How to Troubleshoot a Network

Note: Networks **must only** ever consist of one type of format - standard or fault tolerant. For example, if there is a standard network across all panels and peripherals, then a fault-tolerant card within that network would be unable to communicate. This is the same for a fault-tolerant network when a standard card would not be able to communicate on the network.

Identify the network type

The first step is to identify the network card type that you have attached to your base card. There are two types of network card - standard and fault tolerant. The two cards have the following identifiable features:

Standard card:

- 2 LEDs (Tx & Rx) are located on the left-hand side, near the connector ribbon.
- Wired in radial configuration.

Fault-tolerant card:

- 2 LEDs (Tx & Rx) are located on the top right corner of the PCB, to the right of the OUT terminal.
- Wired in a loop configuration.

Repeater panel fault-tolerant card:

- 2 LEDs (Tx & Rx) are located on the top right corner of the PCB.
- No IN and OUT terminals.
- Located on the back of the repeater PCB.
- Wired in loop configuration.

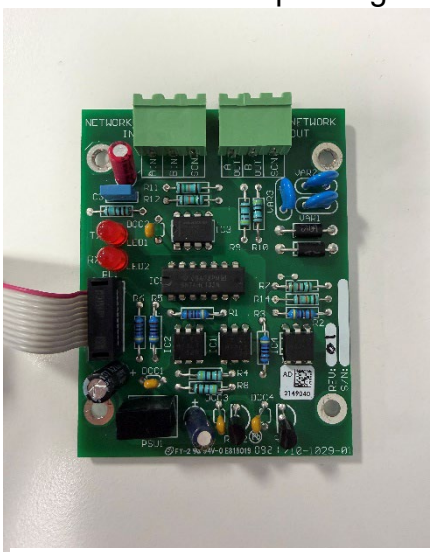

Figure 1 - Standard Network Card

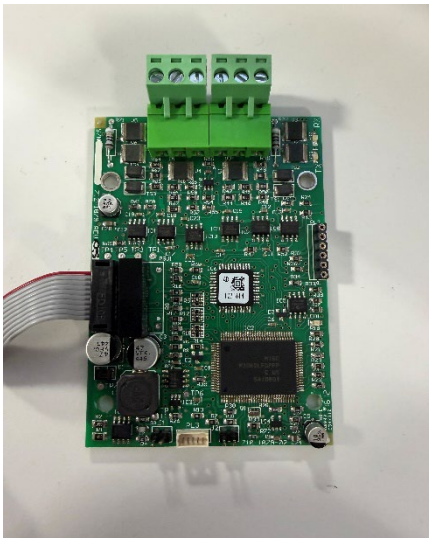

Figure 2 – Fault-Tolerant Network Card

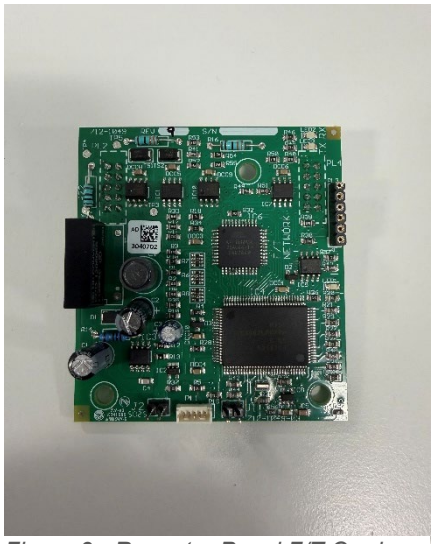

Figure 3 - Repeater Panel F/T Card

Requirement for network cards

The set-up of a network will differ depending on the network card that is connected. Follow the following set-up for each network card:

For standard network (radial):

1. 1st node of the network should be a panel, not a repeater panel.
2. Connect each panel **OUT → IN** in sequence.
3. Fit **150 Ω end of line (EOL) resistors** on the **IN** on the **first** panel and the **OUT** of the **final** panel.
4. Connect a screen cable to **SCN terminal** on the network connector. This is to ensure that there is no excess noise on the network as this can give rise to faults.
5. Ensure the following:
    a. Max distance: **1.5 km end-to-end**
    b. Max nodes: **32**
    c. Repeater panels do **not** require a network card at the back of the display. Ensure that MXS-028 is not fitted, and check that the link connector is in the correct position.

For fault-tolerant (FT) network (loop):

1. Connect each panel **OUT → IN** in sequence, forming a loop (last panel → first panel).
2. Connect a screen cable to **SCN terminal** on the network connector.
3. Ensure the following:
    a. Max ring length: **20km**
    b. Max nodes: **200**
    c. Repeater panels **require** a fault-tolerant network card on the back of the display, and the jumper must be moved to the fault tolerant position.

Node configuration

The node configuration denotes how the panels talk to each other.

- Ensure that the main panel is **node 1**, followed by **node 2** etc.
- Repeater panels **must not** be assigned to **node 1**.
- The network set-up must be configured sequentially. For example, in a 4-panel network, ordered **node 1-4**, you cannot have **node 1 to 2**, then **node 2 to 4** then **node 4 to 3**.
- Note that the wiring of the network does not affect the node configuration.

Common faults and their resolution

Network lost

Network lost appears when there has been a loss of communications to the other panels on the network. Check the following:

- In a **standard** network, ensure that the panels are wired in radial and that the **150 Ω EOL**s are fitted on both ends of the network.
- Ensure that the **INs & OUTs** are configured correctly. It should be **OUT → IN**.
- In a **FT** network, ensure that the network is wired in a ring with the last panel looping back to the first panel.
- The **VIEW→ NETWORK** status will indicate where the fault lies. This can only be viewed in **Level 2.**
- Ensure node configuration is followed.

Noisy network & bad packets

A noisy network warning will appear when the network is picking up bad packets on the network. To check if you have bad packets do the following:

- On your panel navigate to:
  (ACCESS LEVEL 3) → VIEW → NEXT MENU → NETWORK
- Bad packets should **always read 0.** If it is above 0, press 0 to clear and check if it increases.
- If the value increases for any reason, check the cabling between the panels.
- Ensure that the **SCR** screen cable is connected between the panels in the same format as the net **IN** and **OUT** cabling.
- Check your cable containment is not shared. If your network cabling is shared with a higher voltage line, it can cause the packets to distort on arrival, causing your noisy network and bad packets.

Input lost

This is identical to network lost. However this will appear on a panel that is still communicating within the network. Follow instructions for 'Network lost' to fix this.

FT ring/network fault

This fault relates to the **fault-tolerant** ring, appearing only when the ring is broken. Follow these steps to remedy:

- Ensure that the network is a f**ault-tolerant** network. There should be **NO STANDARD** network cards on the network.
- If a repeater panel is on the network, ensure that it is fitted with the **FT** network card and that the **jumper** has been **moved** to the **correct position**.
- To view more info about the fault go to: **(Level 2) → View → Network**
    - **Input Lost:** IN terminal isn't receiving a signal.
    - **Network Lost:** Panel is not communicating with the network, check wiring & node configuration.

Further troubleshooting

If all else fails, start with a simpler network. Move the network down to 2 nodes and try troubleshooting from there. Ensure you power down the panel and repower, then check for faults, and slowly build up the network. This can lead to a fault discovery, and enable you to find which device is causing the problem.

When connecting a network card for the first time, **DO NOT** plug it in while the panel is live! **Always** power down the panel before connecting/disconnecting a network card.