

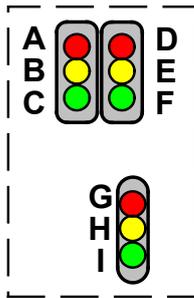
## iMS4-P (revD) Connection and LED Summary

- **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



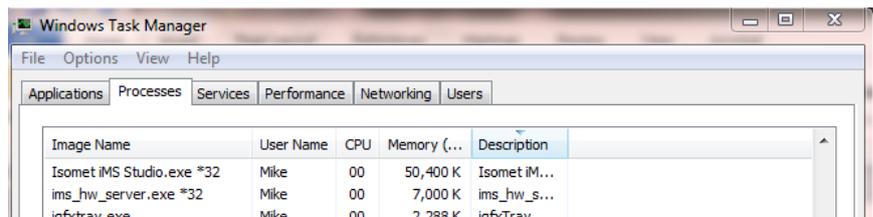
- **Communication**

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.

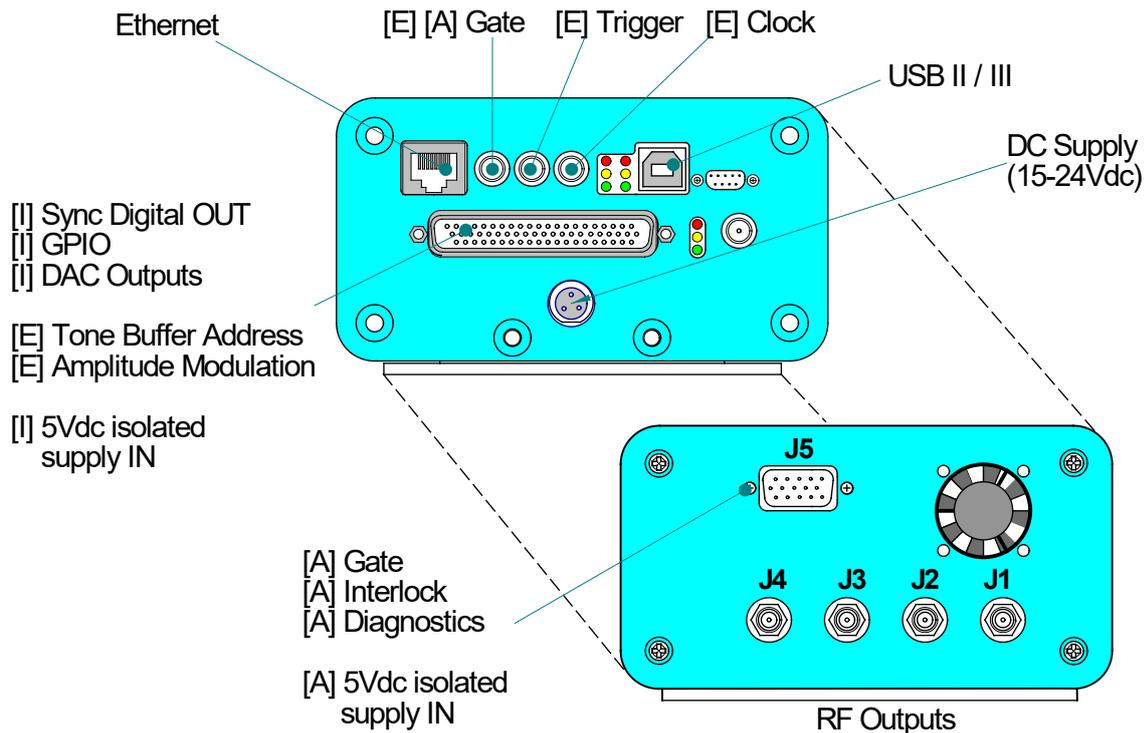
You may need to reassign or disable other Ethernet adaptors to avoid contentions.

- **Software**

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

[https://isomet.com/synth\\_home.html](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).

A functionally equivalent software generated control signal is provided in the SDK.

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

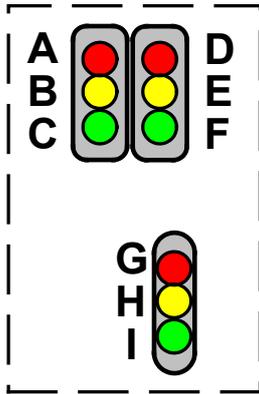
[A] = external power amplifier connections (see explanation below)

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

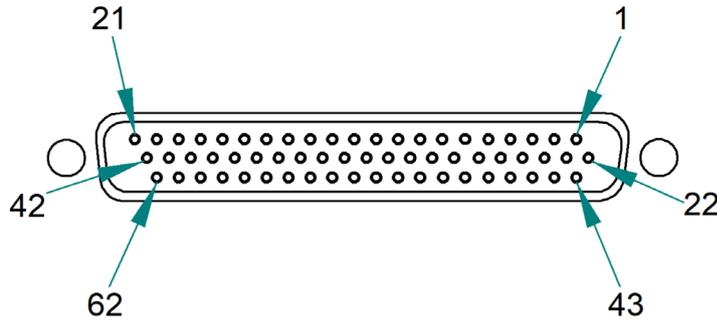
**DC power applied, USB communication problem**

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. J7 connector pin-out.**

D-type pin idents looking into connector of iMS4 revD



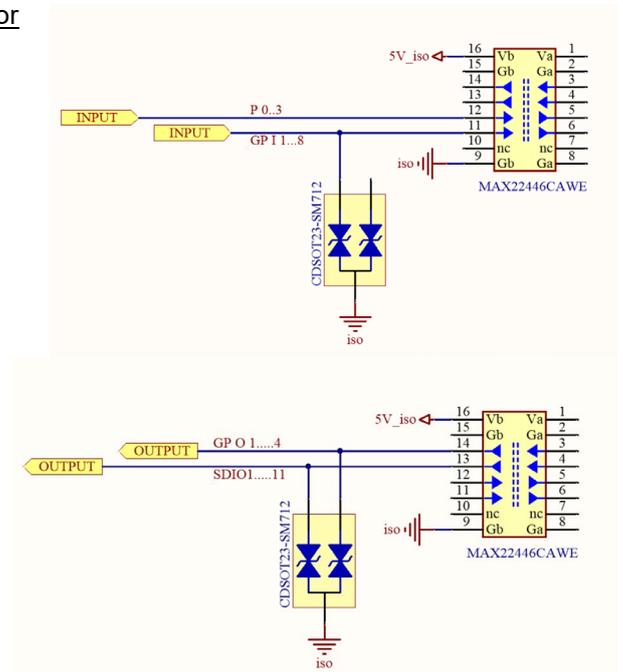
Circuit details for isolated inputs / outputs on J7 connector

**Inputs**

Input high voltage >3.5V  
 Input low voltage <0.8V

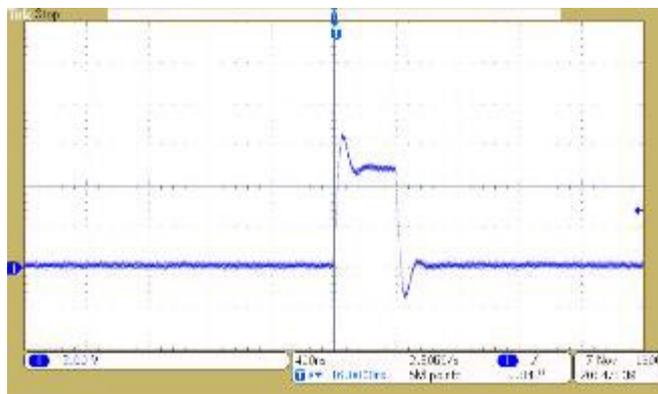
**Outputs**

Output high voltage <4V, -4mA max  
 Output low voltage <0.4V, 4mA max

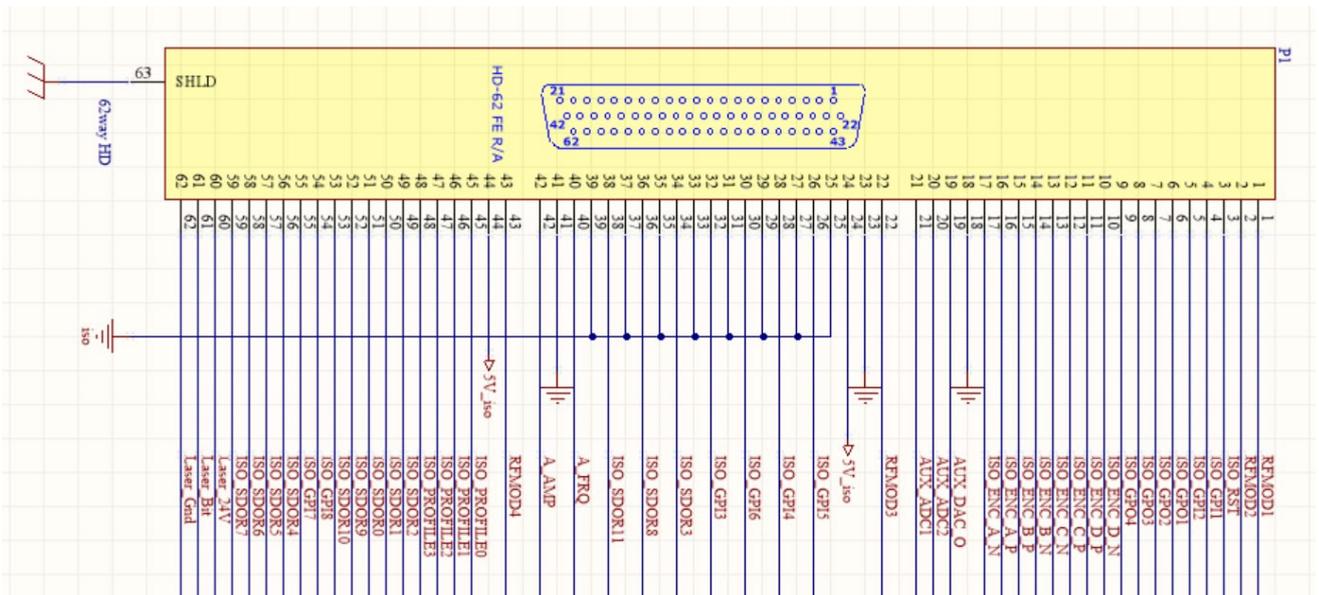


**SDOR output trace at 1.2MHz Image clock rate**

SDIO bits 0..11 are actively driven high. No pull-up resistor required.  
 DO NOT short outputs to 0V or 5V



**J7, 62way high density-D connector**  
 Connection for auxiliary I-O signals



Connector	Type Ident	62way HD-D J7			
Signal Designation	Signal	Type	Description	Alternate use	Pin
RFmod4	In	Analog, 0-10V	External amplitude control for RF4		43
A_Rtn		Analog	Analog return		23
RFmod3	In	Analog, 0-10V	External amplitude control for RF3		22
A_Rtn		Analog	Analog return		(23)
RFmod2	In	Analog, 0-10V	External amplitude control for RF2		2
A_Rtn		Analog	Analog return		(23)
RFmod1	In	Analog, 0-10V	External amplitude control for RF1		1
A_Rtn		Analog	Analog return		(23)
RST	In	isolated logic	Reset		3
D_Rtn	DC		isolated 0V / signal return input	0V	27
GP I1	In	isolated logic	Async general purpose input	LTB location/address, bit4	4
GP I2	In	isolated logic	Async general purpose input	LTB location/address, bit5	5
GP I3	In	isolated logic	Async general purpose input	LTB location/address, bit6	32
GP I4	In	isolated logic	Async general purpose input	LTB location/address, bit7	28
GP I5	In	isolated logic	Async general purpose input		26
GP I6	In	isolated logic	Async general purpose input		30
GP I7	In	isolated logic	Async general purpose input		55
GP I8	In	isolated logic	Async general purpose input		54
D_Rtn	DC		isolated 0V / signal return input	0V	29
P0	In	isolated logic	Profile select, bit0	LTB location/address, bit0	45
P1	In	isolated logic	Profile select, bit1	LTB location/address, bit1	46
P2	In	isolated logic	Profile select, bit2	LTB location/address, bit2	47
P3	In	isolated logic	Profile select, bit3	LTB location/address, bit3	48
D_Rtn	DC		isolated 0V / signal return input	0V	37
D_Rtn	DC		isolated 0V / signal return input	0V	39
5V iso	DC		Isolated 5V DC supply input	5V output, 10mA	44
5V iso	DC		Isolated 5V DC supply input	5V output, 10mA	24
D_Rtn	DC		isolated 0V / signal return input	0V	25
<b>Notes:</b>				<b>Key:</b>	
Type Logic = TTL or 5V CMOS				GP = General Purpose	
Factory option: non-isolated logic				LTB = Local Tone Buffer	
(xx) shared pin				nc = not connected	

AN221125: IMS4 rev-D Connector and LED Summary

Connector	Type Ident	62way HD-D J7	(Continued)		
Signal Designation	Signal	Type	Description	Alternate use	Pin
SDOR0	Out	isolated logic	Synchronous-Digital Output bit0		51
SDOR1	Out	isolated logic	Sync-Digital Output bit1		50
SDOR2	Out	isolated logic	Sync-Digital Output bit2		49
SDOR3	Out	isolated logic	Sync-Digital Output bit3		34
SDOR4	Out	isolated logic	Sync-Digital Output bit4		56
SDOR5	Out	isolated logic	Sync-Digital Output bit5		57
SDOR6	Out	isolated logic	Sync-Digital Output bit6		58
SDOR7	Out	isolated logic	Sync-Digital Output bit7		59
SDOR8	Out	isolated logic	Sync-Digital Output bit8		36
SDOR9	Out	isolated logic	Sync-Digital Output bit9		52
SDOR10	Out	isolated logic	Sync-Digital Output bit10		53
SDOR11	Out	isolated logic	Sync-Digital Output bit11		38
D_Rtn	Out		isolated 0V / signal return input	0V	31
D_Rtn	Out		isolated 0V / signal return input	0V	35
ENC_D_N	In	5V differential logic	Encoder Input N, Channel D		10
ENC_D_P	In	5V differential logic	Encoder Input P		11
ENC_C_P	In	5V differential logic	Encoder Input P, Channel C		12
ENC_C_N	In	5V differential logic	Encoder Input N		13
ENC_B_N	In	5V differential logic	Encoder Input N, Channel B		14
ENC_B_P	In	5V differential logic	Encoder Input P		15
ENC_A_P	In	5V differential logic	Encoder Input P, Channel A		16
ENC_A_N	In	5V differential logic	Encoder Input N		17
D_Rtn	In	(5V_iso supply required)	isolated 0V / signal return input	0V	33
GP_O1	Out	isolated logic	Async general purpose output		6
GP_O2	Out	isolated logic	Async general purpose output		7
GP_O3	Out	isolated logic	Async GP logic output		8
GP_O4	Out	isolated logic	Async GP output		9
D_Rtn	Out		isolated 0V / signal return input		27
24V_laser	In	PLC	Laser Opto-Supply		60
Laser_Bit	Out	PLC	Laser Opto relay bit Tr/Tf < 50usec)		61
Gnd_laser	In	PLC	Laser Opto-Gnd		62
AOUT_Frq	Out	Analog	8-bit analog representation of Image freq		40
AOUT_Amp	Out	Analog	8-bit analog equivalent of Image amplitude		42
A_Rtn	Out	Analog	Analog return		41
AOUT_DAC	Out	Analog	GP 12-bit DAC analog output.		19
A_Rtn	Out	Analog	Analog return		18
Aux_ADC1	In	Analog	GP Analog input. 12-bit ADC (0 to 10V).		21
A_Rtn	In	Analog	Analog return		(18)
Aux_ADC2	In	Analog	GP Analog input. 12-bit ADC (0 to 10V).		20
<b>Notes:</b> Type Logic = TTL or 5V CMOS Factory option: non-isolated logic (xx) shared pin				<b>Key:</b> GP = General Purpose LTB = Local Tone Buffer nc = not connected	

## Other Connectors

Connector	Type Ident	see table see table					
Signal Designation	Signal	Type	Description	Alternate use	Connector	Ident	Pin
<b>Communication</b>							
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
<b>DC Supply</b>							
Vdc	DC	DC-In	Supply 15V -24V dc, <0.4A		3w TINI-Q		1
	0V	DC-In			3w TINI-Q		2
<b>SMA Coax Connections</b>							
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
<b>(Factory fitted option or nc)</b>							
Clock	In	20dBm/50ohm	Reference Clock		SMA coaxial	J8	Centre
Rtn	Gnd		Sig Rtn				Outer
<b>J5 Power Amp Control *</b>							
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	IO	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	IO	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 Power Amplifier							