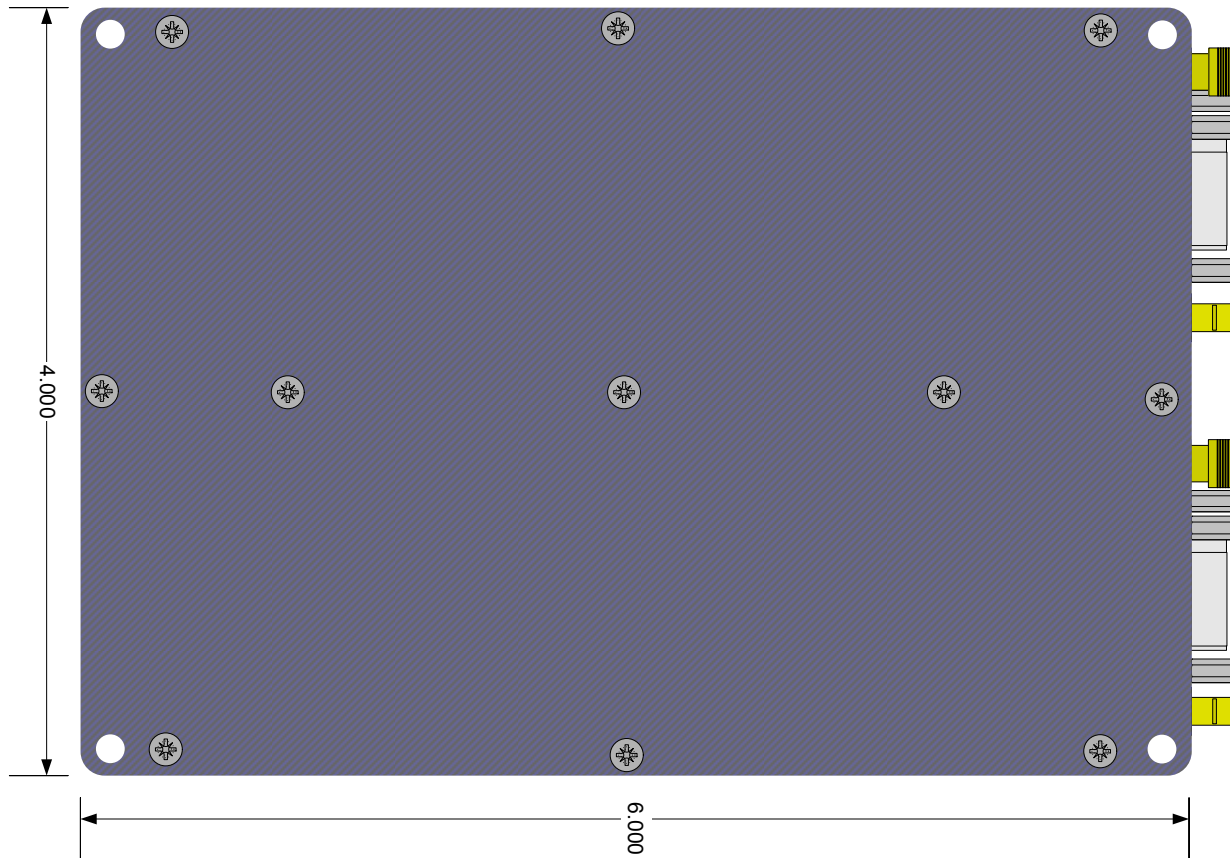


# Top View

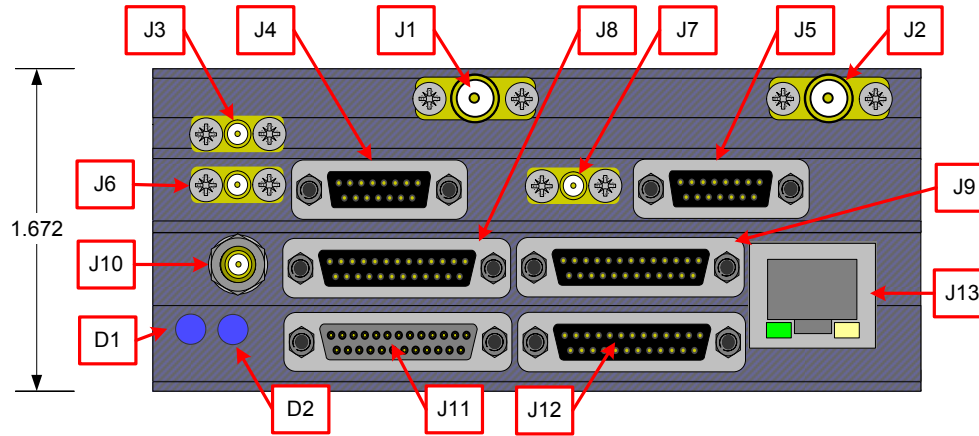


**Notes:**

- 1.) All dimensions shown are in inches.
- 2.) Tolerances are +/- 0.005 inches.

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## Front View



Designator	Style	Signal Description
J1	SMA-F	Channel 1 RF/IF Input
J2	SMA-F	Channel 2 RF/IF Input
J3	SMB-M	10MHz Reference Input/Output
J4	uDSUB15	Channel 1 Analog I/O (AM, AGC, Video, BSync In)
J5	uDSUB15	Channel 2 Analog I/O (AM, AGC, Video, BSync In)
J6	SMB-M	Channel 1 70MHz IF Out Linear/DAGC
J7	SMB-M	Channel 2 70MHz IF Out Linear/DAGC
J8	uDSUB25	Channel 1 Digital I/O
J9	uDSUB25	Channel 2 Digital I/O
J10	SMB-M	IF Modulator Output
J11	uDSUB25	Combiner Digital I/O (Power)
J12	uDSUB25	User Digital I/O
J13	RJ45	Ethernet Control/Status/Data Interface
D1	Multi Color LED	Channel 1 Status LED
D2	Multi Color LED	Channel 2 Status LED

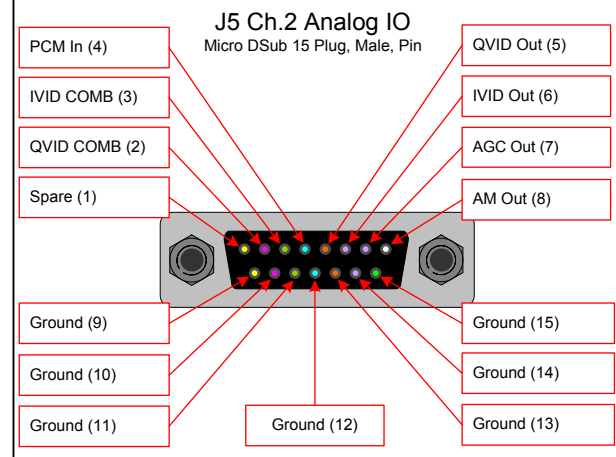
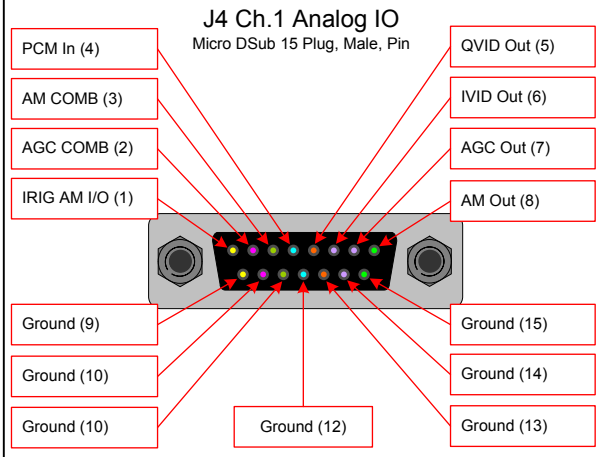
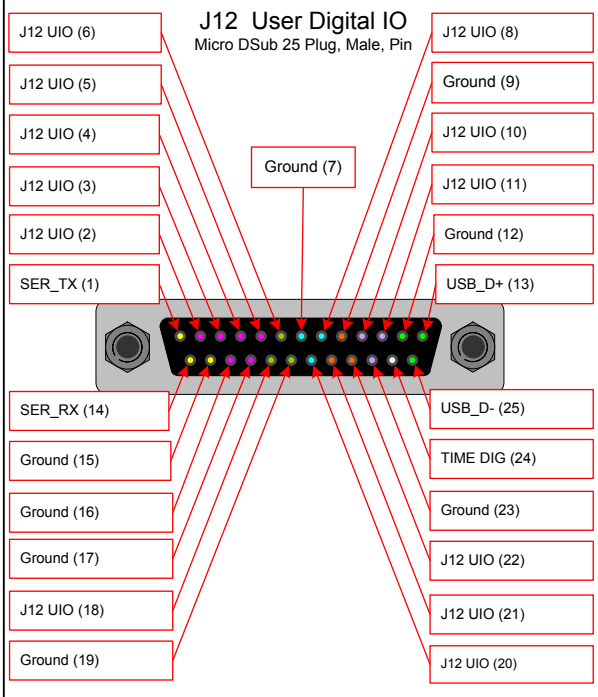
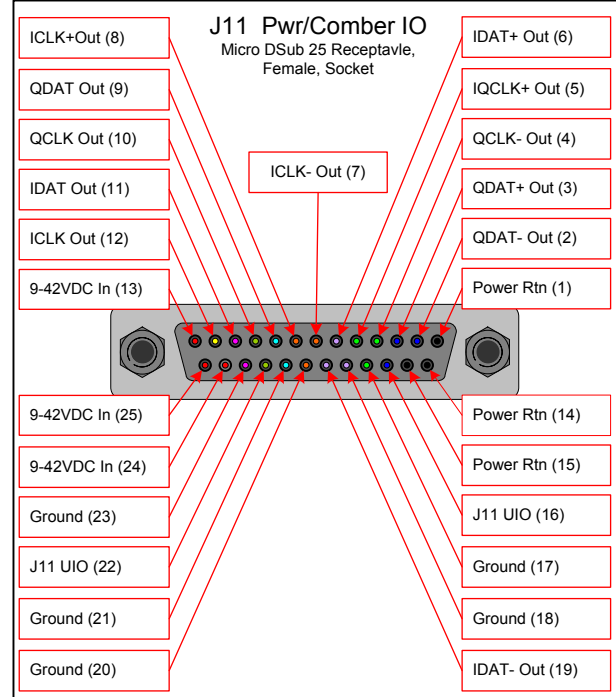
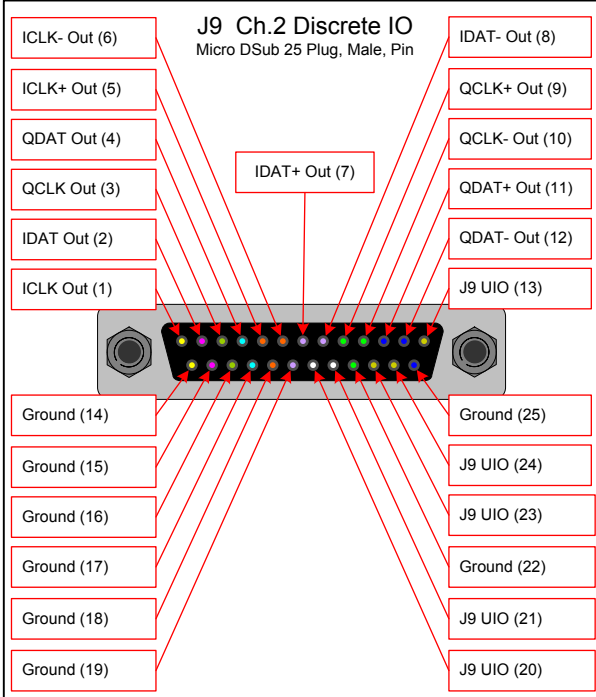
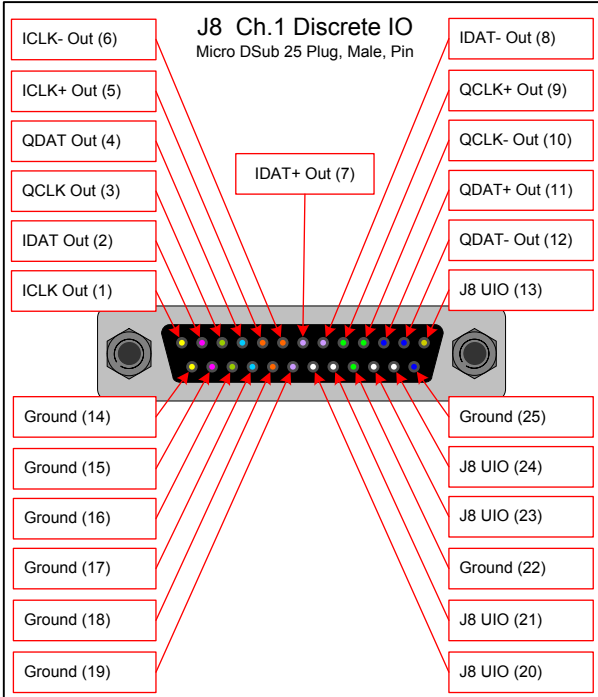
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**Receiver Specifications/Notes:**

1.) RF Bandpass Frequencies (MHz):	215-320, 400-1150, 1435-1540, 1710-1850, 2200-2400, 2185-2485, 4400-4950, 5091-5150, 5091-5250, Custom
2.) RF Bands per channel:	1-5 plus 70MHz, ( <i>1-6 plus 70MHz optional</i> )
3.) RF Tuning Step:	50 kHz steps (typical); as small as 10Hz is possible upon request
4.) Maximum RF Input Signal without damage:	+30 dBm
5.) RF Input P1dB:	+10 dBm
6.) RF Input Dynamic Range:	110dB (nom.) 120dB (max.)
7.) Receiver AGC range:	+4V to -4V, unipolar and bipolar user selectable, positive and negative slope user selectable; 12 user selectable ranges
8.) VSWR:	1.5:1 typical
9.) Frequency Accuracy:	0.002 ppm (internal)
10.) Noise Figure:	<4 dB typical, 6dB maximum
11.) RF Input Impedance:	50 ohms
12.) IF Outputs Ch1 and Ch2:	Linear, Limited, DAGC controlled; 50 Ohms
13.) 70MHz Test Modulator Output:	Can provide 70MHz combined output in limited mode; can be used to modulate internal or external PCM data; adjustable output level and noise level
14.) IF Adjacent Channel Rejection Filters (3dB BW):	Up to 8 Bandwidths; Std = 250K, 500K, 1M, 2M, 5M, 10M, 20M, 40M; Custom
15.) Digital Data Demodulation modes:	Linear PM, MS-PCMFm (Tier 0), BPSK, QPSK, OQPSK, SQPSK, SOQPSK (Tier 1), AUQPSK, AQPSK, MultiH CPM (Tier 2), PM w BPSK/QPSK subcarriers
16.) Analog Demodulation modes:	AM, Single Symbol PCMFm, FM Video w/wo de-emphasis
17.) Analog FM Demodulator bandwidth:	14MHz
18.) FM Video De-emphasis modes:	NTSC, PAL, bypass
19.) Analog AM Demodulator bandwidth:	32 User selectable; Ranges from 50Hz to 50kHz
20.) AM Output:	2Vp-p @ 50% AM Index; User Adjustable; 50 ohms
21.) Video Outputs:	Up to 8 user selectable Bandwidths for FM analog demodulation, digital reproduced I and Q video outputs for both channels and combined; variable output levels
22.) Receiver Digital Data Outputs:	5V TTL (50 ohm drive capable), High speed RS422/485 enhanced; simultaneous operation
23.) User Inputs/Outputs:	Total of 20 IO available (see sheet 5 for user IO details).
24.) Time Interfaces:	IRIG A, B, G input or output, AC or DC coupled selectable; Ethernet IEEE1588 with input trigger and output clock interfaces
25.) Data Streaming:	Via Ethernet interface only ( <i>optional</i> )
26.) Data Archive Storage:	4/8/16/32/64 GB of on-board data storage per channel (L/R/Combined)
27.) DC Input Power (calculated):	9-42VDC; 59.7W ( <i>typ.</i> ) / 74.6W ( <i>max.</i> ); mode dependent
28.) Control Interfaces:	(See below)

**User IO Notes:**

- 1.) Consult factory for configuration options, configuration limitations, and ordering information.
- 2.) A total of 24 User defined IO pins are available
- 3.) Configurations of the LS28M module may include the standard use of these available IO ports and thus limit the total number available for user control
- 4.) Limit of six (6) Open-Collector Outputs available; 50V breakdown voltage; 500mA sink current capable per channel
- 5.) Limit of sixteen (16) Single-Ended 3.3V or 5V logic level interface; configurable as inputs or outputs in groups of two
- 6.) Limit of six (6) high-speed (up to 100Mbps) RS422/485 interfaces; configurable in groups of two as inputs or outputs
- 7.) Default user IO configuration for J12 user IO: 4 High-Speed SE 5V Logic Outputs; 4 High-Speed Differential Output pairs
- 8.) Default user IO configuration for J8 user IO: 2 High-speed SE 5V Logic Inputs; 3 Open/Collector Outputs
- 9.) Default user IO configuration for J9 user IO: 2 High-speed SE 5V Logic Inputs; 3 Open/Collector Outputs
- 10.) User IO configurations for J12 are can be directionally controlled via user selections

**Control Interface Notes:**

- 1.) Serial interface for control and general status only in USB 2.0 and RS232 format; simultaneous operation
- 2.) Ethernet interface supports 10/100/1000Mbps rates; IPv4, UDP (including multi-cast), TCP, ARP, ICMP, IGMP, PTP, and HTTP
- 3.) Ethernet provides multiple sockets for data, controls and status.
- 4.) Serial interfaces can operate simultaneously with Ethernet connection.

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User I/O Configuration Details Table:

Connector Signal ID	HW Drivers Available	Primary Signal Speed	Pri Signal HW Dvr Assignment	Aux Signal Speed	Aux Signal HW Dvr Assignment	IO Direction Ctrls	IO Dir
J8 UIO (13)	OC, 5V, 3.3V	SLOW	1	-	1	HW	O, I
J8 UIO (23)	OC, 5V, 3.3V	SLOW	1	FAST	2	HW	O, I
J8 UIO (20)	5V, 3.3V	FAST	2	-	3	HW	I, O
J8 UIO (21)	5V, 3.3V	FAST	2	-	3	HW	I, O
J8 UIO (24)	OC, 5V, 3.3V	SLOW	3	FAST	2	HW	O, I
J9 UIO (13)	OC, 5V, 3.3V	SLOW	4	-	4	HW	O, I
J9 UIO (23)	OC, 5V, 3.3V	SLOW	4	FAST	5	HW	O, I
J9 UIO (20)	5V, 3.3V	FAST	5	-	6	HW	O, I
J9 UIO (21)	5V, 3.3V	FAST	5	-	6	HW	O, I
J9 UIO (24)	OC, 5V, 3.3V	SLOW	3	-	2	HW	O, I
J11 UIO (16)	GND, RS232	GND	-	RS232	7	HW	XCVR
J11 UIO (22)	GND, RS232	GND	-	RS232	7	HW	XCVR
J12 UIO (2)	5V, 3.3V, RS422	FAST	8	-	-	SW	SW Defined
J12 UIO (3)	5V, 3.3V, RS422	FAST	8	-	-	SW	SW Defined
J12 UIO (4)	5V, 3.3V, RS422	FAST	9	-	-	SW	SW Defined
J12 UIO (5)	5V, 3.3V, RS422	FAST	9	-	-	SW	SW Defined
J12 UIO (6)	RS422, 5V, 3.3V	FAST	10	-	-	SW	SW Defined
J12 UIO (18)	RS422, 5V, 3.3V	FAST	10	-	-	SW	SW Defined
J12 UIO (8)	RS422, 5V, 3.3V	FAST	11	-	-	SW	SW Defined
J12 UIO (20)	RS422, 5V, 3.3V	FAST	11	-	-	SW	SW Defined
J12 UIO (21)	RS422, 5V, 3.3V	FAST	12	-	-	SW	SW Defined
J12 UIO (22)	RS422, 5V, 3.3V	FAST	12	-	-	SW	SW Defined
J12 UIO (10)	RS422, 5V, 3.3V	FAST	13	-	-	SW	SW Defined
J12 UIO (11)	RS422, 5V, 3.3V	FAST	13	-	-	SW	SW Defined
TIME DIG	3.3V	FAST	14	-	-	SW	SW Defined

Notes:

- 1.) Maximum signaling rate of a SLOW interface is 50kHz.
- 2.) Maximum signaling rate of a FAST interface is 100MHz.
- 3.) Hardware signal driver assignments are made as pairs. See the table above for assignments.
- 4.) Hardware drivers required must be specified at the time of purchase. Default drivers shipped are listed first in the table above.
- 5.) Signal direction of IO on connectors J8 and J9 are factory configured. Default IO directions are listed first in the table above. J12 IO directions are software controlled.
- 6.) "OC" hardware drivers are Open-collector drivers that have a 50V breakdown voltage and can control up to a 500mA load. A maximum of six (6) outputs of this type are
- 7.) RS422 signaling levels are provided through high-speed drivers capable of 100MHz signaling. There are a limit of six (6) UIO pairs of RS422 signals.
- 8.) Single-ended discretes are configured in groups of two. There are a maximum of twenty-two (22) single-ended 5V or 3.3V user IO signals.
- 9.) RS232 bus signals on J11 are provided for an optional Hand-held User Control/Status touchscreen interface.
- 10.) Default configuration for J12 UIO: (4) 5V Logic Outputs, (4) DIFF Output Pairs
- 11.) Default configuration for J8 UIO: (2) 5V Logic Inputs, (3) Open-Collector Outputs
- 12.) Default configuration for J9 UIO: (2) 5V Logic Outputs, (3) Open-Collector Outputs
- 13.) Consult factory for configuration options, limitations, and ordering instructions.

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