A modular line array using the Mark Audio CHR-70 Generation 3 driver. Build as many modules as you need/can afford, add additional modules as needed. Vented & sealed variations.

Notes:
1/ Conceptual design has been kept as simple as possible, user should feel free to add bracing or other enhancements, use of good quality plywood recommended.
2/ Modules should be secured together, such as by metal strip/mending plates at each vertical joint, and wide stabilizing bases are recommended.
3/ Round over or chamfer on vertical edges recommended.
4/ 4 modules can be cut from a 5x5 sheet, 5 out of a 4x8 sheet
5/ A full height additional layer of material on the sides would assist bracing, tie modules together and allow more material for a larger round-over or chamfer
7/ some EQ is likely necessary
Notes:
0/ stack 3, 4, 5, 6 modules, easy to expand
1/ for CHR-70.3
2/ wire modules in parallel
3/ modules should be secured together
4/ a stabilizing base recommended

3 modules – 8 ohms
9 drivers
95 dB 1m/2, 240w

4 modules – 6 ohms
12 drivers
97.6 dB 1m/2, 240w

5 modules – 4.8 ohms
15 drivers
99.5 dB 1m/2, 300w

6 modules – 4 ohms
18 drivers
101.1 dB 1m/2, 360w

The CHR Array | CHR-70.3
Module Stacks

27-august-2011 drawn by ald
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Notes:

1/15 mm (19/32") material quality plywood recommended
2/ for CHR-70.3
3/ wire each module in series, use 3, 4, 5, or 6 modules per side
3/ vfill with polyfluf, teased wool, or ultraTouch
4/ hampher or roundover on front vertical edges recommended
Notes:

1/ 15 mm (19/32") material quality plywood recommended
2/ for CHR-70.3
3/ wire each module in series, use 3, 4, 5, or 6 modules per side
3/ vented version: line with wool felt, cotton felt, or fiberglass
4/ hampher or roundover on front vertical edges recommended

The CHR Array | CHR-70.3
Basic Vented Module

01-september-2011 drawn by didl
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Notes:
1/ bi-wiring terminals or stackable dual banana plugs (with suitable binding posts on each module) would ease the connection of modules

Wire modules in parallel
[3 modules = 8Ω], [4 modules = 6Ω], [5 modules = 4.8Ω], [6 modules = 4Ω]

Wire 3 drivers in each module in series for 24Ω
Notes:

1/ A standard module can be used as a centre channel, the usual arrangement is to orient it horizontally.

2/ A horizontal array is not the best arrangement for a centre channel, introducing power tapering as in the middle arrangements helps to ameliorate the problems at the trade-off of maximum achievable levels.
An inherent feature of monopole column speakers is a 3dB per octave increase in the low frequencies caused by array gain. [ref 1]

With the steady rise of computer audio and cheaply available DSP, nearfield line array projects based upon small wideband drive units have become a much more practical proposition than was the case only a few years ago. With modern developments in electronics and software, it is possible to tailor system response to previously unimaginable degree, and this modular array system has been created primarily with such use in mind. However, an example of a simple active equalizing circuit is also presented here. Although a slightly less flexible approach (will not account with the room influence) than the aforementioned DSP, it does allow those who do not employ a computer based source to still effectively use a wideband driver based line array. This is the method which has been employed with great success by the legendary Roger Russell in several DIY projects and commercial systems [ref 4]. It is also possible to run arrays of this type with passive contour filters; the price is of course a loss in efficiency. [ref 5]

References:
2. Graph source Christian Gather & Holger Barske The Thin Red Line (Klang + Ton, 2/2007) This Visaton based array project employs passive contour circuitry. The HF peak shown at 15KHz is inherent to the FR8SM drive unit employed, while the 600Hz dip is artefact of sub-optimal measurement conditions for array systems.
5. See Gather & Barske The Thin Red Line for an example of passive contour filtering for nearfield line arrays using wideband drive units. This is most easily / effectively achieved with the sealed box variations.
7. Additional references:
8. Griffin, James R. Design Guidelines for Practical Nearfield Line Arrays
Example Active Analog Circuit

Example Passive Analog Circuit

Based on (ref 4) a calculated starting point for a passive circuit for the 18 driver array.

Arrays of low powered resistors can be used to increase their power handling.
The CHR Array | CHR-70.3
5x5 cut | vented version

26-august-2011 drawn by dld
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Notes:
1/5mm trim & kerf allowance
2/sealed version does not need vent shelves, back is 16mm longer (dotted line)
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Notes:
1/ 5mm trim & kerf allowance
2/ sealed version does not need vent shelves, back is 16mm longer (dotted line)
Allow ~1 mm for gasket.