



100V Switching Module Installation Instructions (FP1117)

1. Checking the Kit

The FP1117 100V Switching Module is used in a T-Gen 60 or T-Gen 120 Emergency Warning System.

It splits the T-Gen2's 100V speaker output into four 100V speaker circuits, each with its own supervision. If a short circuit fault is detected the 100V Switching Module disconnects that output, allowing the others to continue working. Each output can also be disconnected from the 100V feed, allowing the T-Gen2 to control which outputs receive the audio signal, e.g., for area paging, or zone control.

These instructions cover the fitting and connection of a 100V Switching Module in a T-Gen2 EWS or an MX1 and Simplex 4100ESi fire alarm panel. The details of any necessary changes to the system configuration or other hardware are not covered here.

The FP1117 100V Switching Module includes all the required hardware to mount the module on the gear plate in the T-Gen2 EWS, MX1 or 4100ESi Compact Panel, and cabling to wire the module to a T-Gen 60 or T-Gen 120.

To mount a 100V Switching Module in a Simplex 4100ESi fire panel equipment bay an FP1120 100V module mounting bracket will also be required. It contains installation instructions (LT0670) detailing how two 100V Switching Modules mount on this bracket and how the bracket can be mounted in a Simplex 4100ESi equipment bay.

Before installing a 100V Switching Module, check that all items in the kit are present and undamaged.

Qty	Description
1	100V switching Module mounted on bracket
1	KT0574 SET OF EOL RESISTORS, 100V WARNING LABEL, SLEEVING
1	LM0630 AUDIO LOOM 2.0m (for wiring to a T-Gen 60/120)
1	734-008 QBUS LOOM 0.6m (for wiring to a T-Gen 60/120)
2	M4 X 10 SCREW (for mounting the module, contained in KT0574)
1	LT0668 INSTALLATION INSTRUCTIONS (these instructions)

2. General Description

The 100V Switching Module is supplied on a metal bracket that allows it to be mounted on the suitable gear plates and panels using two MX Loop Card M4 mounting holes.

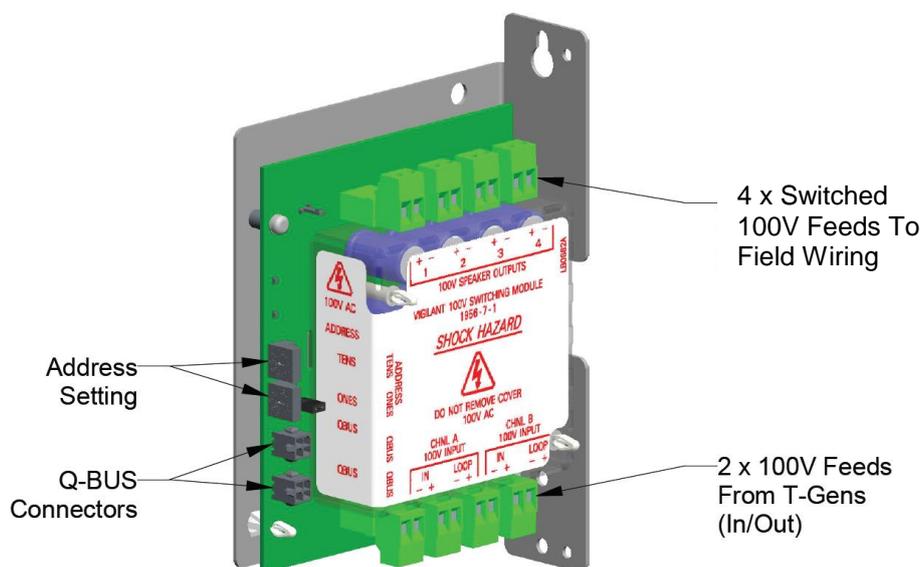


Figure 1 – 100V Switching Module

3. Mounting in a 100V Switching Module

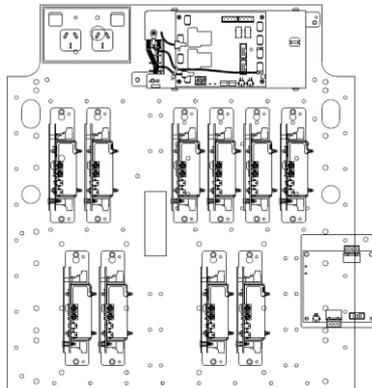
Mounting in a T-Gen2 BOWS/EWS

The 15U gear plate used in T-Gen2 BOWS/EWS panels has mounting positions for up to 10 x 100V Switching Modules (or other modules that use similar mounting methods).

Figure 2 shows the positions on the 15U gear plate, note some overlap with other modules that may already be fitted in some panels.

In the 8U BOWS there are 3 suitable positions on the LHS of the gear plate.

Fit one of the M4 screws from the kit in the top fastening point but do not tighten it. Remove the 100V Switching Module from its packaging and hang it on this screw using the "keyhole" mounting hole in the rear of the bracket. Fit the other M4 screw in the bottom fastening point and tighten both screws.



100V Switch/Splitter/HLI Modules

Figure 2 – 15U Gearplate Module Mounting Positions

Mounting in a 15U MX1 Cabinet

The 100V Switching Module can be mounted in 6 locations on the 15U MX1 gear plate – see Figure 3 for gear plate locations.

This is the recommended mounting method. Fit one of the M4 screws from the kit in the top fastening point but do not tighten it. Remove the 100V Switching Module from its packaging and hang it on this screw using the "keyhole" mounting hole in the rear of the bracket. Fit the other M4 screw in the bottom fastening point and tighten both screws.

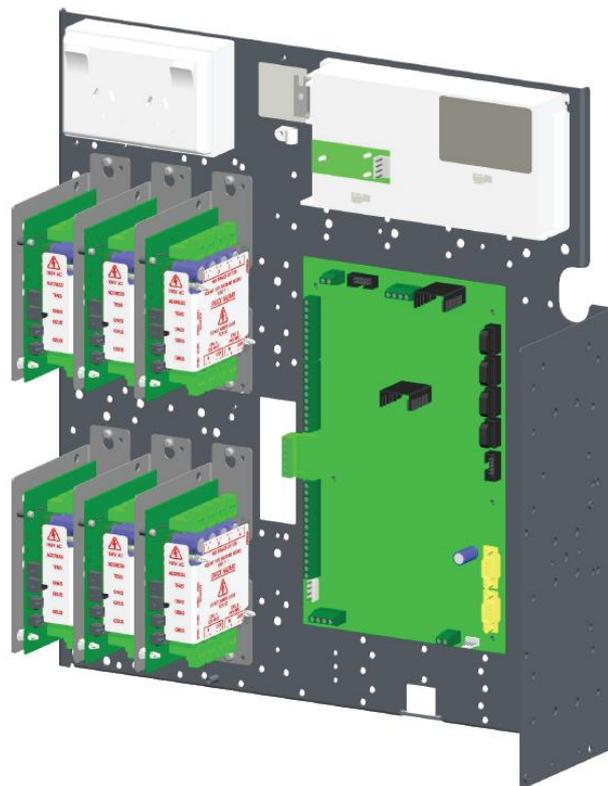


Figure 3 – 100V Switching Modules on 15U MX1 Gear Plate

Mounting in an MX1 Slimline Cabinet

This is the recommended method for mounting in an MX1 Slimline cabinet. The 100V Switching Module is directly mounted on the side wall, as shown in Figure 4. This position will not interfere with the zone LED display cards for a rear service system.

Remove the 100V Switching Module from its packaging and fasten it on the front pair of studs using two M3 barrel nuts (FA2016) and washers (WA0005).

NOTE: The M3 barrel nuts and washers are not supplied with this kit.

WARNING: do not over-tighten the barrel nuts, otherwise the studs may snap.



Figure 4 – 100V Switching Module in Slimline MX1 Cabinet

Mounting 100V Switching Module on other MX1 Gear Plates

The 100V Switching Module can be mounted on other MX1 gear plates where there are two M4 holes at 150mm vertical centres available. The mounting method is the same as the 15U gear plate.

Mounting 100V Switching Modules flat on MX1 Gear Plates

The 100V Switching Modules can be mounted flat on the various MX1 gear plates where there are four Ø4.8 holes at 90mm square centres available. This is not the recommended method as it makes access to the module address switch difficult.

Fit four plastic PCB stand-offs (HW0052) in the Ø4.8 holes of the chosen position. Remove the 100V Switching Module from its ESD protection. Undo the two screws and release the two plastic clips holding the 100V Switching Board to the bracket.

Place the 100V Switching Board carefully on the four standoffs on the gear plate and press it home. Earth the 100V Switching Board to the gear plate using a suitable loom from connector J16.

Mounting in a 8U MX1 Cabinet

The 100V Switching Module can be mounted on other MX1 gear plates where there are two M4 holes at 150mm vertical centres available. The mounting method is the same as the 15U gear plate.

Mounting in a 15U 4100ESi Panel and Expansion Cabinet

One 100V Switching Module can be mounted on a 15U 4100ESi gear plate, at the bottom RH corner to the right of the LPS, where there are two M4 holes at 150mm vertical centres available. The mounting method is the same as the 15U gear plate.

Mounting in 28U/40U 4100ESi Cabinets

Two 100V Switching Modules can be mounted on an FP1120 bracket in a 4100ESi PDI backplane along with 2 T-Gen2 and an APS or 14A PSE. Refer to LT0670 for mounting instructions.

4. Wiring a 100V Switching Module

The wiring of the 100V Switching Module will depend on the grade of the T-Gen2 system and the audio arrangement assigned in SmartConfig.

Basically, there are three arrangements – depending on the number of simultaneous audio channels that need to be supported – 1, 2 or 3.

For all arrangements:

- The 100V Switching Module QBus Connector (J1) must be connected to the QBus connector of the Master T-Gen2 (J32) using the 4-way 734-008 cable. Either directly or via the QBus In/out connectors of another QBus Module (e.g., J2 of another 100V Switching Module).
- The 100V output of the driving T-Gen2 must be connected to IN A/B (J6/J8) of the 100V Switching Module – either directly or via the OUT A/B connection (J7/J9) of another 100V Switching Module in the same audio chain. Maintain the polarity of the 100V wiring through all the modules. This cable carries 100V audio, so needs to use cable rated for 100V (e.g., double insulated) and all terminations need to be arranged so the bare wires cannot be touched. A 2m length of suitable cable is included with the Switching Module.
- The 56K EOL is fitted to the OUT A/B connectors (J7, J9) of the last 100V Switching Module in the chain. This must be sleeved and terminated so that the leads and resistor cannot be touched.

The connection from the driving T-Gen2 to the specific 100V audio inputs needs to match that assigned in the SmartConfig configuration:

T-Gen2 Audio Ch A – connect to IN A

T-Gen2 Audio Ch B – connect to IN B

T-Gen2 Audio Ch C – connect to IN B of the second (Address + 1) 100V Switching Module

Triple Audio Channel Installation

The 100V outputs of two Switching Modules are wired in parallel to provide 4 outputs with 3 x 100V Audio inputs. Connect OUT 1 of the first parallel Switching Module to OUT 1 of the second Switching Module (Address+1) to form a pair. Ensure the polarity of the OUT signals is wired positive to positive, negative to negative for each individual pair. Repeat for OUT 2-4.

The 100V audio output of the T-Gen2 configured as Audio Mapping = A is wired to IN A of the first (parallel) Switching Module.

The 100V audio output of the T-Gen2 configured as Audio Mapping = B is wired to 100V IN B of the first (parallel) Switching Module.

The 100V audio output of the T-Gen2 configured as Audio Mapping = C is wired to 100V IN B of the coupled Address+1 Switching Module. IN A, OUT A of this Switching Module must remain unconnected.

Daisy chain the 3 x 100V Audio Signals from OUT A, OUT B of the first (parallel) Switching Module and OUT B of the Address +1 module on to the IN A, IN B and IN B of the next pair of Switching Modules that are on the same audio chain. Observe polarity.

Fit insulated 56K EOL to OUT A, OUT B, and OUT B of the last Switching Modules in each chain.

Drawing 1982-71 Sheets 134, 137 and 138 show these arrangements.

5. 100V Speaker Wiring

The 100V Switching Module provides 4 separate 100V speaker outputs, each rated at 100W, up to a total of 120W (or the rating of the T-Gen2 that feeds the 100V Switching Module if lower).



The 100V speaker wiring is defined as LV circuits and is subject to the Australian Standard AS/ACIF S009:2013.

Ensure that 100V speaker cabling is appropriately separated and insulated from LV mains power wiring, ELV cabling and other customer cabling such as fire detection and control circuits. 100V speaker wiring is required to be double insulated.

Note: A 100V warning label is provided which should be placed near to the 100V Out terminals.

The 100V Switching Module has 100V line supervision, and therefore requires a DC-decoupling capacitor in series with each speaker transformer. The capacitors must be bipolar, always placed in series with the transformer primary, and have a value of about 1 - 5uF per Watt of the speaker's load (see below).

Many 100V loud speakers used for a fire alarm/evacuation system come with a suitable capacitor built in. It is possible to use a higher value capacitor on each speaker, however if there are a large number of speakers on the line then the 100V Switching Module may indicate a fault on power up. This will clear after a few minutes, once the supervision voltage on the line has stabilised. The capacitor's voltage rating must be at least 10V.

Speaker Load	0.33W - 0.5W	1W - 5W	10W - 20W	40W
Capacitor	1uF	10uF	47uF	100uF

For a single line of loudspeakers a 56k resistor ELD is required to be placed at the end of the line. If wiring in two branches, then two 100k ELDs are used, one on each branch. See Figure 5 for wiring details.

Any unused outputs do not require an EOL resistor, if the T-Gen2 configuration has supervision disabled for the output. If supervision is enabled, first sleeve the EOL resistor and then fit the resistor to the screw terminals so that the resistor and leads cannot be touched.

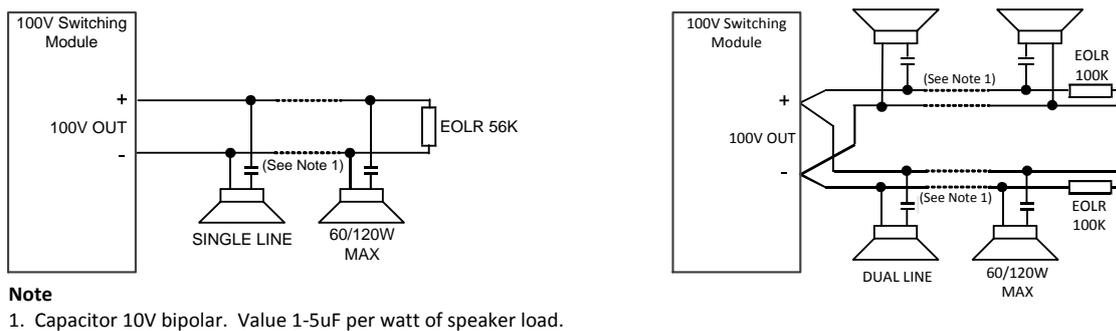


Figure 5 100V Speaker Line Wiring

6. 100V Switching Module Configuration

The QBus address for the 100V Switching Module needs to be set to match the address programmed into the T-Gen 60/120 configuration. This will be a number 1-10. The second module of a parallel pair needs to be at an address 1 higher than the first module.

In general Lk1 should be not fitted.

7. Power On

The T-Gen2 should be powered up with its required configuration. Check the POWER/LINK LED on each 100V Switching Module is blinking and no faults are present on the Switching Module. Refer to Section 9 for the LED indications, or to the T-Gen2 OLED for fault details. Fix any faults that are present.

8. Commissioning, Testing & Maintenance

The suggested steps for commissioning a 100V Switching Module in a T-Gen2 system are as follows:

- Configure the 100V Switching Module and other modules required, using these and the other module installation and configuration instructions. Check the wiring is correct.
- Measure the 100V speaker line load impedance on each of the four outputs using a suitable meter. Check each is below 100W and the sum of all 4 is less than 120W and the rating of the T-Gen2 that is driving the 100V Switching Module.
- Power up using Mains only and check the operation.
- Correct any fault conditions identified.
- Test each paging/zone function (alert, evacuate, speech) and non-emergency functions (BGM, paging) can be heard in the required zones / areas.

The T-Gen2 Test Tone can be used to check speaker operation at a low sound level.

When measuring the sound levels in the various areas, record the sound level of the test tone at a particular level so this can be used in the yearly tests for AS 1851 Items 3.9 and 3.10.

For service and maintenance use the T-Gen2 OLED buttons and display to show the details of any fault conditions. The History menu can be used to see transient faults.

9. Status LEDs

The 100V Switching Module has 2 status LEDs for fault diagnostics:

LED Name	Colour	Description
POWER/LINK	Green	<p>OFF – no power applied</p> <p>Flashing – 100V Switching Module is operating correctly and being polled by the T-Gen2.</p> <p>ON – 100V Switching Module is not being polled by the T-Gen2. Check cabling, address assignment, T-Gen2 configuration.</p>
FAULT	Yellow	<p>OFF – no fault present.</p> <p>Flashing – fault present</p> <p>When a Fault is present the FAULT LED shows a sequence of 13 flashes followed by a pause, with each flash short (250msec) if that fault is not present and long (750msec) if that fault is present.</p> <p>The system faults are indicated in this order:</p> <ol style="list-style-type: none"> 1. OUT1 100V output has a short circuit fault – the output is isolated from the T-Gen2. 2. OUT2 100V output has a short circuit fault – the output is isolated from the T-Gen2. 3. OUT3 100V output has a short circuit fault – the output is isolated from the T-Gen2. 4. OUT4 100V output has a short circuit fault – the output is isolated from the T-Gen2. 5. OUT1 100V output has an open circuit or undefined fault – the output is still connected to the T-Gen2. 6. OUT2 100V output has an open circuit or undefined fault – the output is still connected to the T-Gen2. 7. OUT3 100V output has an open circuit or undefined fault – the output is still connected to the T-Gen2. 8. OUT4 100V output has an open circuit or undefined fault – the output is still connected to the T-Gen2. 9. Not communicating with the T-Gen2. Check the T-Gen2 connection, configuration selected, address setting in T-Gen2 configuration, and Address Rotary switch setting on the 100V Switching Module. Will occur when the T-Gen2 is in programming mode (i.e., PC USB connection active). 10. Invalid Address (Not 0...9). Try rotating the address rotary switch and then back to the desired address. If cannot be fixed, replace the 100V Switching Module. 11. Firmware CRC Incorrect. Replace the 100V Switching Module. 12. Software Fault. Will not occur. 13. Unexpected restart occurred. Something happened to cause the 100V Switching Module microprocessor to restart. Clears once status sent to T-Gen2. If does not clear, even after power down/up, replace the 100V Switching Module.

10. 100V Switching Module Specifications

Power requirements	19.2V – 28.8Vdc, 10mA typ @ 24V, 43mA max (all 4 outputs in short circuit fault)
Operating Temperature Range	-5°C to +45°C
Humidity Range	10% to 93% RH non-condensing
100V Outputs	Each output 100W max, all 4 < 120W (or rating of T-Gen2) Each output 56k EOL (1 branch) or 2 x 100k (2 branches)
100V Speaker Cable	Maximum capacitance (summed for all outputs) 200nF

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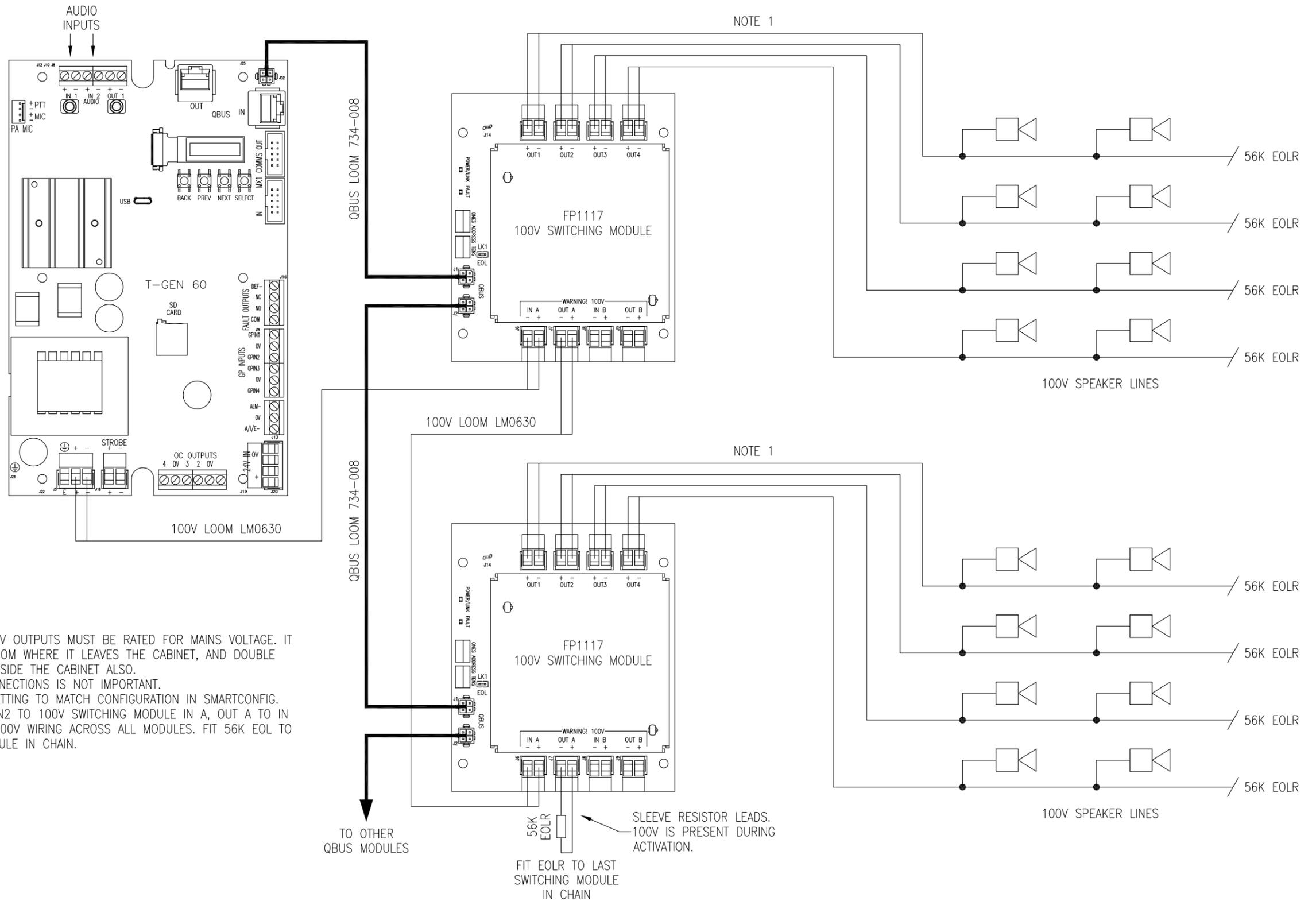
Refer to the T-Gen2 Licences.txt file contained on the T-Gen2 USB drive when it is plugged into the PC for the purposes of updating the T-Gen2 configuration.

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NOTES:

1. WIRING CONNECTED TO THE 100V OUTPUTS MUST BE RATED FOR MAINS VOLTAGE. IT MUST BE DOUBLE INSULATED FROM WHERE IT LEAVES THE CABINET, AND DOUBLE INSULATION IS RECOMMENDED INSIDE THE CABINET ALSO.
2. THE ORDER OF QBUS INTERCONNECTIONS IS NOT IMPORTANT.
3. SWITCHING MODULE ADDRESS SETTING TO MATCH CONFIGURATION IN SMARTCONFIG.
4. DAISY CHAIN AUDIO FROM T-GEN2 TO 100V SWITCHING MODULE IN A, OUT A TO IN A ETC. MAINTAIN POLARITY OF 100V WIRING ACROSS ALL MODULES. FIT 56K EOLR TO OUT A OF LAST SWITCHING MODULE IN CHAIN.

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3rd ANGLE PROJECTION

ISS/REV	AMENDMENTS	ECO	DRN	CHKD	AUTH	APVD	DATE
A	ORIGINAL	5022	KJS	LSC	RC	DC	29-8-17
B	UPDATED FOR T-GEN2 GRADE 2.	5142	KJS	PV	RC	DC	15-10-18

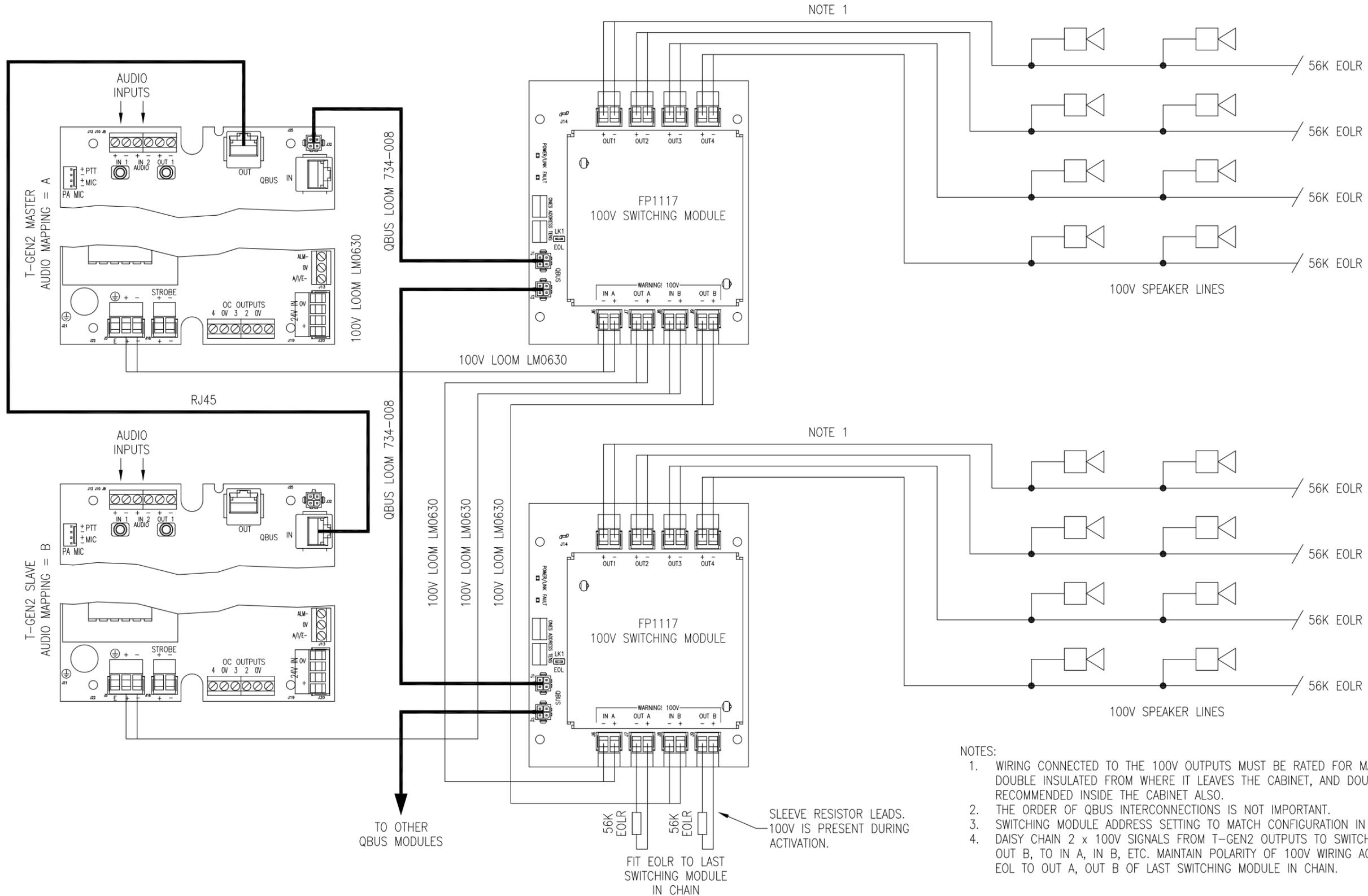
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T-GEN2
SINGLE 100V SWITCHING MODULE
WIRING DIAGRAM

DRAWING No: **1982-71** SHEET **134** of **N**

A3	ISS/REV B	PART No:	
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- NOTES:
1. WIRING CONNECTED TO THE 100V OUTPUTS MUST BE RATED FOR MAINS VOLTAGE. IT MUST BE DOUBLE INSULATED FROM WHERE IT LEAVES THE CABINET, AND DOUBLE INSULATION IS RECOMMENDED INSIDE THE CABINET ALSO.
 2. THE ORDER OF QBUS INTERCONNECTIONS IS NOT IMPORTANT.
 3. SWITCHING MODULE ADDRESS SETTING TO MATCH CONFIGURATION IN SMARTCONFIG.
 4. DAISY CHAIN 2 x 100V SIGNALS FROM T-GEN2 OUTPUTS TO SWITCHING MODULE IN A, IN B, OUT A OUT B, TO IN A, IN B, ETC. MAINTAIN POLARITY OF 100V WIRING ACROSS ALL MODULES. FIT 56K EOL TO OUT A, OUT B OF LAST SWITCHING MODULE IN CHAIN.

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3rd ANGLE PROJECTION

ISS/REV	AMENDMENTS	ECO	DRN	CHKD	AUTH	APVD	DATE
A	ORIGINAL	5142	KJS	PV	RC	DC	15-10-18

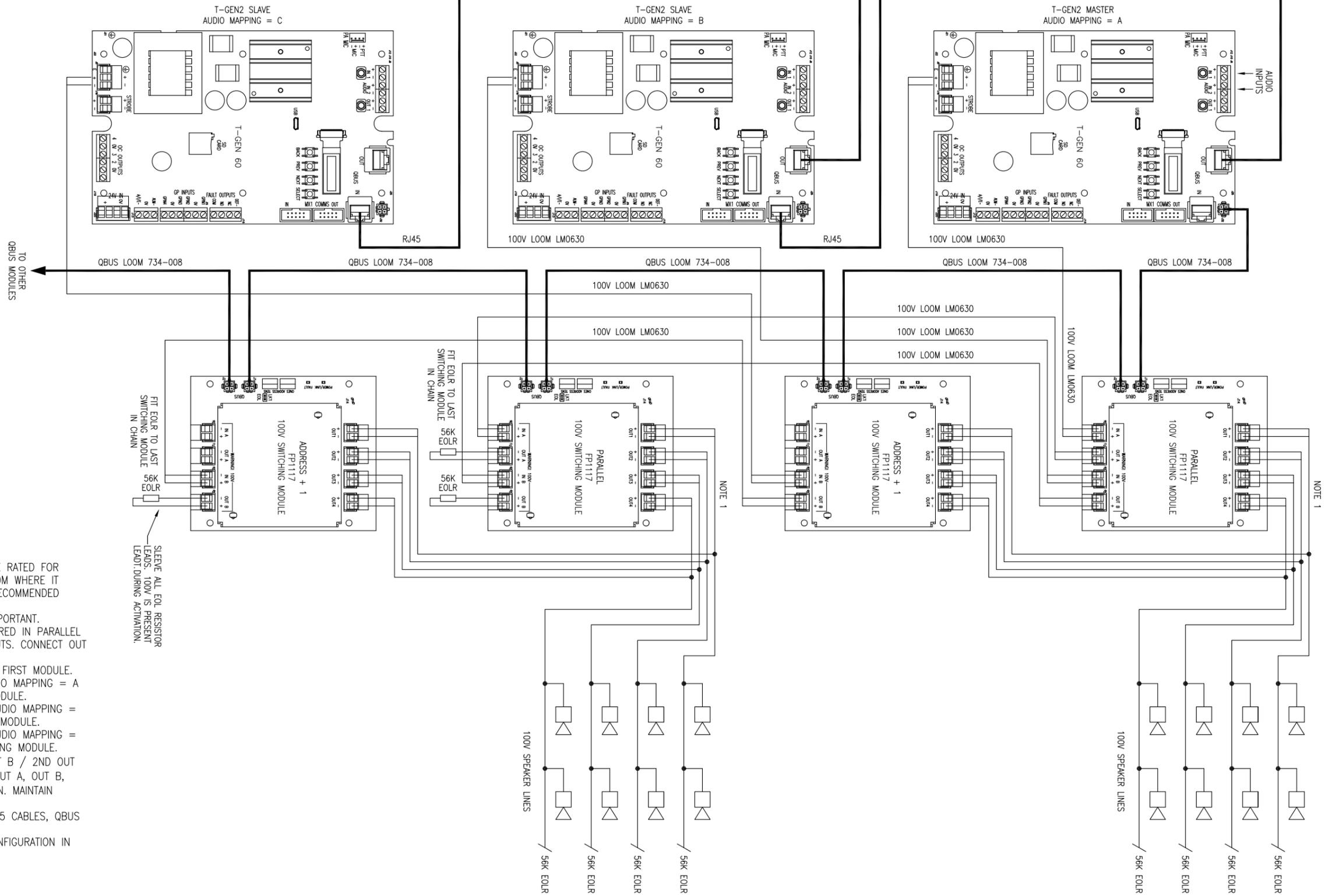
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**T-GEN2
 DUAL 100V SWITCHING MODULE
 WIRING DIAGRAM**

DRAWING No: **1982-71** SHEET **137** of **N**

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- NOTES:
1. WIRING CONNECTED TO THE 100V OUTPUTS MUST BE RATED FOR MAINS VOLTAGE. IT MUST BE DOUBLE INSULATED FROM WHERE IT LEAVES THE CABINET, AND DOUBLE INSULATION IS RECOMMENDED INSIDE THE CABINET ALSO.
 2. THE ORDER OF QBUS INTERCONNECTIONS IS NOT IMPORTANT.
 3. 100V OUTPUTS OF TWO SWITCHING MODULES ARE WIRED IN PARALLEL TO PROVIDE 4 OUTPUTS WITH 3 X 100V AUDIO INPUTS. CONNECT OUT 1+ TO OUT 1+, OUT 1- TO OUT 1-, ETC.
 4. 2ND MODULE IS CONFIGURED WITH ADDRESS +1 OF FIRST MODULE.
 5. THE 100V OUTPUT OF T-GEN2 CONFIGURED AS AUDIO MAPPING = A IS WIRED TO 100V IN A OF PARALLEL SWITCHING MODULE.
 6. THE 100V OUTPUT OF T-GEN2 CONFIGURED WITH AUDIO MAPPING = B IS WIRED TO 100V IN B OF PARALLEL SWITCHING MODULE.
 7. THE 100V OUTPUT OF T-GEN2 CONFIGURED WITH AUDIO MAPPING = C IS WIRED TO 100V IN B OF ADDRESS +1 SWITCHING MODULE.
 8. DAISY CHAIN 3 x 100V SIGNALS FROM OUT A / OUT B / 2ND OUT B TO IN A / IN B / 2ND IN B; ETC. FIT EOLR TO OUT A, OUT B, 2ND OUT B OF LAST SWITCHING MODULE(S) IN CHAIN. MAINTAIN POLARITY OF 100V WIRING ACROSS MODULES
 9. T-GEN2 MODULES CONNECTED TOGETHER USING RJ45 CABLES, QBUS OUT TO QBUS IN.
 10. SWITCHING MODULE ADDRESS SETTING TO MATCH CONFIGURATION IN SMARTCONFIG.

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3rd ANGLE PROJECTION

ISS/REV	AMENDMENTS	ECO	DRN	CHKD	AUTH	APVD	DATE
A	ORIGINAL	5142	KJS	PV	RC	DC	15-10-18

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T-GEN2
TRIPLE 100V SWITCHING MODULE
WIRING DIAGRAM

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