BLONDER TONGUE
LABORATORIES

Reading a System

Level, Set, and Ready to Go

ONE JAKE BROWN ROAD, OLD BRIDGE, NJ 08857
800-523-6049 | FAX 732-679-6049

- What are the most practical places in an RF Distribution System to measure?
  - Are you initially setting up the system?
  - Are you Troubleshooting the system?
- Either way, there are locations in the distribution that should always be measured, and other locations that do not need to be measured all the time.

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- Before measuring, a few things need to be known:
  - Distribution Design – blueprint for the system
- Specifications of all components in System
  - Coaxial Cable Loss
  - Splitter Loss
  - Tap Down Loss / Through Line Loss
  - Amplifier Gain / Rated Output Level

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Splitter Specifications – SCVS & SXRS

Splitter Loss is the Specification we are most interested in

	SCVS / SXRS-2	SCVS / SXRS-3	SCVS / SXRS-4	SCVS-6	SCVS / SXRS-8
# OUTPUTS	2	3	4	6	8
FREQ. RANGE (MHz)	5-1000	5-1000	5-1000	5-1000	5-1000
SPLITTER LOSS (dB MAX)					
5-500 MHz	3.6	6.1	7.0	9.5	10.5
500-860 MHz	3.8	6.2	7.5	10.0	11.5
860-1000 MHz	4.2	6.8	8.0	11.0	12.0
Input Return Loss (dB MIN)					
5-40 MHz	16	16	16	16	16
40-500 MHz	22	20	20	18	20
500-860 MHz	20	20	18	18	18
860-1000 MHz	18	16	16	18	16
Isolation Between Outputs (dB MIN)					
5-40 MHz	22	22	22	25	22
40-500 MHz	26	25	25	28	25
500-860 MHz	26	25	25	23	25
860-1000 MHz	24	21	22	21	21

Tap / DC Specifications – SRT & SCW

Thru-line or Insertion Loss is the Specification we are most interested in

Tap Value	4	6	9	12	16	20	24	27	30
Thru-Line Loss (dB)									
5-900 MHz	4.0	3.5	1.8	1.6	1.1	1.1	1.1	1.1	1.1
900-1000 MHz	4.5	4.0	2.0	2.0	1.5	1.5	1.5	1.5	1.5
Input Return Loss (dB)									
5-400 MHz	15	15	15	20	20	20	20	20	20
400-900 MHz	12	13	16	18	18	18	18	18	18
Tap Down Loss (+/- 1 dB)	3	6	9	12	16	20	24	27	30
Isolation Output to Tap (dB)									
5-400 MHz	20	22	24	30	36	36	36	40	40
400-1000 MHz	18	20	20	24	30	30	30	30	30

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Typical Cable Attenuation

High and Low Frequencies are the Specifications we are most interested in

Typical Cable Attenuation in dB per 100 Feet @ 68° F (20°C) – (Higher Temp = Higher Loss)

	DROP CABLE				SEMI-FLEX CABLE						
Freq MHz	RG-59	RG-6	RG-6 Plenum	RG-7	RG-11	RG-11 Plenum	320	412	500	625	750
5	0.77	0.57	0.61	0.56	0.36	0.43	0.24	0.20	0.16	0.13	0.11
55	1.88	1.50	1.62	1.22	0.95	1.07	0.84	0.68	0.55	0.45	0.37
211	3.59	2.87	2.95	2.29	1.81	2.15	1.73	1.35	1.08	0.89	0.73
450	5.30	4.28	4.65	3.41	2.69	3.24	2.52	2.03	1.63	1.35	1.12
550	5.90	4.76	5.40	3.80	3.01	3.90	2.85	2.26	1.82	1.51	1.25
750	6.96	5.62	6.32	4.50	3.58	4.67	3.34	2.68	2.16	1.79	1.48
860	7.54	6.09	7.20	4.87	3.90	5.20	3.62	2.90	2.35	1.95	1.61
950	7.90	6.39	7.70	5.11	4.10	5.75	3.72	3.03	2.49	2.04	1.72
1000	8.09	6.54	8.02	5.25	4.23	5.83	3.89	3.13	2.53	2.11	1.74
1450	9.82	7.89	9.24	6.34	5.29	7.49	4.02	3.81	3.12	2.61	2.16
2150	12.10	9.69	10.76	7.68	6.60	8.49	4.91	4.74	3.92	3.24	2.75

****Based on average cable loss for Times Fiber, Commscope and Belden. Consult Manufacturer's Specifications for your exact Cable Losses**

Example Specs – BIDA 860 / 1000 MHz

Frequency Range, Gain Amplifier, and Rated Output Level are the Specifications we are most interested in.

High Output Level – Gain = Minimum Input Level

RF	86A-30	86A-30P	86A-43	86A-43P	100A-30	UNITS
Frequency Range	49 - 860	49 - 860	49 - 860	49 - 860	49-1000	**MHz**
Channel Loading	129	129	129	129	150	
Flatness	+/- 0.75	+/- 0.75	+/- 0.7	+/- 0.7	+/-0.75	**dB**
Gain	30	30	43	43	30	**dB**
Noise Figure	8.5	8.5	8.5	8.5	8.5	**dB**
Output Level	36/44	36/44	36/44	36/44	32/40	**dBmV**
Test Port Level	-30,+/-2	-30,+/-2	-30,+/-2	-30,+/-2	-30,+/-2	**dB**
Gain Control Range	10	10	10	10	10	**dB**
Slope Control Range	8	8	8	8	8	**dB**
Composite Triple Beat - CTB	-54	-62	-56	-60	-59	**dB**
Composite Second Order - CSO	-57	-61	-59	-59	-59	**dB**
Cross Modulation - XMOD	-54	-62	-60	-65	-60	**dB**
Hum Modulation	-70	-70	-70	-70	-70	**dB**
Impedance - All Ports	75	75	75	75	75	**Ohms**
Return Loss :						
Input	16	16	16	16	16	**dB**
Output	16	16	16	16	16	**dB**
Hybrid Technology	Push-Pull	Power Doubling	Push-Pull	Power Doubling	Push-Pull	

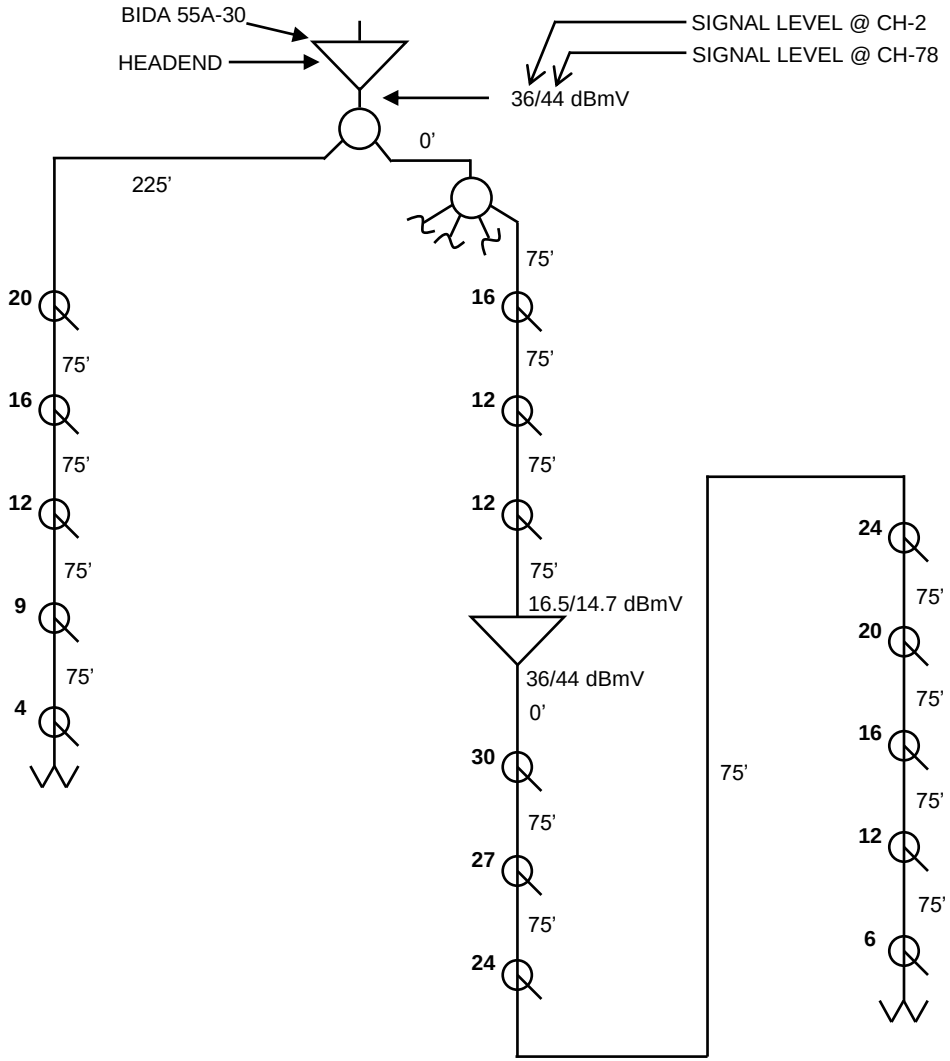
Distribution Design

Initial Installation:

- Headend Output
- Amplifier Inputs
- Amplifier Outputs
- First and Last Tap Ports

Troubleshooting:

- Known Good Location
- Trouble Location
  - Tap Input/Output
- Any Actives (Amplifiers)
- Half distance between known good and trouble location



DESIGN CONSIDERATIONS

RG-6 FOAM

CABLE LOSS PER 100' =

CH-2 = 1.5 DB

CH-78 = 4.7 DB

INSERTION LOSS OF TAP

30 DB = 0.6 DB

27 DB = 0.6 DB

24 DB = 0.6 DB

20 DB = 0.7 DB

16 DB = 0.7 DB

12 DB = 1.5 DB

9 DB = 1.6 DB

6 DB = 3.5 DB

4 DB = 4.0 DB

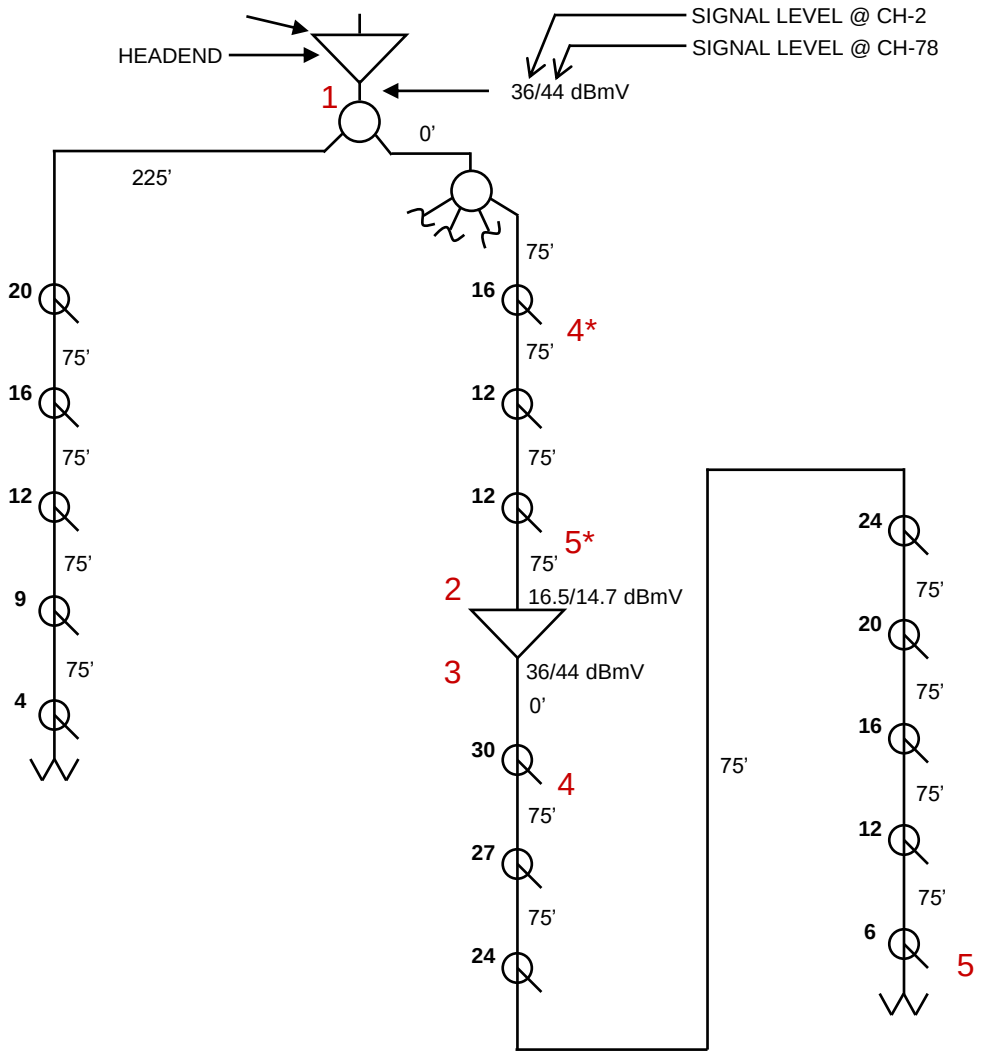
MINIMUM SIGNAL OUT OF TAP = + 6 DBMV

Distribution Design

Initial Installation:

- Headend Output (1)
  Make sure headend properly setup
- Amplifier Inputs (2)
  Verify correct levels
- Amplifier Outputs (3)
  Balance (setup) Amplifier
- First Tap Port (4)
  After second or third amp, unless there are issues
- Last Tap Port (5)
  After second or third amp, unless there are issues

Don't forget to DOCUMENT LEVELS!



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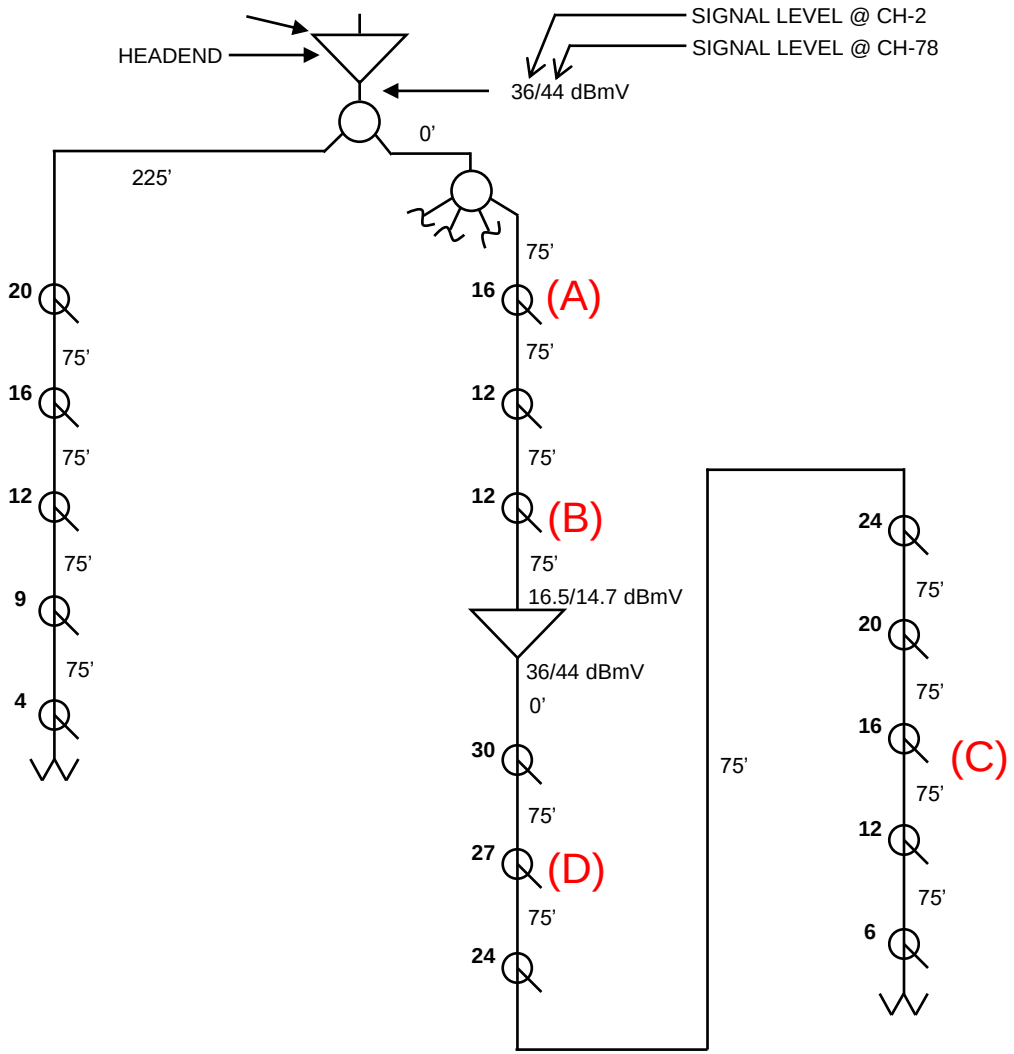
20 DB = 0.7 DB
16 DB = 0.7 DB
12 DB = 1.5 DB
9 DB = 1.6 DB
6 DB = 3.5 DB
4 DB = 4.0 DB

MINIMUM SIGNAL OUT OF TAP = + 6 DBMV

Distribution Design

Troubleshooting:

- Known Good Location (A)
- Trouble Location (B, C)
  - Tap Input/Output
- Any Actives (Amplifiers)
- Half distance between known good and trouble location (D)



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20 DB = 0.7 DB
16 DB = 0.7 DB
12 DB = 1.5 DB
9 DB = 1.6 DB
6 DB = 3.5 DB
4 DB = 4.0 DB

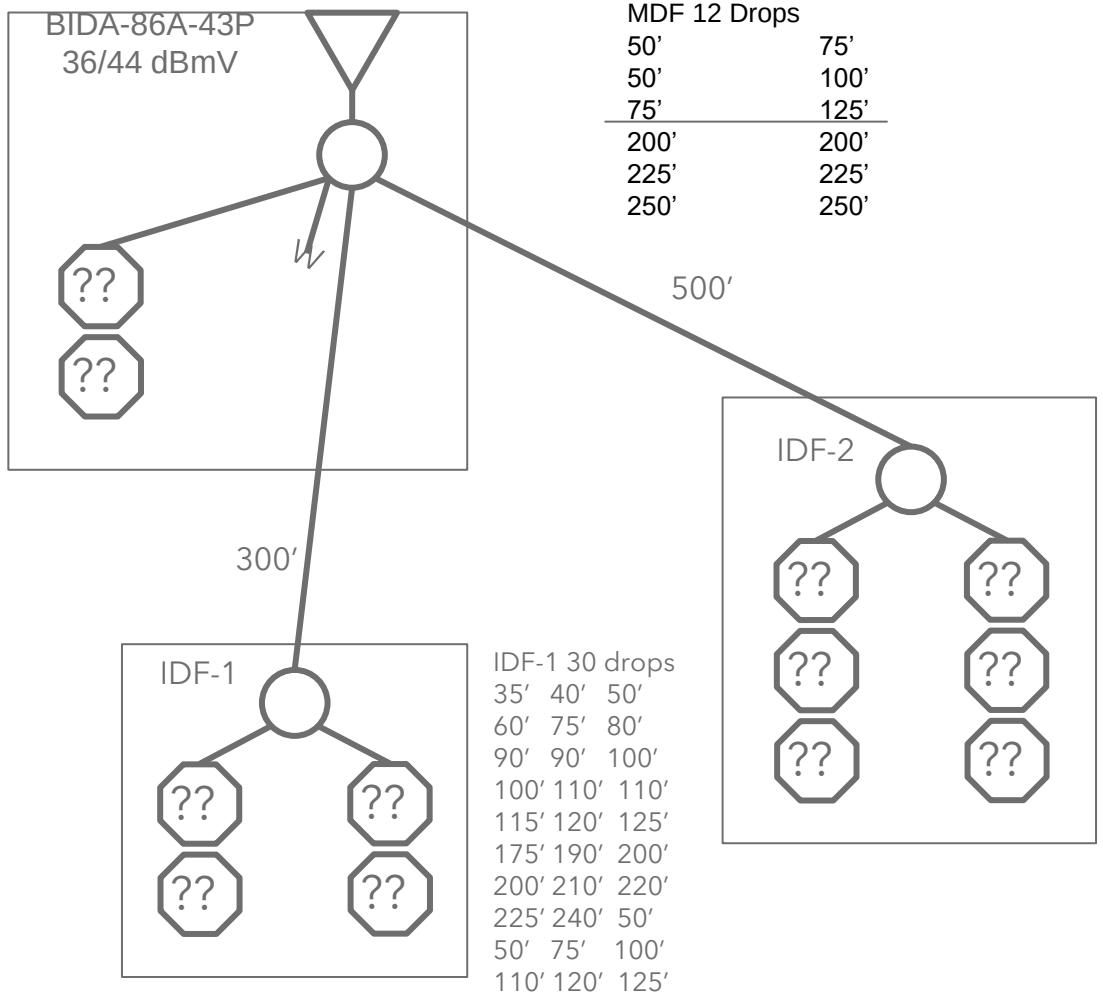
MINIMUM SIGNAL OUT OF TAP = + 6 DBMV

Homerun with SRT Series

Homerun Distribution Systems have all components in closets, making it easier to troubleshoot.

Verify all cables of similar length are on the same Tap.

Tap ports rarely fail. Most issues are cable connector related or caused by unauthorized changes.



MDF 12 Drops

50’	75’
50’	100’
75’	125’
200’	200’
225’	225’
250’	250’

IDF-1 30 drops

35′ 40′ 50′
60′ 75′ 80′
90′ 90′ 100′
100′ 110′ 110′
115′ 120′ 125′
175′ 190′ 200′
200′ 210′ 220′
225′ 240′ 50′
50′ 75′ 100′
110′ 120′ 125′

Trunk Cable - RG-11
@ 55/860 (per 100’)
1 dB / 3.9 dB Loss

Drop cable is RG-6
@ 55/860 (per 100’)
1.5 dB / 6.1 dB loss

DESIGN FOR MIN +5 dBmV @ OUTLET

SXRS-2 = 4 dB
SXRS-4 = 8 dB

IDF-1 45 drops

35′ 40′ 50′
60′ 75′ 80′
90′ 90′ 100′
100′ 110′ 110′
115′ 120′ 125′
175′ 190′ 200′
200′ 210′ 220′
225′ 240′ 50′
50′ 75′ 100′
110′ 120′ 125′
250′ 250′ 250′
240′ 235′ 230′
225′ 225′ 30′
45′ 50′ 50′
75′ 75′ 60′

SRT-8A Taps

Value	Insertion Loss
35	1.0 dB
32	1.0 dB
29	1.0 dB
26	1.0 dB
23	1.2 dB
20	1.8 dB
17	2.4 dB
14	4.2 dB
11	TERM.

Process, Combine & Launch Signals - HEADEND

(1) Measure highest frequency channel, set 2 dB below rated

(2) After combiner, measure all channels, ensure at same level

(3) Balance/adjust Launch Amp output to match specs/design