

The R.L. Drake model DD860 Digital Demodulator is a professional quality modular digital headend component designed to provide optimum performance for VSB or QAM demodulation. The DD860 receives an 8 VSB, 16 VSB, 64 QAM, or 256 QAM signal from a terrestrial broadcast or CATV feed in the 54 to 858 MHz range, and demodulates the signal providing an MPEG-2 digital transport stream output.

The DD860 normally provides two 75 Ohm, serial ASI outputs. A parallel SPI output is available on special order.

Front panel signal to noise ratio and status indicators are provided.

A low phase noise tuner design provides reliable operation with dense signal constellations such as 256 QAM or 16 VSB.

An NTSC co-channel rejection filter for VSB modes is incorporated.

A wide range equalizer eliminates multipath effects.

QAM modes incorporate auto selection of ITU A (DVB) or ITU B (DigiCipher II) FEC.

IRC and HRC channel plans are selectable by moving an internal jumper.

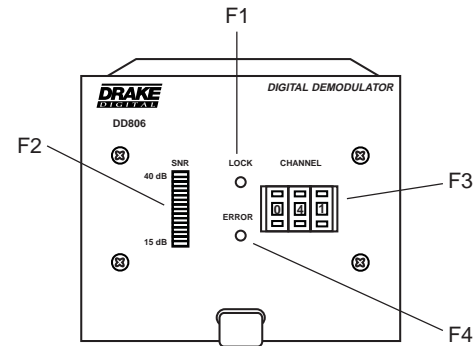
The DD860 is designed to mount in the DRMM12 rack mounting cage.

DRAKE

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FRONT PANEL CONTROLS AND INDICATORS

Figure 1
F1 - LOCK

This indicator shows that the demodulator is receiving a valid digital signal and has locked to it.

F2 - LED Signal-to-Noise Ratio Meter

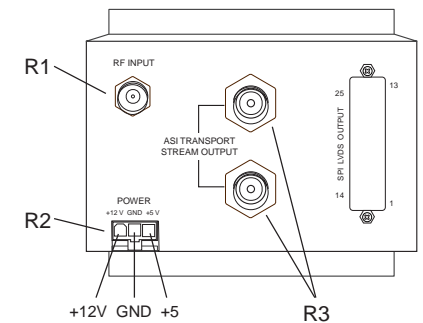
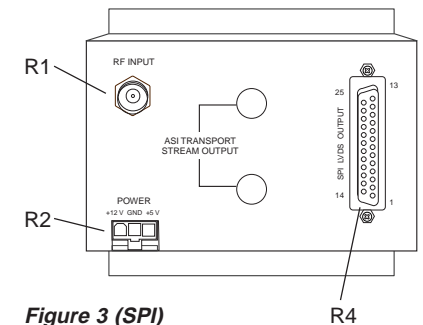
Indicates the signal-to-noise ratio of the received signal. The range is between 15 dB and 40 dB. Threshold levels are nominally 15 dB for 8VSB, 29 dB for 16VSB, 23 dB for 64 QAM, and 28dB for 256QAM. These are minimum levels required for lock. Normal operating levels must exceed threshold by several dB to ensure reliable operation.

F3 - CHANNEL Selector Switch

This switch is used to enter the two or three digit channel number. The range of numbers is also used to determine the mode of operation.

F4 - ERROR

This indicator shows that the FEC is not able to correct all errors in the received signal. Check for a low signal-to-noise ratio or improper antenna aiming if errors occur.

REAR PANEL CONNECTIONS

Figure 2 (ASI)

Figure 3 (SPI)
R1 - RF INPUT

This "F" type connector is the input for the tuner. The DD860 will tune to all U.S.A. off air broadcast frequencies or to standard EIA CATV channels up to 858 MHz (channel 134).

R2 - DC Power Connector

This is the power input connector. Connect to a Drake PS8 or equivalent power supply.

R3 - BNC Connectors (ASI output model)

These are the MPEG2 transport stream outputs. The ASI (Asynchronous Serial Interface) Output Impedance is 75 Ohms.

R4 - 25 Pin SPI LVDS OUTPUT Connector (SPI output model)

This is the MPEG2 transport stream output. The DVB Synchronous Parallel Interface levels comply with low voltage differential signalling specifications.

All connections to and from each module are made through the rear panel. Refer to Figure 4 for correct cable and wiring connections.

RACK MOUNTING

Adequate ventilation is very important in multichannel installations.

The DRMM12 frames should be spaced apart vertically by at least 1 3/4" wherever possible. Air movement is mandatory in enclosed rack cabinets. Excessive heat will shorten component life.

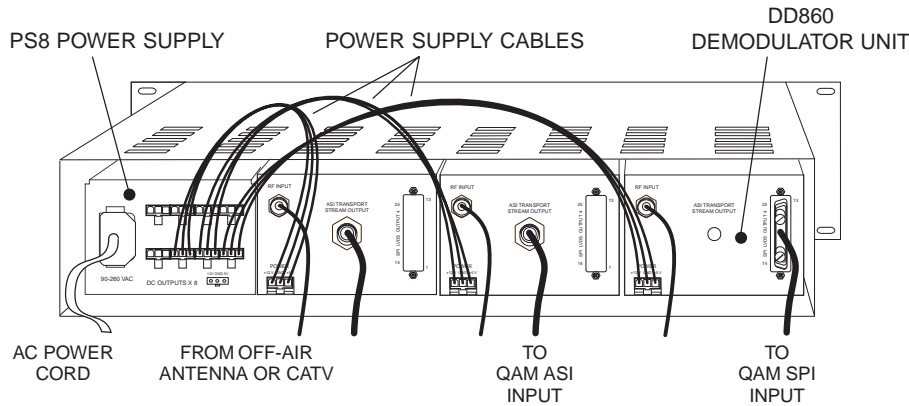
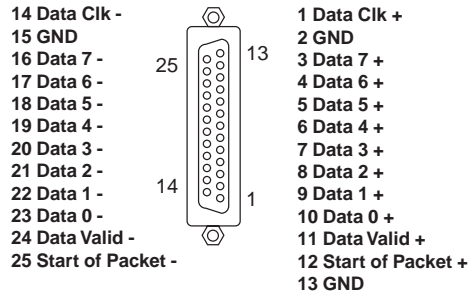


Figure 4

The DD860 is designed to mount into the DRMM12 rack mounting enclosure. The DD860 is four units wide. Power for the DD860 should be supplied by the model PS8 power supply module which also mounts into the DRMM12.

Pin Out DVB SPI Interface



The front panel channel selection switches are used to select the mode of demodulation, the desired band plan (CATV or Broadcast) and the specific channel number. Four blocks of 133 channels each are allocated to CATV channels and two blocks of 68 channels each are allocated for off-air broadcast frequencies.

CATV channels in 64 QAM modulation are selected using switch settings 002 through 134. These switch settings correspond directly to the EIA CATV channel numbers.

CATV channels in 256 QAM modulation are selected using switch settings 202 through 334. To determine the switch setting, add 200 to the desired EIA CATV channel number.

CATV channels in 8 VSB modulation are selected using switch settings 402 through 534. To determine the switch setting, add 400 to the desired EIA CATV channel number.

CATV channels in 16 VSB modulation are selected using switch settings 602 through 734. To determine the switch setting, add 600 to the desired EIA CATV channel number.

Off-Air Broadcast channels in 8 VSB may be tuned by selecting channels 802 through 869. Add 800 to the broadcast channel number that corresponds to the actual RF transmission channel. Do not enter the virtual channel number, used by some broadcasters.

NOTE: IRC and HRC CATV formats are supported by setting of an internal jumper.

OFF-AIR

UHF BROADCAST CHANNELS		8VSB
Channel Number	Center of Channel Frequency (MHz)	DD860 Channel
14	473	814
15	479	815
16	485	816
17	491	817
18	497	818
19	503	819
20	509	820
21	515	821
22	521	822
23	527	823
24	533	824
25	539	825
26	545	826
27	551	827
28	557	828
29	563	829
30	569	830
31	575	831
32	581	832
33	587	833
34	593	834
35	599	835
36	605	836
37	611	837
38	617	838
39	623	839
40	629	840
41	635	841
42	641	842
43	647	843
44	653	844
45	659	845
46	665	846
47	671	847
48	677	848
49	683	849
50	689	850
51	695	851
52	701	852
53	707	853
54	713	854
55	719	855
56	725	856
57	731	857
58	737	858
59	743	859
60	749	860
61	755	861
62	761	862
63	767	863
64	773	864
65	779	865
66	785	866
67	791	867
68	797	868
69	803	869

OFF-AIR

VHF BROADCAST CHANNELS		8VSB
Channel Number	Center of Channel Frequency (MHz)	DD860 Channel
2	57	802
3	63	803
4	69	804
5	79	805
6	85	806
7	177	807
8	183	808
9	189	809
10	195	810
11	201	811
12	207	812
13	213	813

CABLE TV CHANNELS						
Channel Number		Center of Channel	64 QAM	256 QAM	8 VSB	16 VSB
BAND	EIA/NCTA Numeric Equivalent	Frequency in MHz	DD860 Channel	DD860 Channel	DD860 Channel	DD860 Channel
LOW	2	57	2	202	402	602
	3	63	3	203	403	603
	4	69	4	204	404	604
	5	79	5	205	405	605
	6	85	6	206	406	606
MID	95	93	95	295	495	695
	96	99	96	296	496	696
	97	105	97	297	497	697
	98	111	98	298	498	698
	99	117	99	299	499	699
	14	123	14	214	414	614
	15	129	15	215	415	615
	16	135	16	216	416	616
	17	141	17	217	417	617
	18	147	18	218	418	618
	19	153	19	219	419	619
	20	159	20	220	420	620
21	165	21	221	421	621	
22	171	22	222	422	622	
HIGH	7	177	7	207	407	607
	8	183	8	208	408	608
	9	189	9	209	409	609
	10	195	10	210	410	610
	11	201	11	211	411	611
12	207	12	212	412	612	
13	213	13	213	413	613	
SUPER	23	219	23	223	423	623
	24	225	24	224	424	624
	25	231	25	225	425	625
	26	237	26	226	426	626
	27	243	27	227	427	627
	28	249	28	228	428	628
	29	255	29	229	429	629
	30	261	30	230	430	630
	31	267	31	231	431	631
	32	273	32	232	432	632
	33	279	33	233	433	633
	34	285	34	234	434	634
35	291	35	235	435	635	
36	297	36	236	436	636	
HYPER	37	303	37	237	437	637
	38	309	38	238	438	638
	39	315	39	239	439	639
	40	321	40	240	440	640
	41	327	41	241	441	641
	42	333	42	242	442	642
	43	339	43	243	443	643
	44	345	44	244	444	644
	45	351	45	245	445	645
	46	357	46	246	446	646

CABLE TV CHANNELS						
Channel Number		Center of Channel	64 QAM	256 QAM	8 VSB	16 VSB
BAND	EIA/NCTA Numeric Equivalent	Frequency in MHz	DD860 Channel	DD860 Channel	DD860 Channel	DD860 Channel
HYPER	47	363	47	247	447	647
	48	369	48	248	448	648
	49	375	49	249	449	649
	50	381	50	250	450	650
	51	387	51	251	451	651
	52	393	52	252	452	652
	53	399	53	253	453	653
	54	405	54	254	454	654
	55	411	55	255	455	655
	56	417	56	256	456	656
	57	423	57	257	457	657
	58	429	58	258	458	658
	59	435	59	259	459	659
	60	441	60	260	460	660
	61	447	61	261	461	661
	62	453	62	262	462	662
	63	459	63	263	463	663
	64	465	64	264	464	664
	65	471	65	265	465	665
	66	477	66	266	466	666
	67	483	67	267	467	667
	68	489	68	268	468	668
	69	495	69	269	469	669
	70	501	70	270	470	670
	71	507	71	271	471	671
	72	513	72	272	472	672
	73	519	73	273	473	673
	74	525	74	274	474	674
	75	531	75	275	475	675
	76	537	76	276	476	676
	77	543	77	277	477	677
	78	549	78	278	478	678
	79	555	79	279	479	679
	80	561	80	280	480	680
	81	567	81	281	481	681
	82	573	82	282	482	682
	83	579	83	283	483	683
	84	585	84	284	484	684
	85	591	85	285	485	685
	86	597	86	286	486	686
	87	603	87	287	487	687
	88	609	88	288	488	688
	89	615	89	289	489	689
	90	621	90	290	490	690
	91	627	91	291	491	691
	92	633	92	292	492	692
	93	639	93	293	493	693
	94	645	94	294	494	694
	100	651	100	300	500	700

CABLE TV CHANNELS						
	Channel Number	Center of Channel	64 QAM	256 QAM	8 VSB	16 VSB
B A N D	EIA/NCTA Numeric Equivalent	Frequency in MHz	DD860 Channel	DD860 Channel	DD860 Channel	DD860 Channel
	101	657	101	301	501	701
	102	663	102	302	502	702
	103	669	103	303	503	703
	104	675	104	304	504	704
	105	681	105	305	505	705
	106	687	106	306	506	706
	107	693	107	307	507	707
	108	699	108	308	508	708
	109	705	109	309	509	709
	110	711	110	310	510	710
	111	717	111	311	511	711
	112	723	112	312	512	712
	113	729	113	313	513	713
H Y P E R	114	735	114	314	514	714
	115	741	115	315	515	715
	116	747	116	316	516	716
	117	753	117	317	517	717
	118	759	118	318	518	718
	119	765	119	319	519	719
	120	771	120	320	520	720
	121	777	121	321	521	721
	122	783	122	322	522	722
	123	789	123	323	523	723
	124	795	124	324	524	724
	125	801	125	325	525	725
	126	807	126	326	526	726
	127	813	127	327	527	727
128	819	128	328	528	728	
129	825	129	329	529	729	
130	831	130	330	530	730	
131	837	131	331	531	731	
132	843	132	332	532	732	
133	849	133	333	533	733	
134	855	134	334	534	734	

THREE YEAR LIMITED WARRANTY

R.L. DRAKE COMPANY warrants to the original purchaser this product shall be free from defects in material or workmanship for three (3) years from the date of original purchase.

During the warranty period the R.L. DRAKE COMPANY or an authorized Drake service facility will provide, free of charge, both parts and labor necessary to correct defects in material and workmanship. At its option, R.L. DRAKE COMPANY may replace a defective unit.

To obtain such warranty service, the original purchaser must:

- (1) Retain invoice or original proof of purchase to establish the start of the warranty period.
- (2) Notify the R.L. DRAKE COMPANY or the nearest authorized service facility, as soon as possible after discovery of a possible defect, of:
 - (a) the model and serial number,
 - (b) the identity of the seller and the approximate date of purchase; and
 - (c) A detailed description of the problem, including details on the electrical connection to associated equipment and the list of such equipment.
- (3) Deliver the product to the R.L. DRAKE COMPANY or the nearest authorized service facility, or ship the same in its original container or equivalent, fully insured and shipping charges prepaid.

Correct maintenance, repair, and use are necessary to obtain proper performance from this product. Therefore carefully read the Instruction Manual. This warranty does not apply to any defect that R.L. DRAKE COMPANY determines is due to:

- (1) Improper maintenance or repair, including the installation of parts or accessories that do not conform to the quality and specifications of the original parts.
- (2) Misuse, abuse, neglect or improper installation.
- (3) Accidental or intentional damage.

All implied warranties, if any, including warranties of merchantability and fitness for a particular purpose, terminate three (3) years from the date of the original purchase.

The foregoing constitutes R.L. DRAKE COMPANY'S entire obligation with respect to this product, and the original purchaser shall have no other remedy and no claim for incidental or consequential damages, losses or expenses. Some states do not allow limitations on how long an implied warranty lasts or do not allow the exclusions or limitation of incidental or consequential damages, so the above limitation and exclusion may not apply to you.

This warranty gives you specific legal rights and you may also have other rights which vary from state to state. This warranty shall be construed under the laws of Ohio.

SPECIFICATIONS**RFTUNER**

- Input Frequency: 54 to 858 MHz, Broadcast or EIA CATV Channels (Std., IRC, HRC).
- Input Channel Bandwidth: 6 MHz.
- Input Impedance/Return Loss: 75 Ohms/R.L. of 6 dB minimum.
- Optimum Input Level Range: -15 dBmV to +15 dBmV.
- Maximum Input Power: < -16 dBm summed over entire input range.
- Input Noise Figure: 12 dB, maximum.
- Input AGC Range: -20 to +30 dBmV.

DEMODULATOR

- Modulation Types Accepted: 8VSB, 16VSB, 64QAM, and 256QAM.
- Symbol Clock Frequency: 8VSB; 10.762 MHz.
16VSB; 10.762 MHz.
- Symbol Rates: 64QAM; 5.057 Ms/sec.
256QAM; 5.3605 Ms/sec.
- Equalizer Span: -6 to +40 μ Sec delays.

OUTPUTS

- ASI Output Version - Serial Output: ASI according to DVB specifications via two 75 Ohm type BNC connectors.
- SPI Output Version - Parallel Output: SPI according to DVB specifications. LVDS levels via one DB25 connector.

GENERAL

- DC Power Requirement: 5 VDC @ 750 mA, 12 VDC @ 85 mA (Supplied by Drake PS8 power supply).
- Operating Temperature Range: 0° C to + 50° C Ambient temperature around case.
- Mechanical Dimensions: 4.2" W x 3.5" H x 8.38" D, (10.7 cm W x 8.9 cm H x 21.3 cm D).
- Weight: 1 lb. 9 oz. (.72 kg.).