



2050 Communication System MK2

TURRET COMMUNICATION SYSTEM
INSTALLATION MANUAL

STANDARD EDITION

Document # 2050 MK2 install manual v1.0.2.DOC REV 1.0.2 June 4, 2012
Subject to change without notice.

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- **Rack Installation**

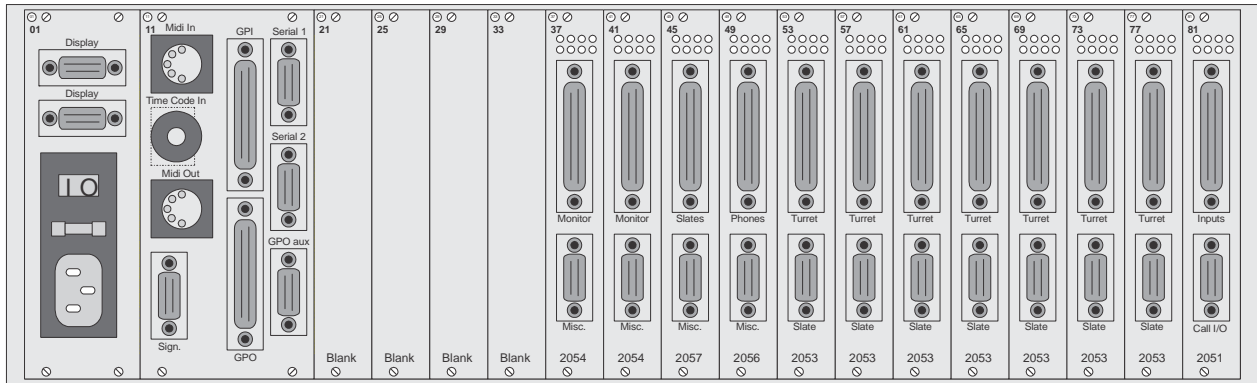
The 2050 frame unit should be installed in a proper ventilated Rack.
At least one vent should be installed over the frame.

Default to proper ventilation may result in premature circuit degradation.

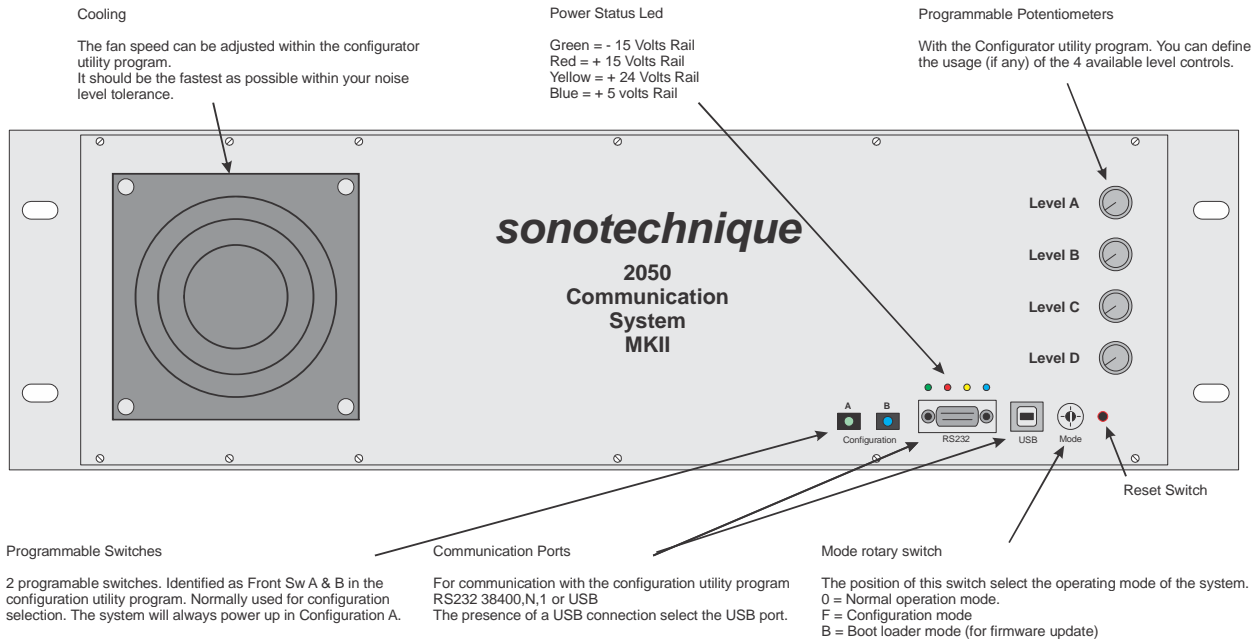
The 19 inches 3U rack mount has 16 audio card slots.

A basic frame come equipped with 1 Monitor management card "2054", 1 Mix/Bus input card "2051", The 2052 CPU module & power supplies leaving 14 available slots.

- **Rear panel connector layout (3U Sample configuration)**



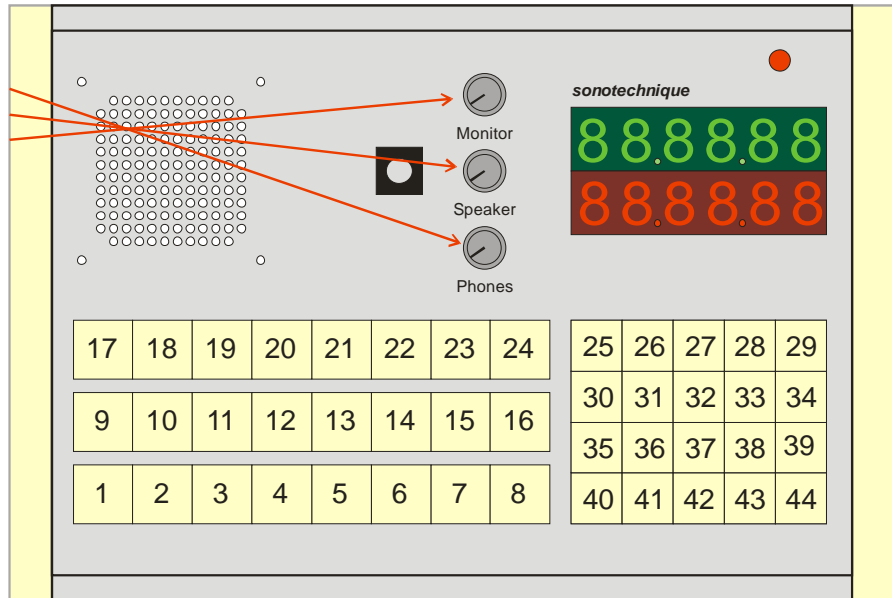
- **Front panel layout**



- **Sample turret layout**

Programmable Potentiometers

With the configurator program
 Bottom potentiometer is pot 1
 Second from bottom potentiometer is pot 2
 Top potentiometer is pot 3 (if present)
 There is no physical pot 4



Programmable Switches

With the configurator program
 The switches numbering is as shown.
 If the row doesn't exist the numbers are skipped

17	18	19	20	21	22	23	24	25	26	27	28	29
9	10	11	12	13	14	15	16	30	31	32	33	34
								35	36	37	38	39
1	2	3	4	5	6	7	8	40	41	42	43	44

2051, Main Stereo buss inputs card. (This card is always and must be located in Slot 81)

Slot 81

D25 Female connector pin assignment

PIN #	Description	NOTES
1	Stereo buss 1 Input Left (+)	
14	Stereo buss 1 Input Left (-)	
2	Analog Ground	
15	Stereo buss 1 Input Right (+)	
3	Stereo buss 1 Input Right (-)	
16	Analog Ground	
4	Stereo buss 2 Input Left (+)	
17	Stereo buss 2 Input Left (-)	
5	Analog Ground	
18	Stereo buss 2 Input Right (+)	
6	Stereo buss 2 Input Right (-)	
19	Analog Ground	
7	Stereo buss 3 Input Left (+)	
20	Stereo buss 3 Input Left (-)	
8	Analog Ground	
21	Stereo buss 3 Input Right (+)	
9	Stereo buss 3 Input Right (-)	
22	Analog Ground	
10	Stereo buss 4 Input Left (+)	
23	Stereo buss 4 Input Left (-)	
11	Analog Ground	
24	Stereo buss 4 Input Right (+)	
12	Stereo buss 4 Input Right (-)	
25	Analog Ground	
13	Chassis Ground	

External Calls connection, D9 Female connector pin assignment

PIN #	Description	NOTES
1	External Call input (+)	
6	External Call input (-)	
2	Analog Ground	
7	External Call output (+)	
3	External Call output (-)	
8	Analog Ground	
4	GPO	Open Collector 100mA Max
9	GPI	Opto cathode, Anode internal to 5Volts via 330R
5	Digital Ground	

This card is shipped as part of the 2050 frame.

It manages the busses of the 2050 system and also usually provides inputs for the 4 stereo busses.

The headphone & off air programs are usually connected to this card.

If the studio monitor speakers and headphone program is the same, the studio monitor program could be feed by this card. Only one 2051 card can be fitted in the 2050 frame and is located in slot 81.

Note 1: Analog ground, Chassis ground and digital ground **must be isolated** from each other.

Note 2: The GPO will follow the activation of an external call. The GPI can be programmed with function(s).

- **2052 CPU MK2 Module.**
This Module has several connector listed below.

This module is fitted in slot 9 only

This is the brain of the system and shipped as part of the 2050 frame.

For now, we will discuss only the GPI portion of it.

There are 20 GPI inputs and 20 GPI outputs available on the 2052.

However, depending on the Mute configuration, they are not always available for programming. Here are some possible mute configurations.

Mute via midi	All GPIO are available.
Mute via serial port	All GPIO are available.
Mute via GPI, 1 to 8 microphones	GPIO 9 through 20 are available.

As you can see, the usage of mutes controlled by GPI is per a block of eight even if there is only one microphone used in that block. For example, a 2050 system handling 4 microphones will have only 12 GPIs available. The 2052 GPI inputs are located on a DB25 connector.

The GPI outputs are also located on a DB25 connector. The GPI outputs are open collector while the inputs are OPTO isolated with a common Anode.

GPO 17 through 20 are also mirrored on a DB9 named GPO aux.

They use reed relays instead of open collectors.

There is also 4 other NON programmable GPI outputs, they are dedicated to the RED, GREEN, Flick light & User Light.

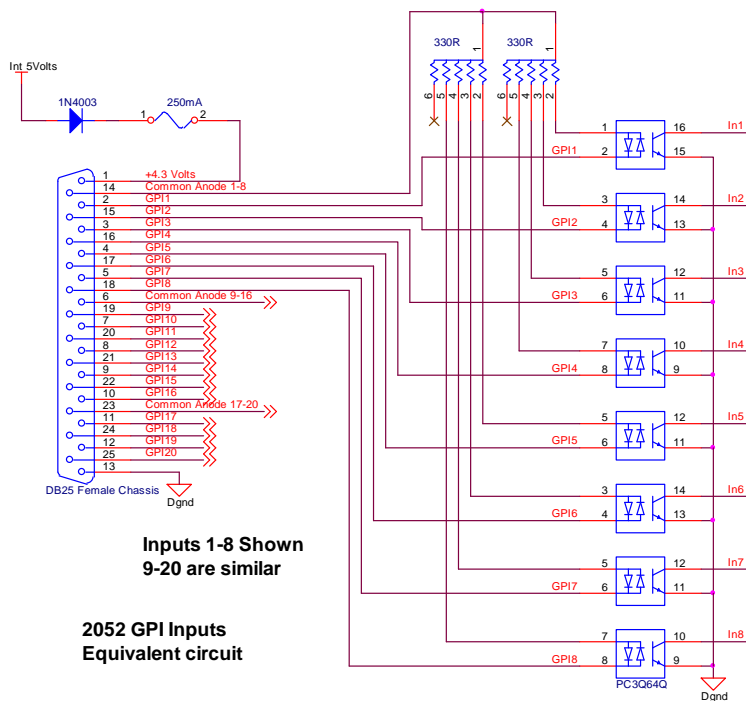
Contrary to the other GPI outputs, they provide 5 volts when activated and floating when not activated.

They should be used to directly drive solid state relays with 5 volts trigger inputs.

- **GPI Inputs (part of 2052 module)**

D25 Female connector pin assignment

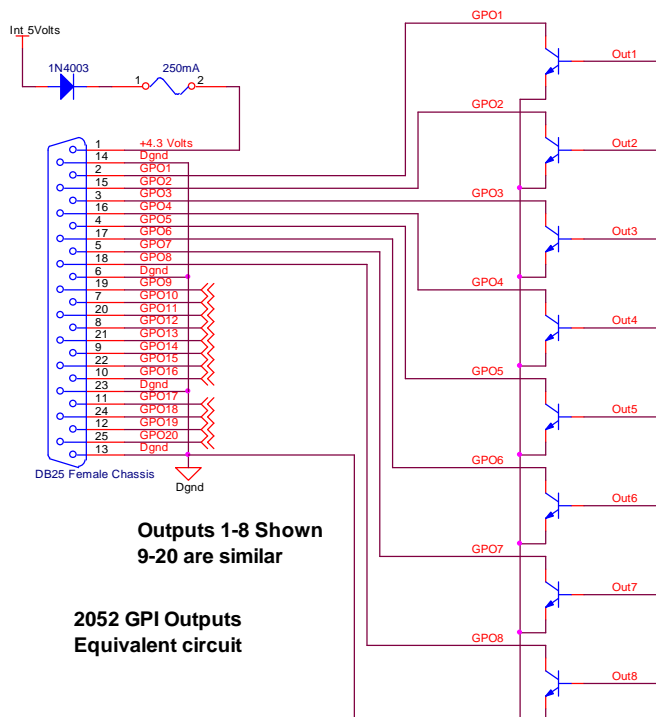
PIN #	Description	NOTES	NOTES 2
1	Internal 5 Volts	250mA Max fused	DO NOT APPLY POWER HERE
14	Common Anode 1-8		
2	GPI Input 1	Opto coupler Cathode with 330R in series.	Mute 1 Tally / user 1
15	GPI Input 2		Mute 2 Tally / user 2
3	GPI Input 3	"	Mute 3 Tally / user 3
16	GPI Input 4	"	Mute 4 Tally / user 4
4	GPI Input 5	"	Mute 5 Tally / user 5
17	GPI Input 6	"	Mute 6 Tally / user 6
5	GPI Input 7	"	Mute 7 Tally / user 7
18	GPI Input 8	"	Mute 8 Tally / user 8
6	Common Anode 9-16		
19	GPI Input 9	Opto coupler Cathode with 330R in series.	User 9
7	GPI Input 10		User 10
20	GPI Input 11	"	User 11
8	GPI Input 12	"	User 12
21	GPI Input 13	"	User 13
9	GPI Input 14	"	User 14
22	GPI Input 15	"	User 15
10	GPI Input 16	"	User 16
23	Common Anode 17-20		
11	GPI Input 17	Opto coupler Cathode with 330R in series.	User 17
24	GPI Input 18		User 18
12	GPI Input 19	"	User 19
25	GPI Input 20	"	User 20
13	Digital Ground	0 Volt	



- **GPI Outputs (part of 2052 module)**

D25 Female connector pin assignment

PIN #	Description	NOTES	NOTES 2
1	Internal 5 Volts	250mA Max fused	DO NOT APPLY POWER HERE
14	Digital Ground	0 Volt	
2	GPI Output 1	Open Collector 20 mA Max	Mute 1 Command / user 1
15	GPI Output 2	"	Mute 2 Command / user 2
3	GPI Output 3	"	Mute 3 Command / user 3
16	GPI Output 4	"	Mute 4 Command / user 4
4	GPI Output 5	"	Mute 5 Command / user 5
17	GPI Output 6	"	Mute 6 Command / user 6
5	GPI Output 7	"	Mute 7 Command / user 7
18	GPI Output 8	"	Mute 8 Command / user 8
6	Digital Ground	0 Volt	
19	GPI Output 9	Open Collector 20 mA Max	User 9
7	GPI Output 10	"	User 10
20	GPI Output 11	"	User 11
8	GPI Output 12	"	User 12
21	GPI Output 13	"	User 13
9	GPI Output 14	"	User 14
22	GPI Output 15	"	User 15
10	GPI Output 16	"	User 16
23	Digital Ground	0 Volt	
11	GPI Output 17	Open Collector 20 mA Max	User 17
24	GPI Output 18	"	User 18
12	GPI Output 19	"	User 19
25	GPI Output 20	"	User 20
13	Digital Ground	0 Volt	



- **Miscellaneous i.e.: Signalisation / Time code out / Video Sync in.**

D9 Female connector pin assignment

PIN #	Description	NOTES
1	Digital Ground	
6	Red Light OUT	5 Volts (100mA max) when active, floating when not active.
2	Green Light OUT	"
7	Flick Light OUT	"
3	User Light OUT	
8	Analog Ground	
4	Time Code Output (+)	Not Implemented
9	Time Code output (-)	Not Implemented
5	Analog Ground	

- **Serial 1. (RS422 for display)**

D9 Female connector pin assignment

PIN #	Description	NOTES
1	Digital Ground	
6	Digital Ground	
2	RXB	RS 485
7	RXA	
3	TXA	
8	TXB	
4	Digital + 24 Volts	Fused (300mA)
9	Digital + 24 Volts	Parallel to above
5	No Connection	

- **Serial 2. (RS 422) (Same UART (data) as Midi)**

D9 Female connector pin assignment

PIN #	Description	NOTES
1	Digital Ground	
6	Digital Ground	
2	RXB	RS 422
7	RXA	
3	TXA	
8	TXB	
4	Digital Ground	
9	Digital Ground	
5	No Connection	

Note: 422 / Midi selection is made via solder jumpers on the main 2052 PCB.

- **GPO aux (GPO17 through 20)**

D9 Female connector pin assignment

<i>PIN #</i>	<i>Description</i>	<i>NOTES</i>
1	Digital Ground	
6	GPO 17 Contact A	500mA @ 30 VDC
2	GPO 17 Contact B	
7	GPO 18 Contact A	
3	GPO 18 Contact B	
8	GPO 19 Contact A	
4	GPO 19 Contact B	
9	GPO 20 Contact A	
5	GPO 20 Contact B	

- **T/C IN**

Smpte longitudinal time code input (used for clock & timer.)

¼ Inch Female connector pin assignment

<i>PIN #</i>	<i>Description</i>	<i>NOTES</i>
Tip	LTC Input (+)	Level Min (-20 dBu) Max (+6 dBu)
Ring	LTC Input (-)	
Sleeve	Analog Ground	

- **MIDI IN**

Midi input (used for mute command from console)

Din 5 Female connector pin assignment

<i>PIN #</i>	<i>Description</i>	<i>NOTES</i>
1	No connection	
2	No connection	
3	No connection	
4	Midi Input +	
5	Midi Input -	

- **MIDI OUT**

Midi output (used to mute console channels)

Din 5 Female connector pin assignment

<i>PIN #</i>	<i>Description</i>	<i>NOTES</i>
1	No connection	
2	Ground (Frame)	
3	No connection	
4	Midi Output +	
5	Midi Output -	

Located on the 2050 PSU Module

- **Display 1 & 2 (transmit only)**

2 x D9 Female connectors pin assignment

Note that those D9 transmit the same data as the Serial 1 port. They have distinct drivers

Display (1)

<i>PIN #</i>	<i>Description</i>	<i>NOTES</i>
1	Digital Ground	
6	Digital Ground	
2	No Connection	
7	No Connection	
3	TXA	RS 485
8	TXB	
4	Digital + 24 Volts	Fused (750mA)
9	Digital + 24 Volts	Parallel to above
5	No Connection	

Display (2)

<i>PIN #</i>	<i>Description</i>	<i>NOTES</i>
1	Digital Ground	
6	Digital Ground	
2	No Connection	
7	No Connection	
3	TXA	RS 485
8	TXB	
4	Digital + 24 Volts	Fused (750Ma)
9	Digital + 24 Volts	Parallel to above
5	No Connection	

Located on the 2050 front panel

- **RS 232. (Used for configuration)**

D9 Female connector pin assignment

<i>PIN #</i>	<i>Description</i>	<i>NOTES</i>
1	No connection	
6	No connection	
2	TX	
7	CTS	
3	RX	
8	RTS	
4	No connection	
9	No connection	
5	Digital Ground	

- **2053 Turret Card**

Could be fitted in any slot from 21 to 77

Turret connection, D25 Female connector pin assignment

PIN #	Description	NOTES	NOTES 2 Wiring with multi pairs cable (8)
1	+ 15 Volts Analog		Pair 8 (+)
14	- 15 Volts Analog		Pair 8 (-)
2	Analog Ground		Pair 8 Shield
15	TB Microphone Input (+)	Line Level	Pair 7 (+)
3	TB Microphone Input (-)	Line Level	Pair 7 (-)
16	Analog Ground		Pair 7 Shield
4	Headphone Left		Pair 6 (+)
17	Headphone Right		Pair 6 (-)
5	Headphone Ground		Pair 6 Shield
18	Speaker drive		Pair 5 (+)
6	Speaker Ground		Pair 5 (-)
19	Chassis Ground		Pair 5 Shield
7	Second headphone Left (Option)		Pair 4 (+)
20	Second headphone Right (Option)		Pair 4 (-)
8	Second headphone Ground (Option)		Pair 4 Shield
21	Digital + 24 Volts		Pair 3 (+)
9	Digital + 24 Volts		Pair 3 (-)
22	Digital Ground		Pair 3 Shield
10	Frame RXA, Turret TXA	485 comm.	Pair 2 (+)
23	Frame RXB, Turret TXB		Pair 2 (-)
11	Digital Ground		Pair 2 Shield
24	Frame TXA, Turret RXA		Pair 1 (+)
12	Frame TXB, Turret RXB		Pair 1 (-)
25	Digital Ground		Pair 1 Shield
13	Chassis Ground		

Note: Analog ground, Chassis ground and digital ground **must be isolated** from each other.

Chassis Ground "Pin 19" Must be connected on each end in all circumstance!

Aux I/O connection, D9 Female connector pin assignment

PIN #	Description	NOTES
1	Aux input / Ext Call input (+)	
6	Aux input / Ext Call input (-)	
2	Analog Ground	
7	Aux output / Ext Call output (+)	
3	Aux output / Ext Call output (-)	
8	Analog Ground	
4	GPO	Open Collector 100mA Max
9	GPI	Opto cathode, Anode internal to 5Volts via 330R
5	Digital Ground	

Note 1: Analog ground and digital ground **must be isolated** from each other.

Note 2: The GPO will automatically follow the activation of a slate or external call. The GPI can be programmed with function(s) like a turret switch.

- **2053 card (Turret audio Amplifier & routing)**

For each turret, a 2053 card handles all the turret audio routing and amplification. The connection to the turret is via one DB25 connector. All the audio, power & serial control “RS422/full duplex” is run through an 8 or 9 pair’s cable.

In addition, this 2053 card has one channel of slate or external call possibility with a related GPIO port, all on one DB9 connector.

The GPI input can be programmed like the main GPI inputs. The choice of slate or external call mode like all other programming are made via the configuration program.

The GPI output will activate automatically with a slate or external call.

Slate mode = a signal is feed through a channel and can be slated on and dimmed.

External call mode = the channel input is the signal source of a possible call while the output feed a possible call destination

Note: in external call mode, the channel input doesn’t feed its output.

There is a maximum of 12 2053 card per system (if available free slots permits).

- **2054 Monitor management card**

Could be fitted in any slot from 21 to 77 But Normally in slot 41
D25 Female connector pin assignment

PIN #	Description	NOTES
1	Monitor A Input Left (+)	From Console
14	Monitor A Input Left (-)	
2	Analog Ground	
15	Monitor A Input Right (+)	From Console
3	Monitor A Input Right (-)	
16	Analog Ground	
4	Monitor B Input Left (+)	From Console
17	Monitor B Input Left (-)	
5	Analog Ground	
18	Monitor B Input Right (+)	From Console
6	Monitor B Input Right (-)	
19	Analog Ground	
7	Monitor A Output Left (+)	To Amplifier
20	Monitor A Output Left (-)	
8	Analog Ground	
21	Monitor A Output Right (+)	To Amplifier
9	Monitor A Output Right (-)	
22	Analog Ground	
10	Monitor B Output Left (+)	To Amplifier
23	Monitor B Output Left (-)	
11	Analog Ground	
24	Monitor B Output Right (+)	To Amplifier
12	Monitor B Output Right (-)	
25	Analog Ground	
13	No internal connection	

One 2054 is provided with the base system. It manages studio monitoring for 2 stereo programs. Up to four 2054 can be installed into a frame providing management for 16 speakers. If the studio monitor speaker program is different for the 2050 stereo busses, the card has inputs of its own. For unbalanced amplifier, DO NOT SHORT THE (-) to ground, Use the (+) in reference to Analog ground.

Misc connection, D9 Female connector pin assignment

PIN #	Description	NOTES (Feature not confirmed)
1	Monitor A Mute	Opto cathode, Anode internal to 5Volts via 330R
6	Monitor A Dim	Opto cathode, Anode internal to 5Volts via 330R
2	Digital Ground	
7	Monitor B Mute	Opto cathode, Anode internal to 5Volts via 330R
3	Monitor B Dim	Opto cathode, Anode internal to 5Volts via 330R
8	Digital Ground	
4	Monitor A muted	Open Collector 100mA Max
9	Monitor B Muted	Open Collector 100mA Max
5	Digital Ground	

- **2056 Quad headphones amplifier card (option)**

Could be fitted in any slot from 21 to 77
D25 Female connector pin assignment

<i>PIN #</i>	<i>Description</i>	<i>NOTES</i>
1	Headphone 1 output left	
14	Headphone 1 output right	
2	Headphone 1 output return	
15	Headphone 2 output left	
3	Headphone 2 output right	
16	Headphone 2 output return	
4	Headphone 3 output left	
17	Headphone 3 output right	
5	Headphone 3 output return	
18	Headphone 4 output left	
6	Headphone 4 output right	
19	Headphone 4 output return	
7	Headphone 1 DCA reference Hi	+3V3
20	Headphone 1 DCA control input	Wiper
8	Headphone 1 DCA reference Low	Dgnd
21	Headphone 2 DCA reference Hi	
9	Headphone 2 DCA control input	
22	Headphone 2 DCA reference Low	
10	Headphone 3 DCA reference Hi	
23	Headphone 3 DCA control input	
11	Headphone 3 DCA reference Low	
24	Headphone 4 DCA reference Hi	
12	Headphone 4 DCA control input	
25	Headphone 4 DCA reference Low	
13	No internal connection	

This optional card provides 4 additional headphone outputs, those outputs are usually connected to HD1 headphone boxes, with their individual level control.
The output can be fed by any of the 4 program busses.
They can also be called individually.

Misc connection, D9 Female connector pin assignment

The presence on this connector is only to get physical support to the PCB

<i>PIN #</i>	<i>Description</i>	<i>NOTES</i>
1	No internal connection	
6	No internal connection	
2	Dgnd	
7	No internal connection	
3	No internal connection	
8	Dgnd	
4	No internal connection	
9	No internal connection	
5	Dgnd	

- **2057 Quad Slate card (option)**

Could be fitted in any slot from 21 to 77
D25 Female connector pin assignment

<i>PIN #</i>	<i>Description</i>	<i>NOTES</i>
1	Slate input 1 (+)	
14	Slate input 1 (-)	
2	Analog Ground	
15	Slate input 2 (+)	
3	Slate input 2 (-)	
16	Analog Ground	
4	Slate input 3 (+)	
17	Slate input 3 (-)	
5	Analog Ground	
18	Slate input 4 (+)	
6	Slate input 4 (-)	
19	Analog Ground	
7	Slate output 1 (+)	
20	Slate output 1 (-)	
8	Analog Ground	
21	Slate output 2 (+)	
9	Slate output 2 (-)	
22	Analog Ground	
10	Slate output 3 (+)	
23	Slate output 3 (-)	
11	Analog Ground	
24	Slate output 4 (+)	
12	Slate output 4 (-)	
25	Analog Ground	
13	Chassis Ground	

This optional card provides 4 additional channels of slates/external calls. Each channel can be configured as slate or external call.

Up to four 2057 card can be fitted in the 2050 frame (if available free slots permits).

For unbalanced destination, DO NOT SHORT THE (-) to ground.

Use the (+) in reference to Analog ground.

Misc connection, D9 Female connector pin assignment

<i>PIN #</i>	<i>Description</i>	<i>NOTES (Feature not confirmed)</i>
1	GPI 1 (Not functional)	Opto cathode, Anode internal to 5Volts via 330R
6	GPI 2 (Not functional)	Opto cathode, Anode internal to 5Volts via 330R
2	GPO 1	Open Collector 100mA Max, Attached to slate 1
7	GPI 3 (Not functional)	Opto cathode, Anode internal to 5Volts via 330R
3	GPI 4 (Not functional)	Opto cathode, Anode internal to 5Volts via 330R
8	GPO 2	Open Collector 100mA Max, Attached to slate 2
4	GPO 3	Open Collector 100mA Max, Attached to slate 3
9	GPO 4	Open Collector 100mA Max, Attached to slate 4
5	Dgnd	

Appendix A

Frame Power consumption

Been modular, the 2050 system power consumption would have to be evaluate case by case.

So let's have the worst case scenario

The 2050 system is powered by 2 x 150 watts Power supply.

Worst Case scenarios

First PSU is a 150 W unit rated at a minimum of 80 % efficiency = 190 watts (Let say 200 Watts)
(Note peak Inrush 40A)

Model # REL-150-1006 by Integrated power design
(<http://www.ipdpower.com/home/>)

Second PSU is a 150 W unit rated at a minimum of 68 % efficiency = 220 watts (let say 225 Watts)
(Note peak Inrush 30A)

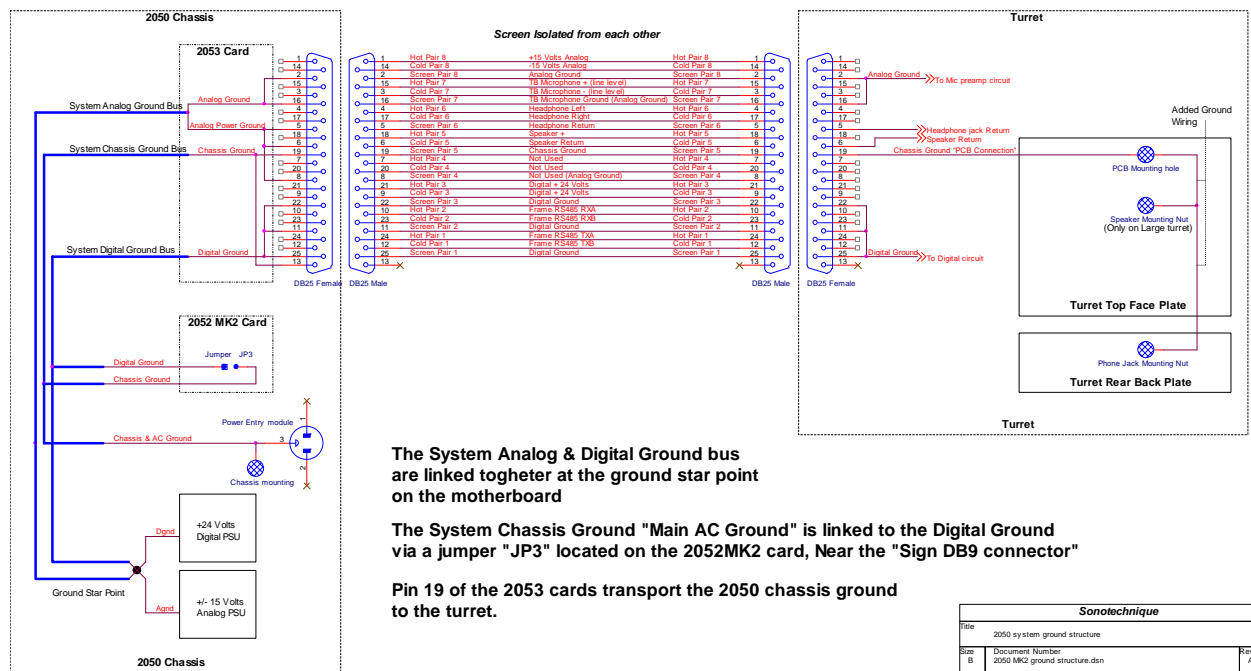
Model # CE-150-2002 by Integrated power design

For a total of 425 Watts Max

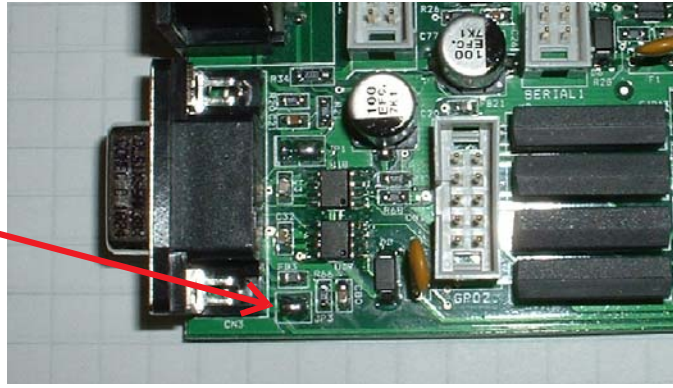
Note that the frame is fused @ 5 Amps

System Ground Structure

2050 system ground structure

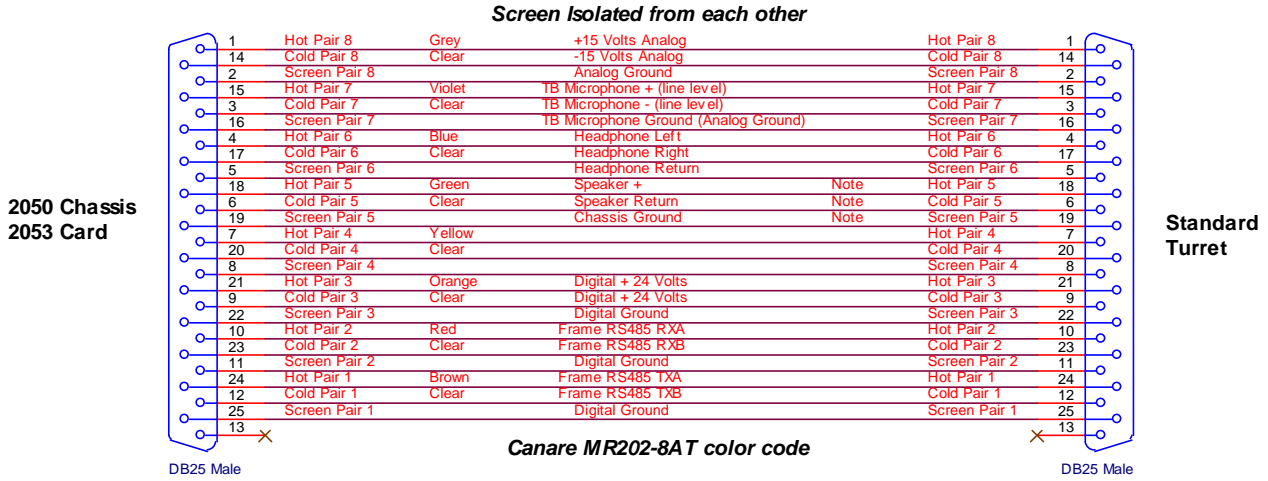


Ground Link
JP3
Located on
2052MK2 card

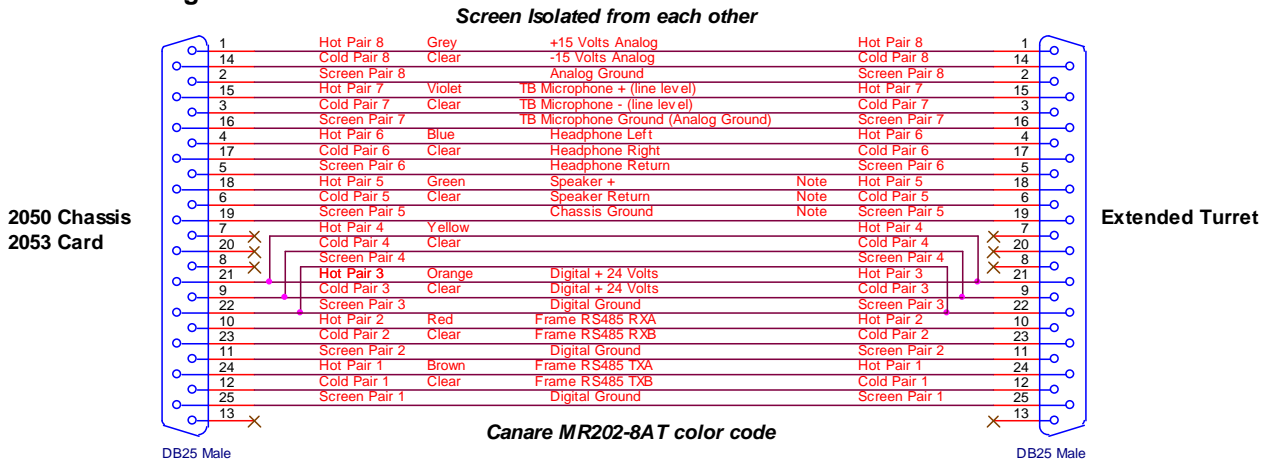


Appendix B

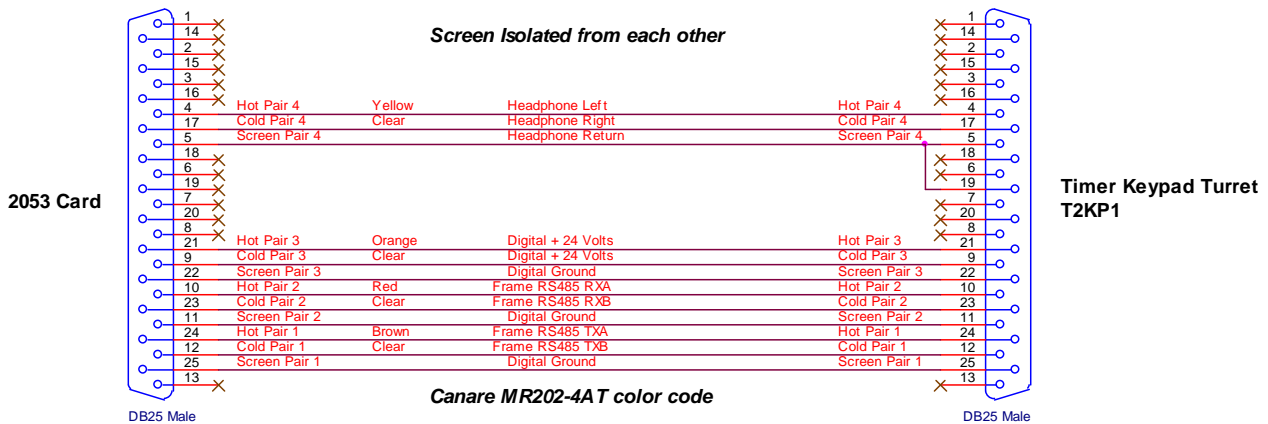
Standard Turret Cable



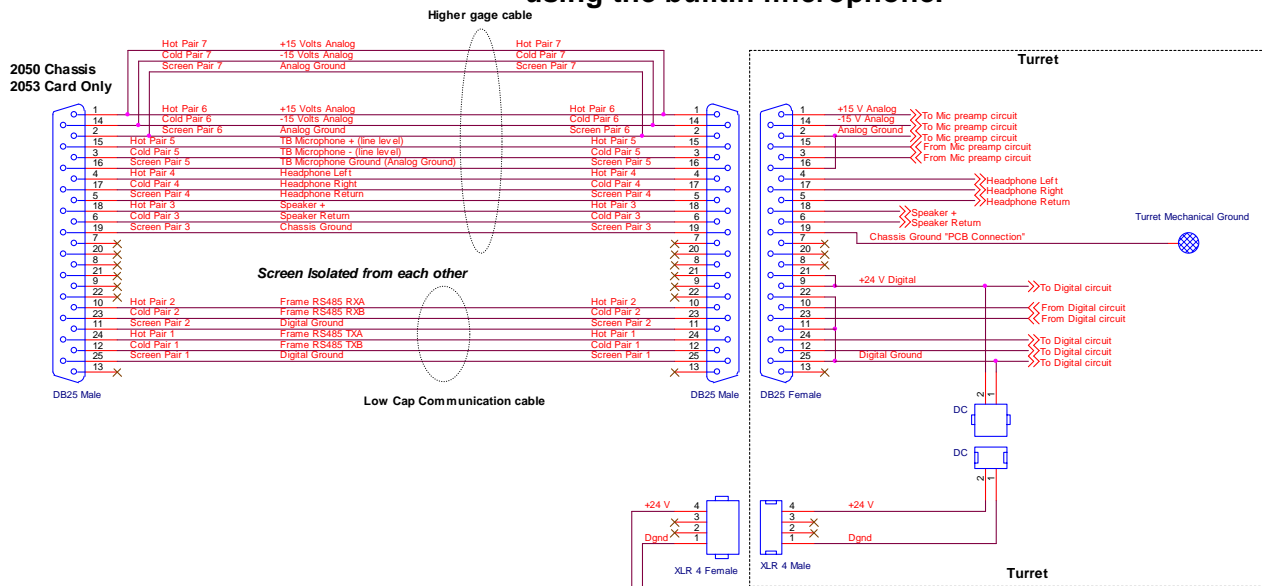
Extended Length Turret Cable



Timer Keypad Turret Cable (T2KP1)

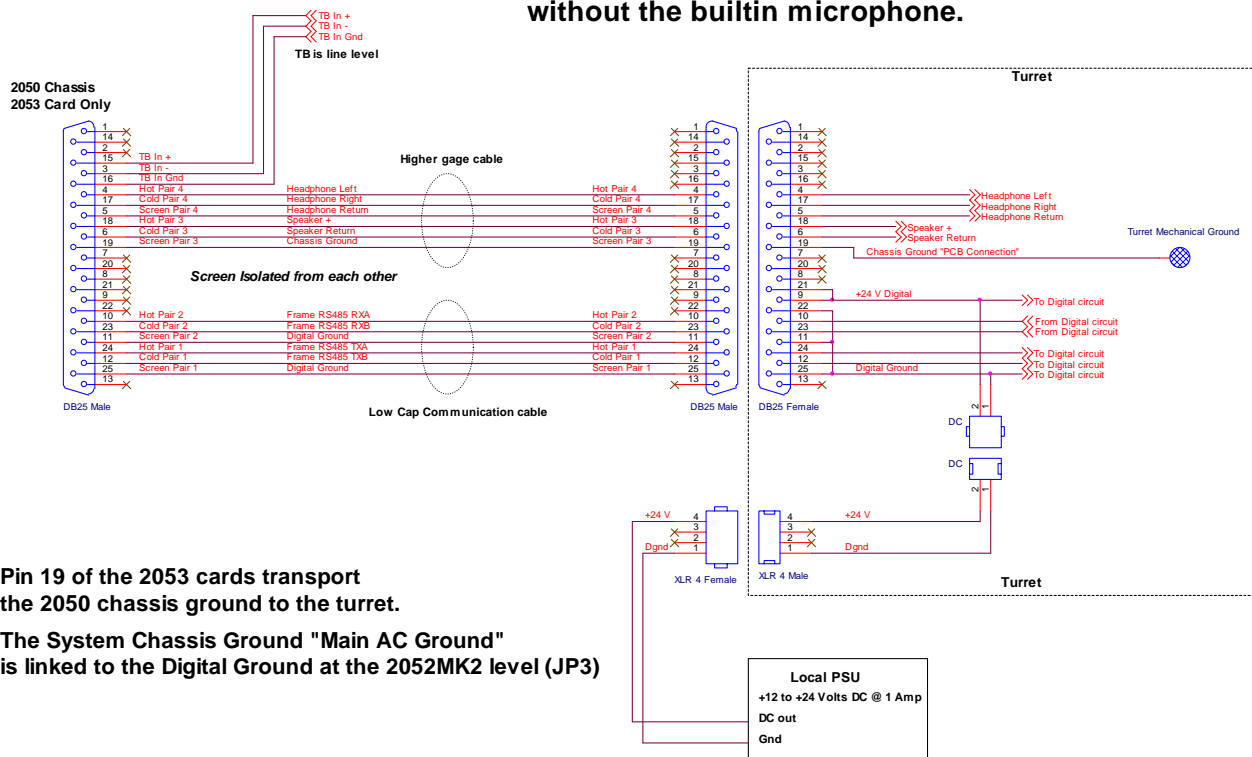


Very Extended Length Turret Cable with Built in TB microphone 2050 system long distance cabling using the builtin microphone.



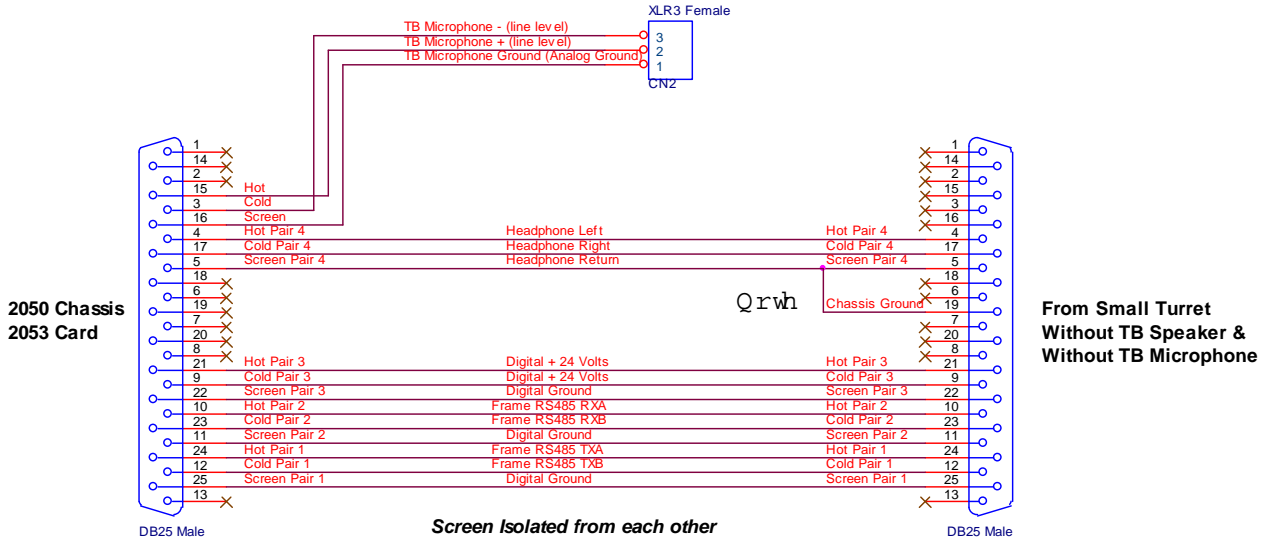
Pin 19 of the 2053 cards transport the 2050 chassis ground to the turret.
The System Chassis Ground "Main AC Ground" is linked to the Digital Ground at the 2052MK2 level (JP3)

Very Extended Length Turret Cable without Built in TB microphone 2050 system long distance cabling without the builtin microphone.

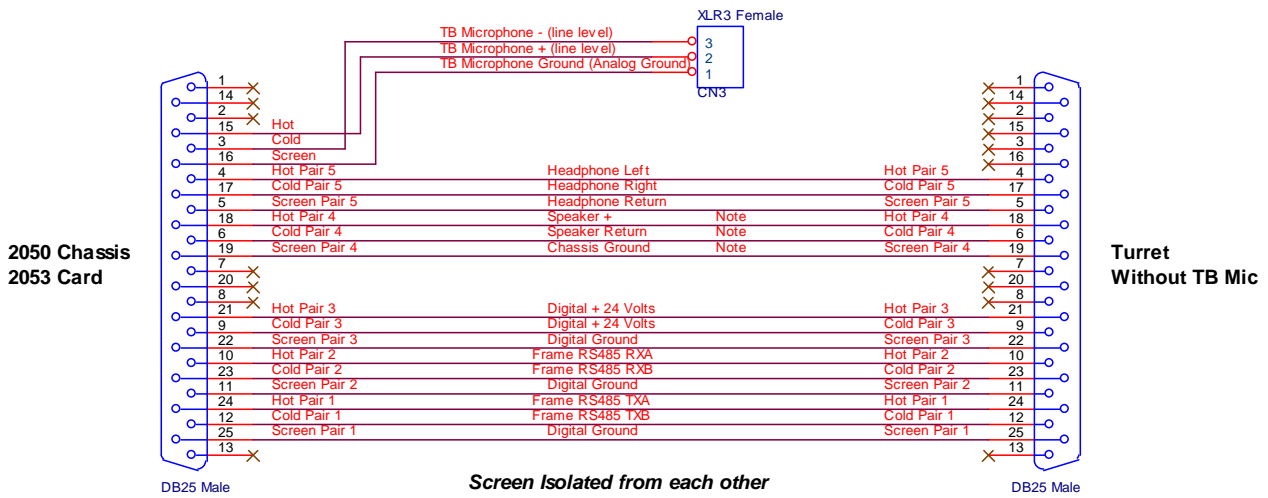


Pin 19 of the 2053 cards transport the 2050 chassis ground to the turret.
The System Chassis Ground "Main AC Ground" is linked to the Digital Ground at the 2052MK2 level (JP3)

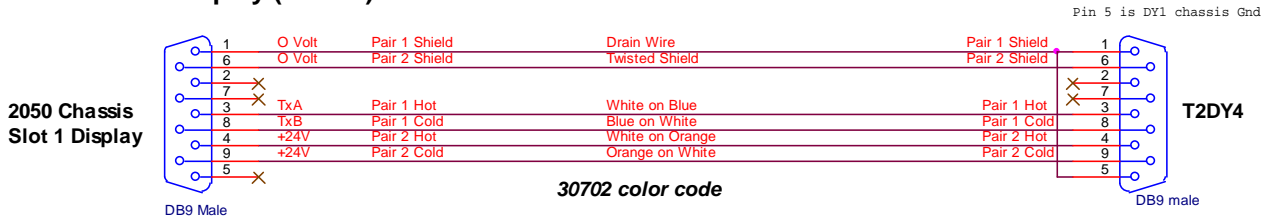
Strict minimum Turret Cable without Built in TB microphone & Speaker (T2SD1/C Turret)



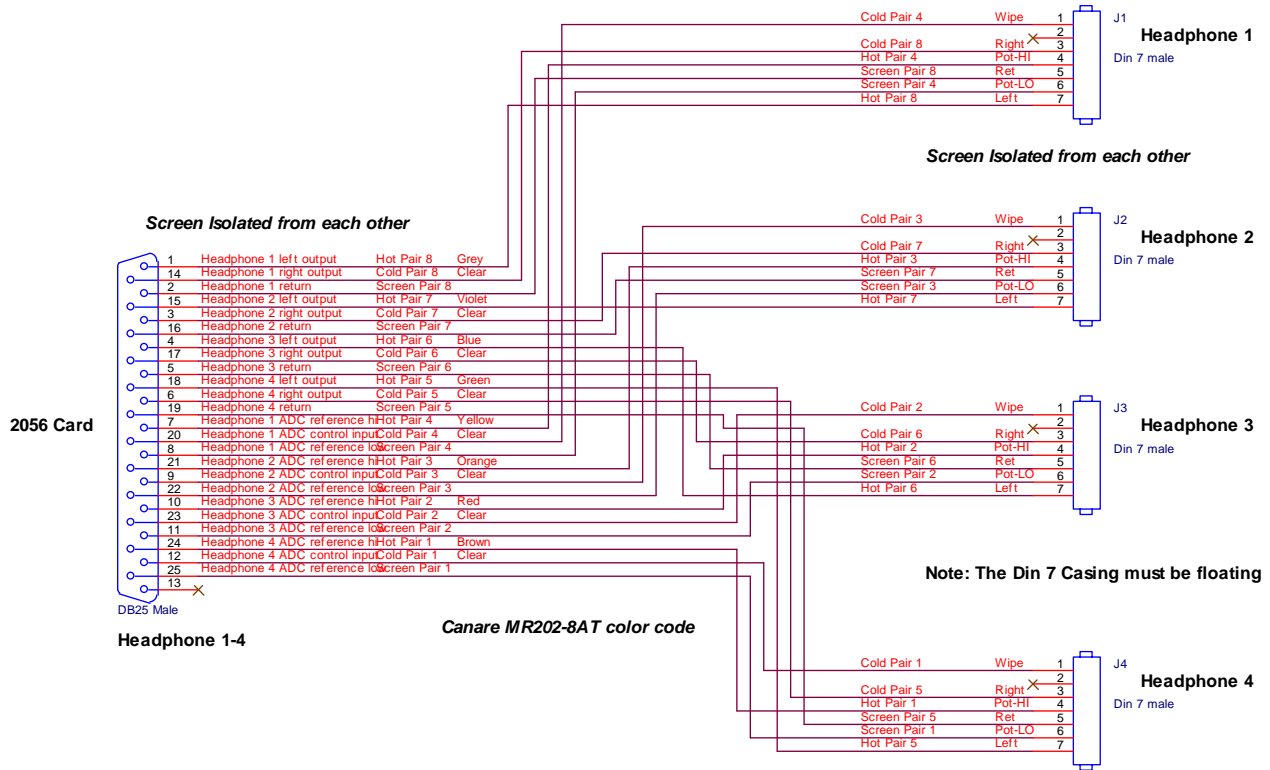
Strict minimum Turret Cable without Built in TB microphone



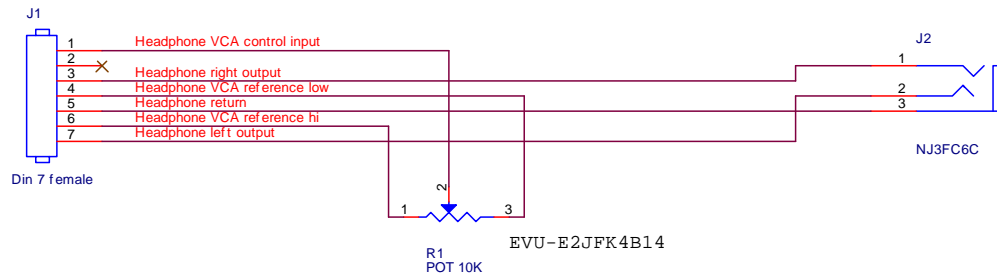
Stand Alone Display (T2DY4)



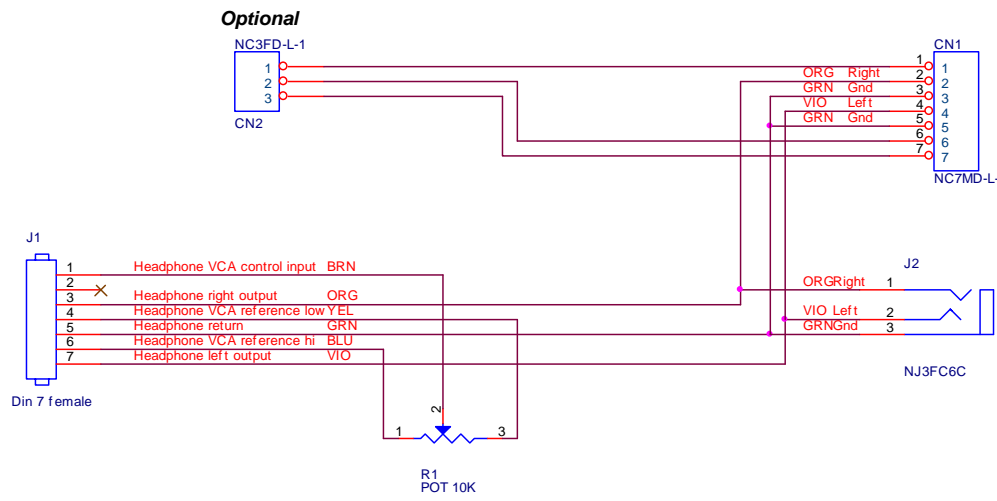
Headphone amp Card (2056) to HD1 or HD2 wiring



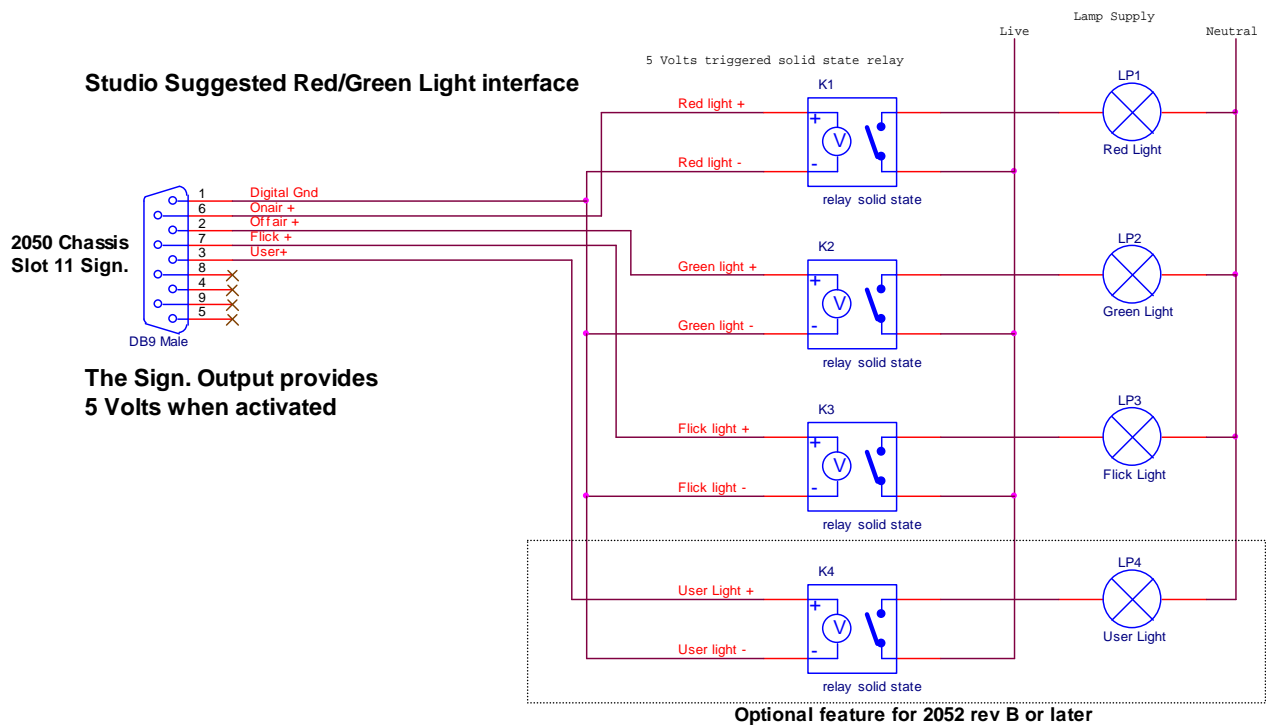
HD1 Internal wiring (for reference).



HD2 Internal wiring (for reference).



Signalisation wiring.



Midi Control

