
A 4 line by 20 character LCD display with backlight is provided to provide addition alarm information in textual format.

The text display is a 20 character alphanumeric liquid crystal display, divided into an upper and lower half.
Line 1 of the upper half of the display provides device number, type, and the type of alarm condition.
Line 2 is user definable if used on R3 systems, but on Nexus systems will reflect user definable text programmed into Nexus panels.
The lower half of the display is a repeat of the top half and is for indication of second and subsequent alarm conditions.

When more than two alarms are present, the "MORE DATA" led will pulse. Pressing the 'CYCLE DISPLAY' switch will display the next alarm condition and when all alarm

conditions have been viewed the "MORE DATA" led will change to a constant illumination.

User controls are provided in the form of membrane push button switches.

The repeater can be configured, via the engineer's menu, to display all or selected network events as can each individual node [i.e. fire panel or global repeater]on the network. The actual network functions provided by the user control and indication features described in the following pages will depend upon how each node in the network is configured.

Repeater outputs [via A1478 board] can be programmed to operate on specific network events via cause and effect programming.

The repeater can be fitted with a printer allowing a hard copy of events with time and date information.

Further details are to be found in document TSX1592.

User Indications and Controls

Repeater response to a particular network event depends upon whether the repeater is configured to respond to that event. Similarly, user control actions initiated at the repeater are actioned only by those network nodes [other global repeaters and panels] which have been configured to respond.

System Healthy Indicator

This indicator is lit whenever the repeater is operating correctly and will turn off if there is a problem with repeater software or microprocessor hardware malfunction.

Alarms Silenced Indicator

This indicator will pulse when the repeater detects a network panel fire event. [I.E. A fire alarm condition or operation of the panel manual evacuate switch on a fire alarm panel connected to the network].
Operation of the 'Silence Alarms' switch will cause the panel alarm circuit outputs to deactivate and the 'Alarms Silenced' led will go steady.

Buzzer Silenced Indicator

Operation of the 'Silence Buzzer' switch will cause the 'Buzzer Silenced' led to illuminate and the 'Fault' buzzer will silence.

When the fault conditions clear down this indication will automatically clear.

More Data Indicator

This indicator will pulse when the L.C.D. is showing its full 4 line messages [i.e. 2 alarm events] and further information is available.

When all current information has been viewed by operation of the 'Cycle Display' switch, the indicator becomes steady.

If any new information becomes available subsequently, the led will pulse again until all the new information has been viewed.

Fire Indicator

This indicator will pulse and the 'Fire' buzzer will sound when a network panel fire condition is active.

Operation of the 'Silence Alarms' switch will cause the 'Fire' LEDs to go steady. The 'Alarms Silenced' led will also be illuminated.

Operation of another panel 'Fire' condition will clear the “Alarm Silenced” indication and reflash the “Fire” LEDs.

Alert Indicator

This indicator will pulse if a network panel alert condition is active and the 'Fault' buzzer will sound.

Operation of the 'Silence Buzzer' switch will cause the 'Alert' indication to become steady, the 'Buzzer Silenced' LEDs to illuminate and stop the 'Fault' buzzer sounding.

Operation of another panel 'Alert' condition will clear the “Buzzer Silenced” indication, sound the 'Fault' buzzer and reflash the 'Alert' indicators.

Fault Indicator

This indicator will pulse if a network panel fault condition is active and sound the 'Fault' buzzer.

Operation of the 'Silence Buzzer' switch will cause the 'Fault' indication to become steady, the 'Buzzer Silenced' LEDs to illuminate and stop the 'Fault' buzzer sounding.

Operation of another panel 'Fault' condition will clear the “Buzzer Silenced” indication, sound the 'Fault' buzzer and reflash the “Fault” indication.

Device Isolated Indicator

This indicator will illuminate if any network connected panel devices/inputs have been isolated.

When all panel devices/inputs have been de-isolated then this led will extinguish.

Silence Alarms Button

Operating this switch while there is a network panel Fire condition active will operate the ‘Alarms Silenced’ indicator, make the Fire indicator steady, change the buzzer tone from Fire to Fault, and transmit an ‘Alarms Silenced’ message to the network. The network panel fire alarm will also be silenced.

Reset System Button

Operating this switch when there is an active Fire condition, and the alarms have been

silenced, will clear down the LED indications and LCD display, except for 'System Healthy' and 'Device Isolated' LEDs, and transmit both a ‘Reset System’ and ‘Clear Display’ message to the network.

Operating this switch when there is no fire condition active will clear down any indicated alert, fault or indication conditions, and transmit a ‘Clear Display’ message to the network.

Test Alarms Button

Operation of this button will transmit a ‘Test Alarms On’ message to the network, and the subsequent release of the button will transmit a ‘Test Alarms Off’ message to the network. The Fire buzzer will sound while the switch is pressed.

Silence Buzzer Button

If there are any active alerts, faults or indications, and the fault buzzer is sounding, then the operation of this switch will make the appropriate alert or fault indicator go steady, silence the fault buzzer, and illuminate the ‘Buzzer Silenced’ indicator.

Test Display Button

This switch will test all display indications when operated.

Cycle Display Button

If there are more than two messages in the display queue such that the ‘More Data’ indicator is illuminated, then the operation of this switch will replace the message shown on the bottom two lines of the display with the next available message.

Engineers Indications and Controls

Alarm Fault

The Alarm fault indicator and will pulse if a network panel alarm fault condition occurs and the 'Fault' buzzer will sound.

Operation of the 'Silence Buzzer' switch will cause the 'Alarm fault' indication to become steady, the 'Buzzer Silenced' LEDs to illuminate and stop the 'Fault' buzzer sounding.

Operation of another panel alarm fault condition will clear the “Buzzer Silenced” indication, sound the 'Fault' buzzer and reflash the Alarm fault indicator.

Communications Fault

This is a serial 'Communications' fault indicator and will pulse if there is a communications link failure.
The 'Fault' buzzer will sound.
Operation of the 'Silence Buzzer' switch will cause the "Communications' fault” indication to become steady, the 'Buzzer Silenced' LEDs to illuminate and stop the 'Fault' buzzer sounding.

Card Removed

This is a panel 'Card Removed' indicator and will pulse if a card has been removed from any panel connected to the network.. The 'Fault' buzzer will sound.

Operation of the 'Silence Buzzer' switch will cause the 'Card Removed' indication to become steady, the 'Buzzer Silenced' LEDs to illuminate and stop the 'Fault' buzzer sounding.

Operation of another 'Card Removed' condition will clear the “Buzzer Silenced” indication, sound the 'Fault' buzzer and reflash the Alarm fault indicator.

Power Supply Fault

This is a local, repeater 'Power Supply' fault indicator which will pulse if a battery or mains fault has occurred on the repeater’s local power supply unit. In a fault condition, the local PSU’s fault contact should connect 0V to the repeater’s PSF input.
The 'Fault' buzzer will sound when a power supply fault condition is detected.

Operation of the 'Silence Buzzer' switch will cause the 'Psu Flt' indication to become steady, the 'Buzzer Silenced' LEDs to illuminate and stop the 'Fault' buzzer sounding.

Connection Details

The global repeater consists of several PCBs that will be configured and used for various panel requirements.

The board types and connection details are described below.

A1592 Display PCB [A1474]

This is the main PCB and is used on all panel configurations.

It provides an L.C.D. display and 8 user LEDs which are visible on the membrane side and another 4 Engineer's LEDs on the opposite side. These facilities are detailed earlier in this document.

Connector J7 [J4 on A1474] allows the interface of the global repeater membrane which provides the USER SWITCHES and windows for the L.C.D. display and the 8 user LEDs.

Connector J2 allows a printer to interface to the PCB allowing events to be printed.

SW1 is the repeater/node address select switch which has a different function depending upon which repeater configuration is used. If used as a network global repeater, then this switch sets the repeater's node address within the network, but if the repeater is used to interface an R3 panel to a network then this switch sets the address within the R3 panel's repeater system.

SW2 is used to select the network node address when the repeater is used as an R3 interface repeater, but is not used when the repeater is used as a network global repeater.

Up to 15 repeaters can be connected to the network but as the information above states each repeater must have a unique address.

The switches are in binary format and the address options are given as below.

					SW 1 [Note 1]		SW2 [Note 1]
1	**2**	**3**	**4**	**ADDRESS**	**NETWORK**	**R3 INTERFACE**	**NETWORK**
OFF	OFF	OFF	OFF	0	Receive Only	R3 Output only	Receive Only
ON	OFF	OFF	OFF	1	Transmit & Receive	(See note 2 below)	Transmit & Receive
OFF	ON	OFF	OFF	2	"	R3 Output & User control Input	"
ON	ON	OFF	OFF	3	"	"	"
OFF	OFF	ON	OFF	4	"	"	"
ON	OFF	ON	OFF	5	"	"	"
OFF	ON	ON	OFF	6	"	"	"
ON	ON	ON	OFF	7	"	"	"
OFF	OFF	OFF	ON	8	"	"	"
ON	OFF	OFF	ON	9	"	"	"
OFF	ON	OFF	ON	10	"	"	"
ON	ON	OFF	ON	11	"	"	"
OFF	OFF	ON	ON	12	"	"	"
ON	OFF	ON	ON	13	"	"	"
OFF	ON	ON	ON	14	"	"	"
ON	ON	ON	ON	15	"	"	"

Notes.
1.When the repeater is used as a global repeater on a network, SW1 sets the repeater's node address on that network.
When the repeater is used to interface an R3 panel to a network, SW1 sets the repeater's address on the R3 panels repeater comms link and SW2 is used to set the repeater's network node address.

2. When used as an R3 interface repeater, the address set up on the R3 repeater (SW1) must be different to the address set within the K1340 of the common control module. In this system, only the board set to address 1 will be able to isolate sensors. Thus if sensor isolation via the network is required, the network interface repeater needs to be set to address 1, and the K1340 in the common control to address 2. In this situation, it will not be possible to isolate sensors via the R3 common control module itself. Local isolations are, however, still able at the R3 interface repeater via the engineer's key pad on the A1475 board. All other menu functions, normally provided via the R3 common control module, will still be available.

J5 allows the A1592 to configure its network comms port for RS232 or RS485

communications. THIS SHOULD BE SET TO RS485.

The RS485 network comms transmits on a 2 wire system. Links must fitted across NET+ and NET- on J5 and the field cable must be connected to the A1475 termination board terminals NET+ and NET [TB2, TB3].

J3 allows the A1592 to repeat its received RS485 data via the computer RS232 port J4 on the A1475 board so that a computer and relevant software can eavesdrop on the network.
This is achieved by a single link on J3 RS485 pins.
If access to the menu and download facilities are required from a computer, then the J3 link should be in the RS232 position.
Note: Only a single link RS485 or RS232 can be placed on J3.

J1 provides the connection to the A1475 interface board.

A1475 Interface board

This is the main field interface board and is used on all panel configurations.

It interfaces to the main A1592 PCB via J1 which is a 40 way ribbon cable connector.

All PCBs share a common supply of 24 volts DC. The incoming DC supply is connected to TB1 0V and 24V terminals and routed to the other PCBs via interconnected ribbon cables.

A remote power supply input fault can be monitored by the A1475 via the PSF terminal and will be indicated by the repeater as a Remote Power Supply Fault condition. The fault indication is active when 0V is applied to the PSF terminal.

Fuse FS1 rated at 1 AMP protects all repeater PCBs.

A serial port is provided which can be configured to operate at RS232 or RS485 signal levels. This port is connected to 2 terminal groups:

TB2 and 3 provide duplicated 2 wire connections for RS485 links.

TB4 is a 3 wire connection intended for RS232 links.

The RS232/485 signal level selection is set by link on J5 on the A1592 board. The RS232 option is not currently used.

J3 is a 4 by 3 keypad which provides access to the Engineer's functions in conjunction with the menu feature displayed via the repeater's LCD. Further details of the Engineer's menu system for the [Nexus] expanded network can be found in the Technical Specification for the Global RepeaterTSX1592].

J4 provides a computer link which allows downloading Cause/Effect and messages data to the repeater from a computer or to monitor the network communication, depending upon the J3 setting on the A1592 board.

J5 allows an ASCII keyboard to interface to the repeater which allows the user to manually input messages.

J2 can interface to either an N1478 16 way I/O board or an A1489 memory/comms expansion board dependent on the application requirements.

N1478 Input and Output PCB

This is used on network global repeaters for either the Proton/R3 or Nexus network protocols.

Each global repeater can provide up to 128 inputs and 255 outputs.

The N1478 PCB connects to the A1475 PCB via its J1 connector and provides the facility of interfacing 16 inputs and 16 outputs.

A maximum of 16 N1478 PCBs can be cascaded together giving the user the full repeater I/O capability.

The outputs are active switched 0V and can be programmed to operate for various system events.

The repeater inputs are active switched 0V inputs and can be programmed to operate various outputs on 1478 I/O cards or Nexus panels.

For Nexus, expanded network Global Repeaters, each node can drive 255 unique outputs.

For Proton Repeaters, the outputs are global:

> i.e. If more than 1 repeater is connected to the network then each repeater's outputs will mimic each other. Repeater inputs are unique to the specific repeater.

SW1 is used to allocate a unique bank address to each N1478 board allowing each input and output to be individually referenced via cause and effect programming. [See the table below].

1	2	3	4	I/O ADDRESS RANGE *
OFF	OFF	OFF	OFF	1 TO 16
ON	OFF	OFF	OFF	17 TO 32
OFF	ON	OFF	OFF	33 TO 48
ON	ON	OFF	OFF	49 TO 64
OFF	OFF	ON	OFF	65 TO 80
ON	OFF	ON	OFF	81 TO 96
OFF	ON	ON	OFF	97 TO 112
ON	ON	ON	OFF	113 TO 128
OFF	OFF	OFF	ON	129 TO 144
ON	OFF	OFF	ON	145 TO 160
OFF	ON	OFF	ON	161 TO 176
ON	ON	OFF	ON	177 TO 192
OFF	OFF	ON	ON	193 TO 208
ON	OFF	ON	ON	209 TO 224
OFF	ON	ON	ON	225 TO 240
ON	ON	ON	ON	241 TO 255

*Each N1478 cascaded together MUST have a different bank selection.

Field termination is as follows:

Inputs 1 to 16 are active switched 0V. A common 0V is available on the board on the COM terminal.

Repeater outputs are active switched 0V and are driven by darlington drivers rated at 500mA. Resistor networks N4, N5, N6 and N7 provide current limiting for these outputs.
Standard values for these networks are 2K2 limiting the current on all outputs to 10mA @ 24V DC, but the networks can be changed or linked out to give a greater current drive capability.

Terminals LED Cathodes 1 to 16 provide the field termination for the outputs.

A Test LEDs terminal is available which when switched to 0V will operate all outputs on the selected N1478 PCB.

A1489 Memory Expansion PCB

This board is used when the repeater is used to interface between an R3 panel and the network.

The A1489 allows the repeater to expand its non-volatile memory area by up to 128k and provides an extra serial RS232 link.

The R3 serial link is terminated to TB1 TXD, RXD and COM on the A1489 board.

The non-volatile memory is EEPROM (electrically erasable programmable read only memory), and can be either 8K, 32K or 64K. These EEPROMs are located in sockets U2 and U3.
Note: Both sockets U2 and U3 must have the same size EEPROM.
If 64K EEPROMs are used then the user MUST link LK1.

28C64 = 8K EEPROM
28C256 = 32K EEPROM
28C512 = 64K EEPROM

The extra memory is required on standard R3 systems using the K1339/K1340 Common Control Module.
If the panel does not contain any loop modules any of the above EEPROMs may be fitted to the A1498 to retain zone/indication/input location information.
If the R3 panel contains 1 to 18 loops then only the 32K or 64K EEPROMs must be fitted to retain zone/indication/input and sensor location information.
If the R3 panel contains 19 to 44 loops then the 64K EEPROMs must be used.

Commissioning Procedure

This section lists a number of general actions required. Supporting details are contained elsewhere within this manual or in the list of associated documents listed below.

1) Make sure that repeater is addressed correctly via SW1 and SW2 as appropriate onboard the A1592 PCB.

2) Verify that J5 onboard the A1592 PCB is linked as NET+ and NET-.

3) J3 should be set to “485” for normal network communications or “232” for text edit and download.

4) Connect field network wires into A1475 termination board TB2 & 3 NET+ and NET-.

5) Connect PSU inputs into A1475 termination board [TB1].

6) If used as an R3 interface repeater, connect the RXD, TXD and COM terminals of the A1489 PCB to the TX1, RX1 and GD1 terminals respectively on the R3 backplane. Also, ensure that the appropriate EPROM’s are fitted to sockets U2 and 3. Check LK 1 is fitted if 64K EPROM’s are installed.

7) If A1478 I/O boards are used, check that each are correctly connected and that SW 1 on each board is set correctly.

8) Turn on DC supply and verify that the repeater 'System Healthy’ led illuminates.

9) Configure the repeater according to the application requirements. Technical Specification TSX1592 provides details of:

    Specifying input types.
    Configuring network responses.
    Network display enable.
    Buzzer enable/disable.
    Printer dump.
    Edit text.
    Set time/date.
    Read sensor status.
    Read loop content.
    Read message memory.
    Cause and effect memory.

    Edit text using a standard Cherry keyboard connected to J5 on A1475 board and J3 on the A1592 set to “232”.

    Download from PC using minimum 386 machine and null modem lead connected to J4 on the A1475 with J3 on the A1592 set to “232”.

The Proton network cause and effect editor program runs in DOS. The Nexus expanded network cause and effect editor runs in Windows 3.1X or Windows 95.

10) Generate a panel alarm condition and verify that the repeater responds accordingly.

11) Generate an alarm via A1478 input and operate user controls on the repeater verifying that the panel(s) responds accordingly.

Fig 1. A1592 PCB Layout

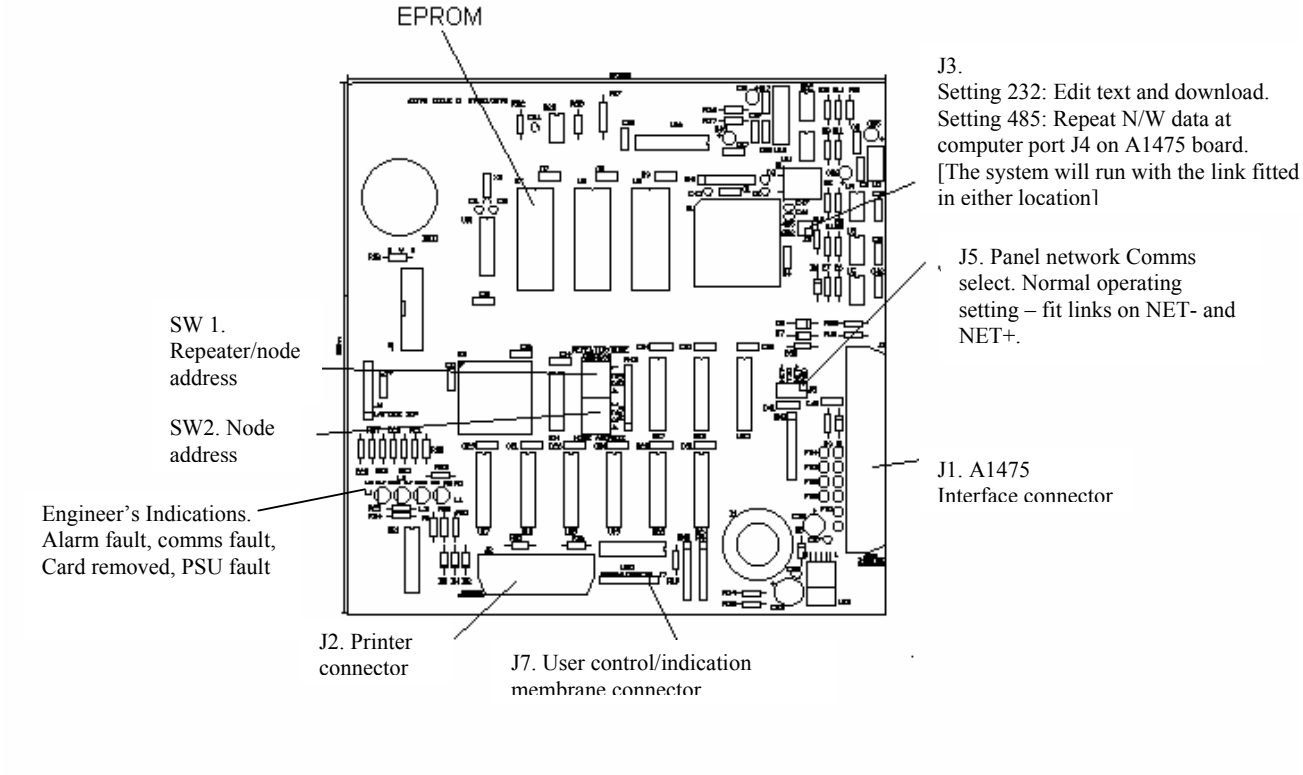
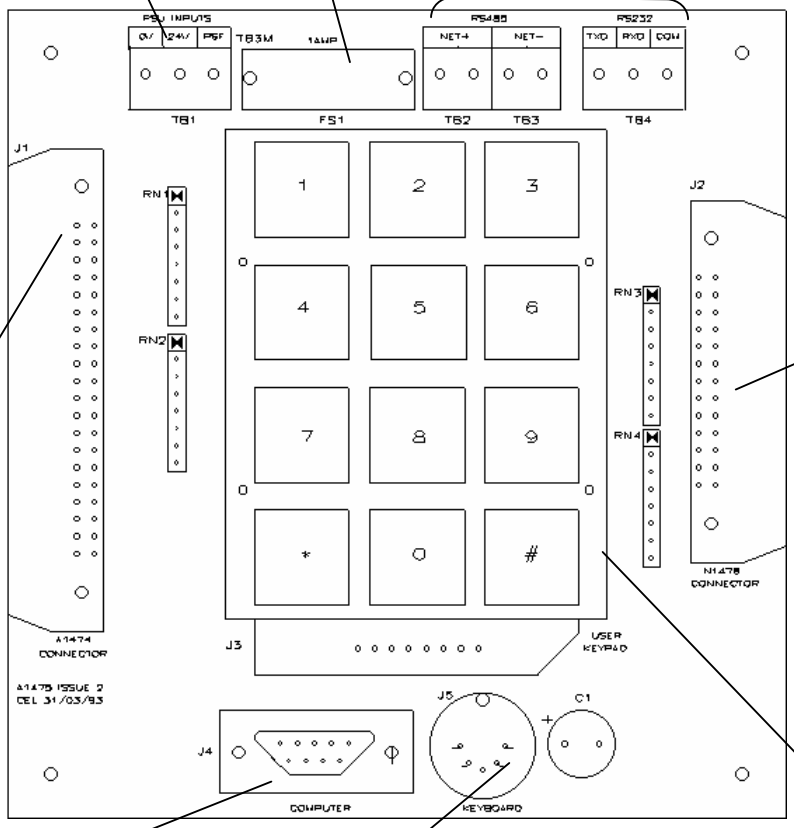


Fig 2. A1475 PCB Layout



PSU I/Ps
0V, 24V,PSF

1 amp
Fuse

Network connections:
TB 2 & 3: RS485 NET+, NET-.
TB4: RS232 TXD, RXD, COM
[RS232 not used]

J1.
A1474 /A1592
Connector.

J2.
N1478
CONNECTOR
Also used to connect A1489 memory expansion board for R3 interface applications.
[Note that A1475 I/O cannot be used when A1489 is used].

User keypad

J4. Computer
Port

J5.
Keyboard port

Fig 3. N1478 PCB Layout

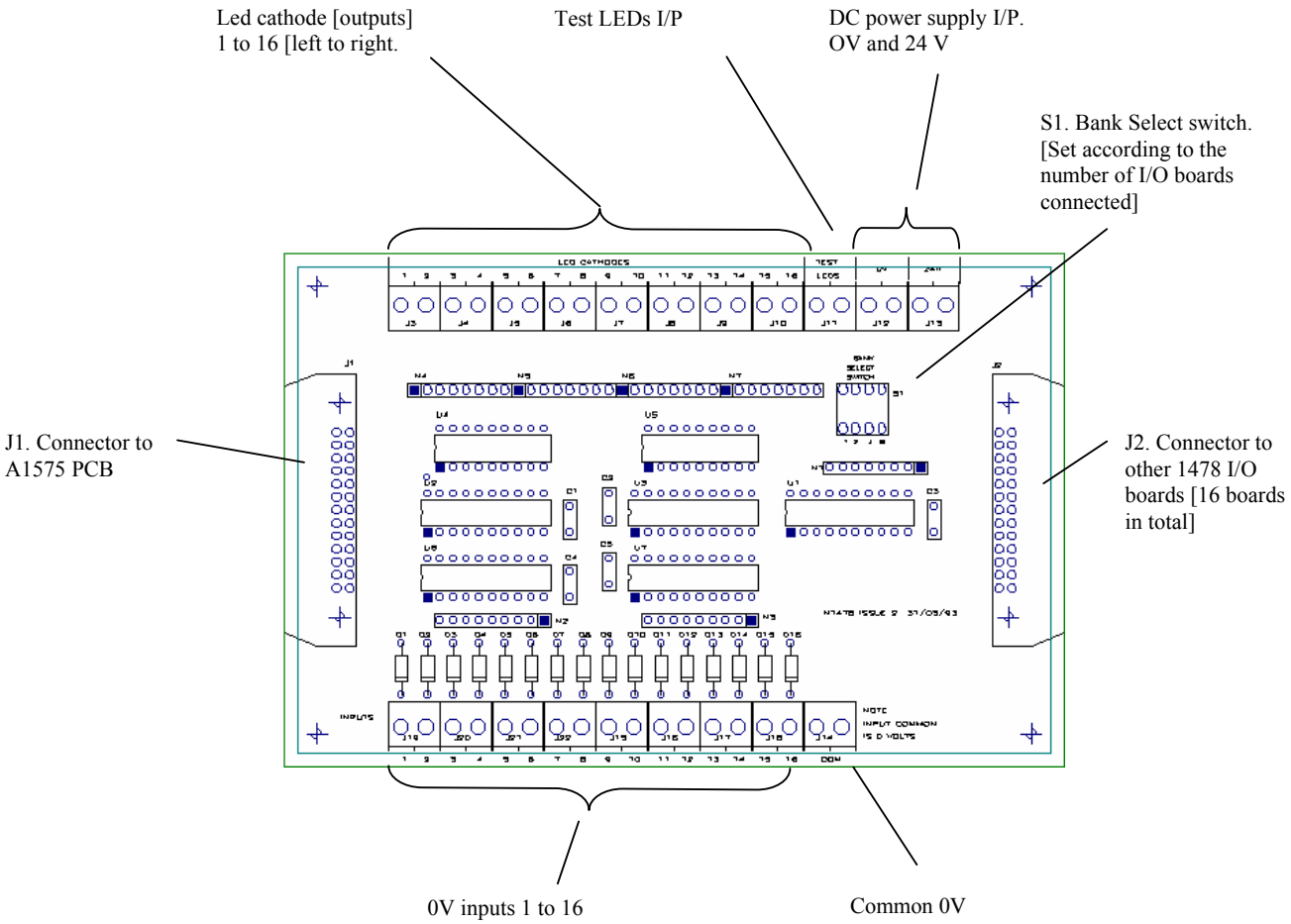


Fig 4. A1489 PCB Layout

LK1.
Fit link if 64 K EPROM fitted

RS232 serial comms port.
[Connect to R3 panel serial link].

J1.
A1475 connector

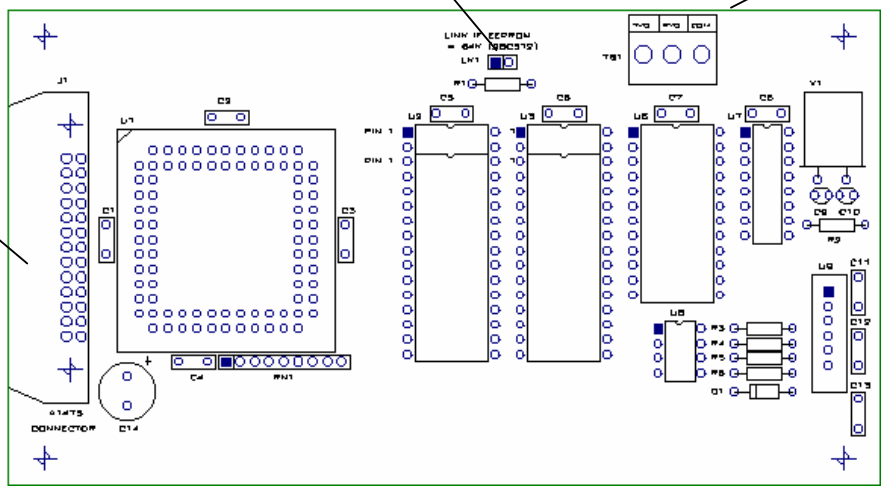
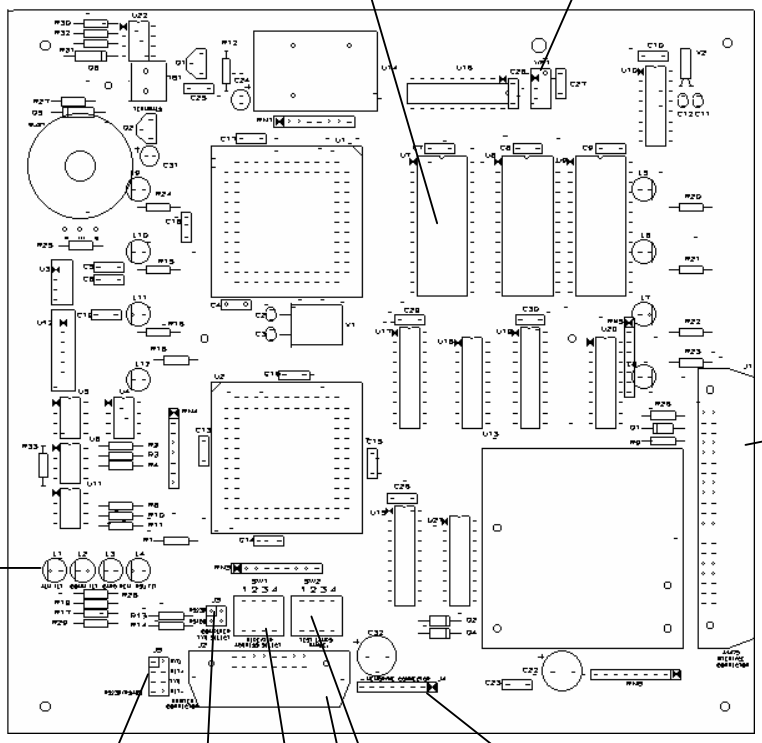


Fig 5. A1474 Board [Replaced by A1592]



EPROM

VR1. Adjust display contrast

J1. A1475 connector.

Engineer's Indications. Alarm fault, comms fault, card removed, PSU

J5. Panel network comms select. Normal operating setting – fit links on NET –and NET +.

J4. User control/indication membrane connector.

SW2. Node address

J3. Setting 232: Edit text and download. Setting 485: Repeat N/W data at computer port J4 on A1475 board. [The system will run with the link fitted in either location]

J2. Printer connector

SW1. Repeater/node address

Fig 1. Use of Global Repeater with R3 Control Panels

The diagram shows one R3 interface node and two global repeater nodes with optional I/O. The maximum number of nodes supported by the network is 15. This may comprise of any mixture of R3 interfaces, Global repeaters and PC based alarm managers [not detailed].
The network protocol used is R3/Proton and is not compatible with Nexus expanded network protocol. The appropriate software is detailed in the diagram.
Diagram details 2 versions of Global Repeater module – A1474 and its replacement - A1592. Both are interchangeable/compatible.

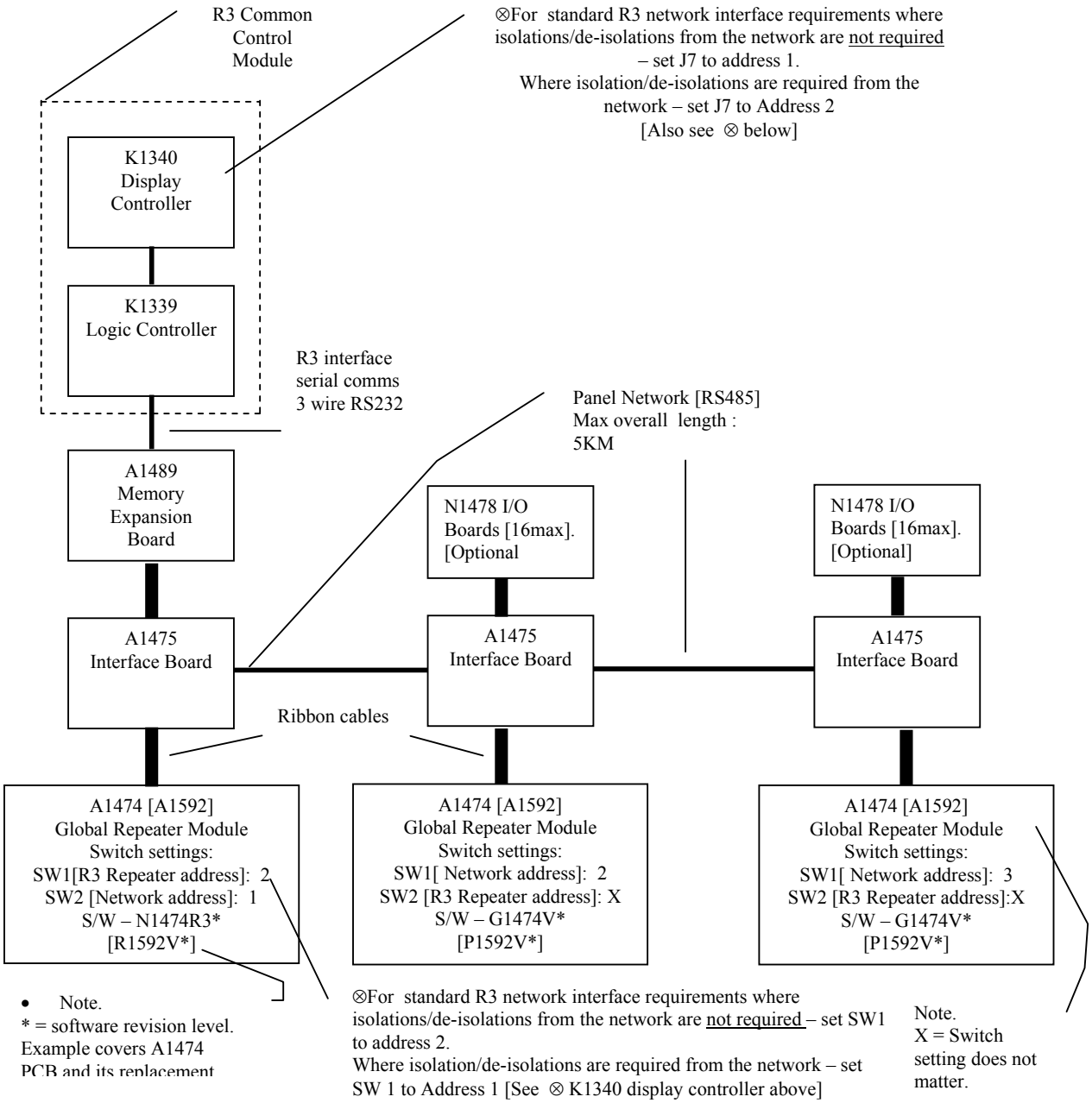
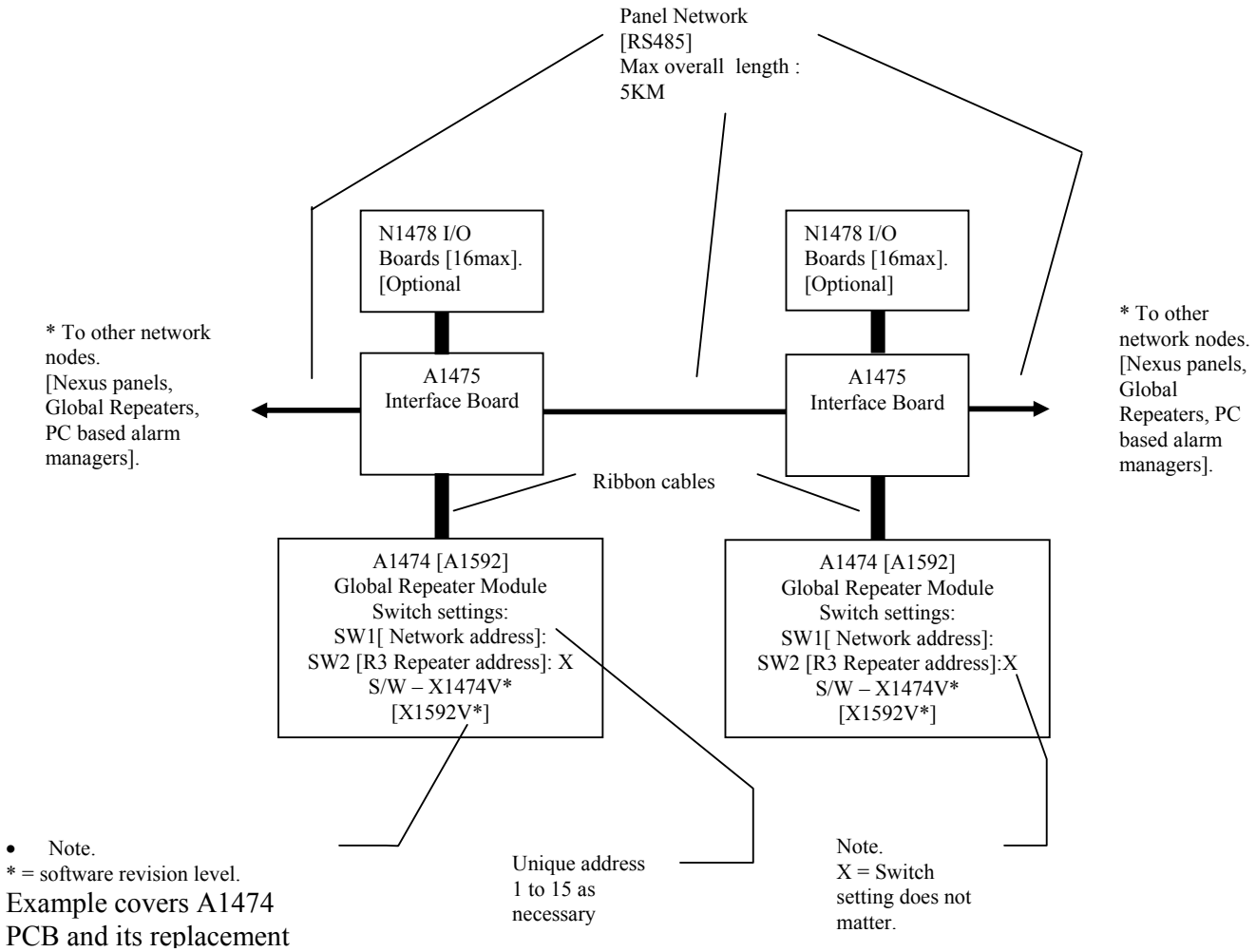


Fig 2. Use of Global Repeater on Nexus Expanded Network

The diagram shows one two global repeater nodes with optional I/O. The maximum number of nodes supported by the network is 15. This may comprise of any mixture of Global repeaters, Puisant panels [with network cards] and PC based alarm managers [not detailed].
The network uses Nexus expanded network protocol and is not compatible with R3/Proton protocol. The appropriate software is detailed in the diagram.
Diagram details 2 versions of Global Repeater module – A1474 and its replacement - A1592. Both are interchangeable/compatible.



- Note.

* = software revision level.
Example covers A1474 PCB and its replacement