

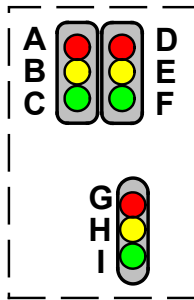
iMS4-P (revC) Connection and LED Summary

- **iMS4- LED indicators**

All LEDs on the iMS4-P will illuminate during initialization.

The boot sequence includes read flash, initialize peripherals, DHCP request for Ethernet (timeout after ~10sec if not connected and revert to static IP). Power up USB controller

After this period, the upper red LED's will remain illuminated and two green LED's will beat at ~1Hz rate



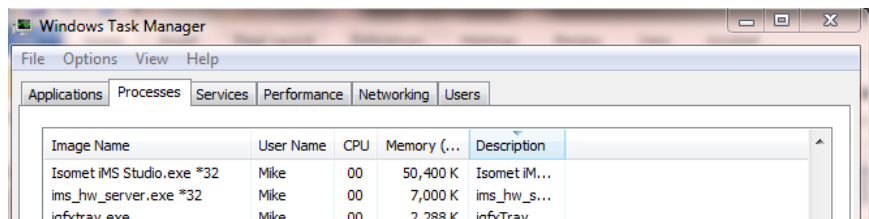
- **Communication**

It is recommended that USB or Ethernet lead is connected to the iMS4-P-T (-O) prior to power up.

Attempt software communication AFTER initialization is complete.

iMS Library versions 1.4 (and onwards) will allow Ethernet or USB connection using the Isomet GUI or Microsoft Visual Studio software.

If the GUI is not closed correctly, crashes or will not open, then please use Windows Task Manager to delete the *Isomet iMS Studio* and *ims_hw_server* processes.



Restart GUI

Ethernet:

The default static IP address for the iMS4 is 192.168.1.10.

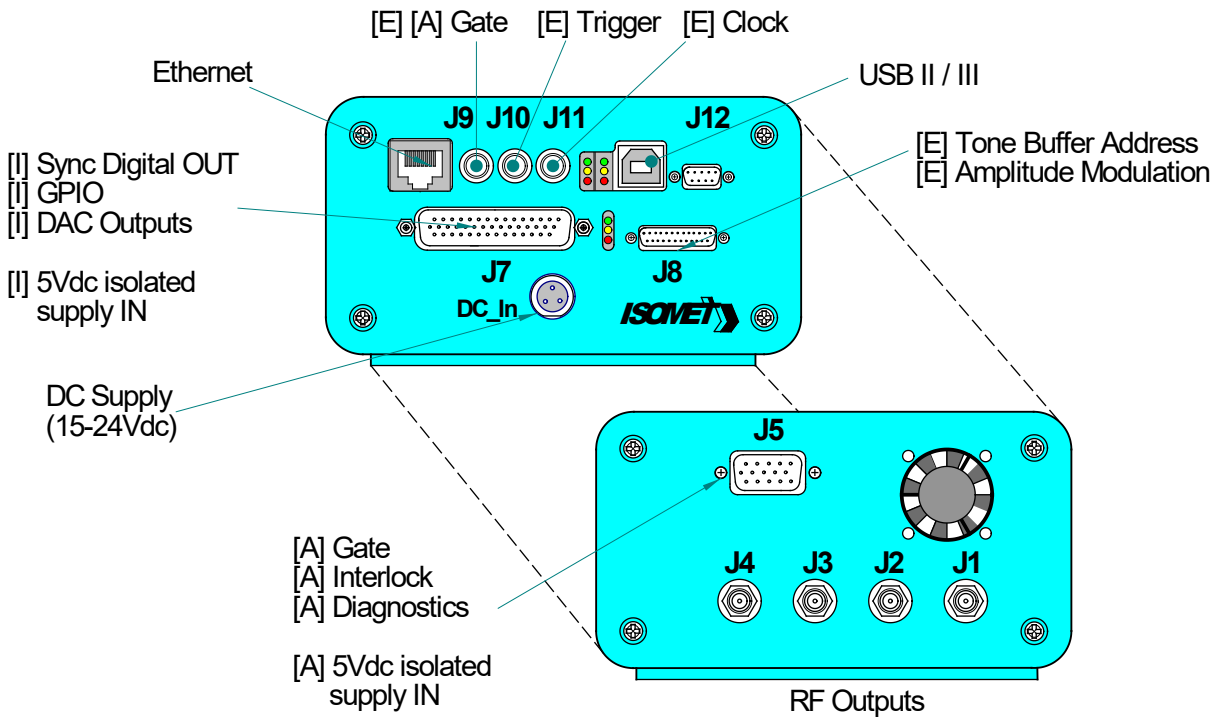
You may need to reassign or disable other Ethernet adaptors to avoid contentions.

- **Software**

Download the latest software, SDK and Guide from the Support page:

https://isomet.com/synth_home.html

• **Connections**



Minimum Connections:

- USB II / III or Ethernet to a host PC.
- DC Supply, 15V / 1A minimum to 24V / 0.5A maximum
- One or more RF outputs, as required.

Recommended channel connections

AOD / Amplifier Channels	iMS Outputs
Single	Any
Dual	J1, J2 or J3, J4
Quad	All, in ascending or descending order

Optional connections are identified as follows:

[E] = hardwired control signals from external signal source(s).
Functionally equivalent software generated control signal are provided in the SDK.

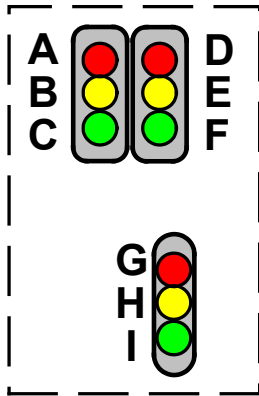
[I] = opto-isolated IO buffered signals requiring an external 5Vdc supply connection to J7 or J8

[A] = external power amplifier connections (see explanation below)

The iMS4-P features external power amplifier diagnostic and control signals. These are available on J5. J5 will require 5V opto-isolator dc feed (5V_RFA) from the connected RF amplifier. An appropriate interface card must exist within the power amplifier.

In detail:

1. LED Indicators.



Top Stack, Controller PCB

Ident	LED	Mode	iMS4-P
A	RED (top left)	If illuminated	Not Downloading File
B	Yellow	If illuminated	Downloading File
C	Green	Pulsing	Controller OK
D	RED (top right)	If illuminated	Image output stopped
E	Yellow	If illuminated	Waiting on Trigger
F	Green	If illuminated	Image playing / output active

Lower stack. Synthesizer PCB

Ident	LED	Mode	Stand Alone iMS4-	In combination with PA J5 connected
G	RED (top)	Constant on	DC power On	Thermal Interlock Open (= fault) or GATE input J9 = low/OFF
H	Yellow	Constant on	NA	PA is enabled. Thermal Interlock OK
I	Green	Pulsing	Synthesizer OK	Synthesizer OK

DC power applied, USB communication problem

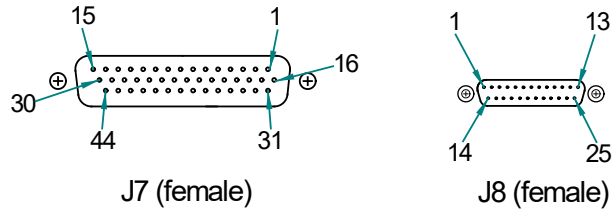
If the 6x LED's (A,B,C,D,E,F) are constantly illuminated, then USB communication has not been established. In this case:

- a: Ensure USB driver is loaded (see section 10)
 - b: Cycle DC power
- and /or
- c: Disconnect then reconnect USB

2. Connector pin-outs.

D-type pin idents looking into connector

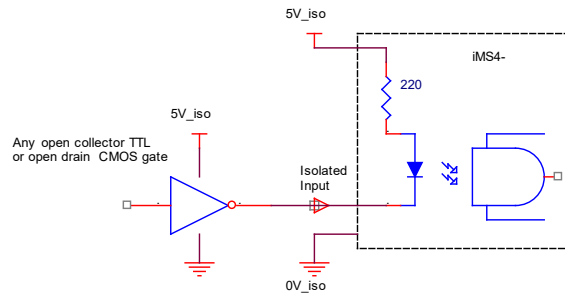
Front panel view



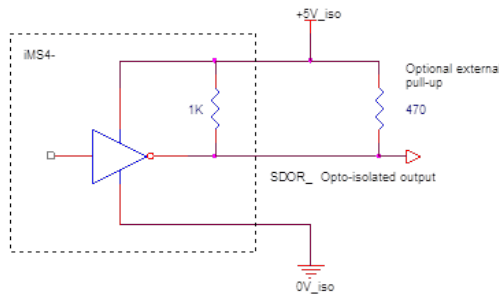
Pin-out descriptions as follows:

Circuit details for opto-isolated inputs / outputs on J7 and J8 connector

Recommended drive circuit for opto-isolated logic inputs



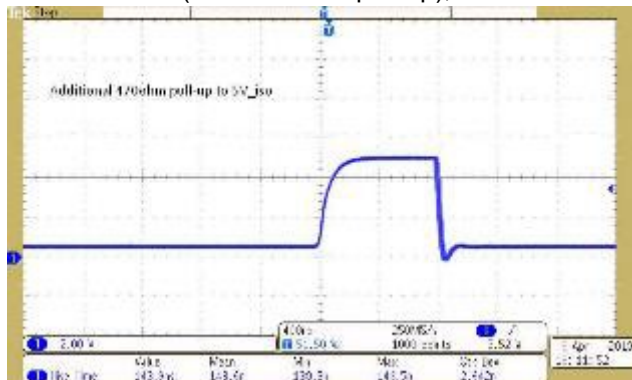
Opto-isolated logic output schematic



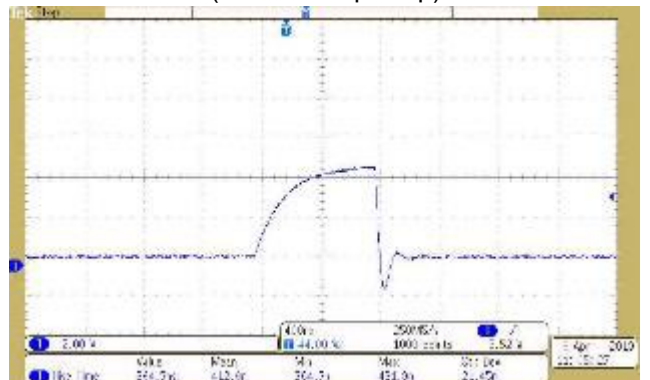
SDOR output trace at 1.2MHz Image clock rate

Default:

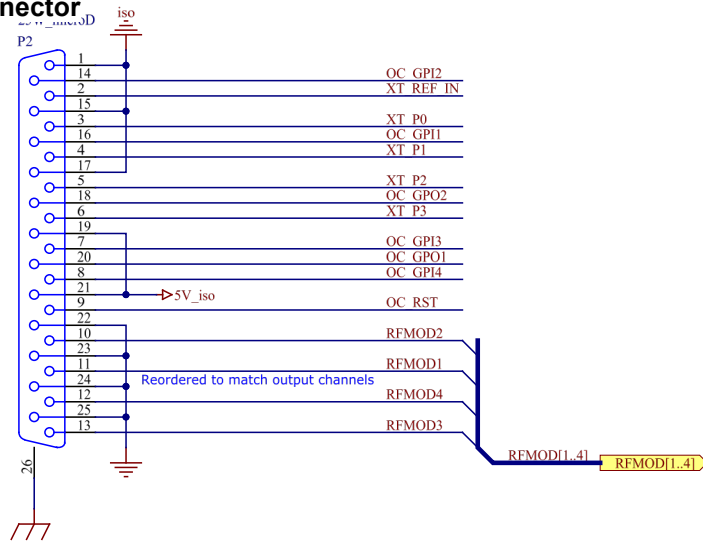
SDIO bits 0..3 (330R internal pull up),



SDIO bits 4..11 (1K internal pull up)



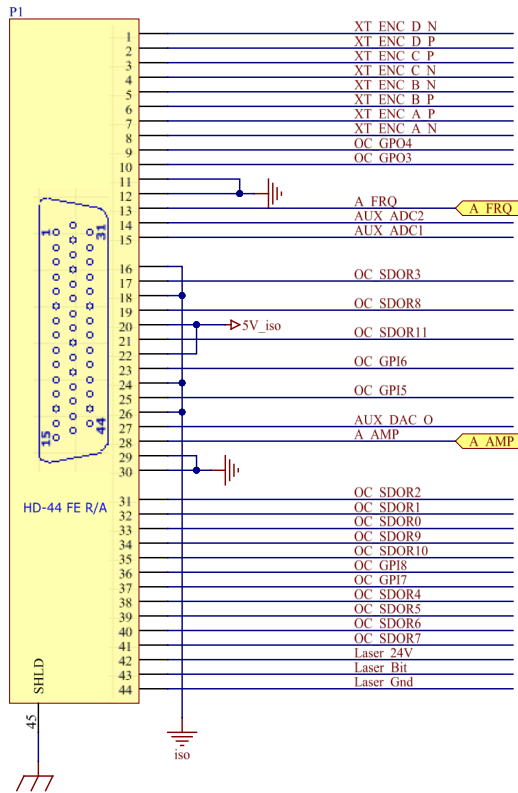
J8, 25way micro-D connector



J8: Main connector for external control signals (Micro-D to full size D-type converter cable available).

Connector	Type Ident	25way micro-D J8			
Signal Designation	Signal	Type	Description	Alternate use	Pin
RFmod4	In	Analog, 0-10V	External amplitude control for RF4		12
A_Rtn		Analog	Analog return		24
RFmod3	In	Analog, 0-10V	External amplitude control for RF3		13
A_Rtn		Analog	Analog return		25
RFmod2	In	Analog, 0-10V	External amplitude control for RF2		10
A_Rtn		Analog	Analog return		22
RFmod1	In	Analog, 0-10V	External amplitude control for RF1		11
A_Rtn		Analog	Analog return		23
RST	In	Opto isolated logic	Reset		9
REF_IN	In	Opto isolated logic	Reference Frequency (Optional)		2
GP I1	In	Opto isolated logic	Async general purpose input	LTB location/address, bit4	16
GP I2	In	Opto isolated logic	Async general purpose input	LTB location/address, bit5	14
GP I3	In	Opto isolated logic	Async general purpose input	LTB location/address, bit6	7
GP I4	In	Opto isolated logic	Async general purpose input	LTB location/address, bit7	8
GP O1	Out	Opto isolated logic	Async general purpose output		20
GP O2	Out	Opto isolated logic	Async general purpose output		18
D_Rtn	DC		isolated 0V / signal return input	0V	17
P0	In	Opto isolated logic	Profile select, bit0	LTB location/address, bit0	3
P1	In	Opto isolated logic	Profile select, bit1	LTB location/address, bit1	4
P2	In	Opto isolated logic	Profile select, bit2	LTB location/address, bit2	5
P3	In	Opto isolated logic	Profile select, bit3	LTB location/address, bit3	6
D_Rtn	DC		isolated 0V / signal return input	0V	1
D_Rtn	DC		isolated 0V / signal return input	0V	15
5V_iso	DC		Isolated 5V DC supply input	5V output, 10mA	19
5V_iso	DC		Isolated 5V DC supply input	5V output, 10mA	21
D_Rtn	DC		isolated 0V / signal return input	0V	17
Notes:				Key:	
Type Logic = TTL or 5V CMOS				GP = General Purpose	
Drive inputs with open collector or open drain gate, 16mA sink				LTB = Local Tone Buffer	
Open collector outputs with internal 1Kohm pull-up to 5V_iso					

J7, 44way high density-D connector
 Connection for auxiliary I-O signals



Connector	Type Ident	44way HD-D J7			
Signal Designation	Signal	Type	Description	Alternate use	Pin
SDOR0	Out	Opto isolated logic	Synchronous-Digital Output bit0		33
SDOR1	Out	Opto isolated logic	Sync-Digital Output bit1		32
SDOR2	Out	Opto isolated logic	Sync-Digital Output bit2		31
SDOR3	Out	Opto isolated logic	Sync-Digital Output bit3		17
SDOR4	Out	Opto isolated logic	Sync-Digital Output bit4		38
SDOR5	Out	Opto isolated logic	Sync-Digital Output bit5		39
SDOR6	Out	Opto isolated logic	Sync-Digital Output bit6		40
SDOR7	Out	Opto isolated logic	Sync-Digital Output bit7		41
SDOR8	Out	Opto isolated logic	Sync-Digital Output bit8		19
SDOR9	Out	Opto isolated logic	Sync-Digital Output bit9		34
SDOR10	Out	Opto isolated logic	Sync-Digital Output bit10		35
SDOR11	Out	Opto isolated logic	Sync-Digital Output bit11		21
D_Rtn	Out		isolated 0V / signal return input	0V	26
ENC_D_N	In	5V differential logic	Encoder Input N, Channel D		1
ENC_D_P	In	5V differential logic	Encoder Input P		2
ENC_C_P	In	5V differential logic	Encoder Input P, Channel C		3
ENC_C_N	In	5V differential logic	Encoder Input N		4
ENC_B_N	In	5V differential logic	Encoder Input N, Channel B		5
ENC_B_P	In	5V differential logic	Encoder Input P		6
ENC_A_P	In	5V differential logic	Encoder Input P, Channel A		7
ENC_A_N	In	5V differential logic	Encoder Input N		8
D_Rtn	In	(5V_iso supply required)	isolated 0V / signal return input	0V	16
GP I5	In	Opto isolated logic	Asynchronous GP logic input		25
GP I6	In	Opto isolated logic	Async GP input		23
GP I7	In	Opto isolated logic	Async GP input		37
GP I8	In	Opto isolated logic	Async GP input		36
GP O3	Out	Opto isolated logic	Async GP logic output		9
GP O4	Out	Opto isolated logic	Async GP output		10
D_Rtn	Out		isolated 0V / signal return input		24

AN210723: iMS4 rev-C Connection and LED Summary

24V_laser	In	PLC	Laser Opto-Supply		42
Laser_Bit	Out	PLC	Laser Opto relay bit Tr/Tf < 50usec)		43
Gnd_laser	In	PLC	Laser Opto-Gnd		44
AOUT_Frq	Out	Analog	8-bit analog representation of Image freq		13
AOUT_Amp	Out	Analog	8-bit analog equivalent of Image amplitude		28
A_Rtn	Out	Analog	Analog return		30
AOUT_DAC	Out	Analog	GP 12-bit DAC analog output.		27
A_Rtn	Out	Analog	Analog return		29
Aux_ADC1	In	Analog	GP Analog input to a 12-bit ADC (0 to 10V).		15
A_Rtn	In	Analog	Analog return		11
Aux_ADC2	In	Analog	GP Analog input to a 12-bit ADC (0 to 10V).		14
A_Rtn	In	Analog	Analog return		12
5V_iso	DC		Isolated 5V DC supply input	5V output 10mA	22
5V_iso	DC		Isolated 5V DC supply input	5V output 10mA	20
D_Rtn	DC		isolated 0V / signal return input	0V	18
Notes:				Key:	
Type Logic = TTL or 5V CMOS				GP = General Purpose	
Drive inputs with open collector or open drain gate, 16mA sink					
Open collector outputs with internal 1Kohm pull-up to 5V_iso					

Other Connectors

Connector	Type	see table see table					
<u>Signal Designation</u>	<u>Signal</u>	<u>Type</u>	<u>Description</u>	<u>Alternate use</u>	<u>Connector</u>	<u>Ident</u>	<u>Pin</u>
Communication							
Ethernet	In/Out	Logic	GbE		RJ45		
USB Serial	In/Out	Logic	USB II / USBIII		B-type	-	
RX-P	In	Logic	RS422 receive+		9-way D	J12	2
RX-N	In	Logic	RS422 receive-		9-way D	J12	1
TX-P	Out	Logic	RS422 transmit+		9-way D	J12	7
TX-N	Out	Logic	RS422 transmit-		9-way D	J12	6
Rtn	Gnd		Sig Rtn		9-way D	J12	5
DC Supply							
Vdc	DC	DC-In	Supply 15V -24V dc, <0.4A		3w TINI-Q		1
	0V	DC-In			3w TINI-Q		2
SMA Coax Connections							
Gate	In	Logic	Enable power amplifiers via J5	POF input	SMA coaxial	J9	Centre
Rtn	Gnd		Sig Rtn				Outer
Trigger	In	Logic	Trigger Image Data Output	POF input	SMA coaxial	J10	Centre
Rtn	Gnd		Sig Rtn				Outer
Clock	In	Logic	Clock Image Data	POF input	SMA coaxial	J11	Centre
Rtn	Gnd		Sig Rtn				Outer
Ch0	Analog	RF	RF1 frequency output, 50Ω		SMA coaxial	J1	Centre
Rtn	Gnd		Sig Rtn				Outer
Ch1	Analog	RF	RF2 frequency output, 50Ω		SMA coaxial	J2	Centre
Rtn	Gnd		Sig Rtn				Outer
Ch2	Analog	RF	RF3 frequency output, 50Ω		SMA coaxial	J3	Centre
Rtn	Gnd		Sig Rtn				Outer
Ch3	Analog	RF	RF4 frequency output, 50Ω		SMA coaxial	J4	Centre
Rtn	Gnd		Sig Rtn				Outer
J5 Power Amp Control *							
5V_RFA	In		Opto supply from connected PA	5V, 20mA out	15w-HD D	J5	1
5V_RFA	In		Opto supply from connected PA	5V, 20mA out	15w-HD D	J5	10
0V_RFA	In		Opto 0V from connected PA	0V	15w-HD D	J5	4
0V_RFA	In		Opto 0V from connected PA	0V	15w-HD D	J5	7
SCL_RFA_TX	IO	Opto isolated logic	I2C Clock_TX		15w-HD D	J5	2
SCL_RFA_RX		Opto isolated logic	I2C Clock_RX		15w-HD D	J5	3
SDA_RFA_TY	IO	Opto isolated logic	I2C Data_TY		15w-HD D	J5	5
SDA_RFA_RY		Opto isolated logic	I2C Data_RY		15w-HD D	J6	6
EXT-CONVST	Out	Opto isolated logic	Start ADC conversion		15w-HD D	J5	8
-EXT_GATE	Out	Opto isolated logic	Enable connected amplifier		15w-HD D	J5	9
EXT-BSY	In	Opto isolated logic	ADC conversion busy		15w-HD D	J5	11
EXT-INT_MON	In	Opto isolated logic	Interlocks valid monitor		15w-HD D	J5	12
* Applies only when signals supported by connected PA							