LF Forum

Dave Pick G3YXM

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RSGB 2018 Convention

Timetable

- Where are we now?
- Receiver tests
- Commercial gear
- Forum Q&A

Where are we now?

- Most countries in the world now have access to the bands:

- 135.7kHz-137.8kHz
- Open to all licence classes
- 472.0kHz-479.0kHz
- Advanced (full) licence only

Modes commonly in use

- WSPR * (mostly 2 minute)
- CW on 472kHz
- JT9 *
- FT8 *
- Opera
- QRSS

Experimental modes

- EbNaut
- WSQCall by ZL2AFP
- JS8Call by KN4CRD

- http://abelian.org/ for EbNaut
- https://www.qsl.net/zl1bpu/MFSK/WSQweb.htm
- http://js8call.com/

Receiving LF/MF

- Antenna

- Loop (active or tuned)
- E-probe
- Wire antenna

Receiving LF/MF

- Receiver

- HF transceiver
- SDR
- Converter

LF Forum

Over to David G0MRF

Available equipment ?

Receiving :

- Commercial transceivers (Gen coverage RX)
- Dedicated SDR with PC / Laptop. – Softrock ($23)
- Receive only Dongles RTL / FUNcube etc
- Home built kits and designs. Upconverter / transverter

Transmitting :

- Commercial transceivers. - mainly low level out
- Dedicated products. TX converters / transverters
- Home built designs. Transverters / amplifiers

Transceiver reviews

ICOM IC-7610 MEASURED PERFORMANCE

RECEIVER MEASUREMENTS

	----------SENSITIVITY SSB 10dBs+n:n----------		
FREQUENCY	PREAMP OFF	PREAMP 1	PREAMP 2
1.8 MHz	0.28μV (-118dBm)	0.13μV (-125dBm)	0.1μV (-127dBm)
3.5 MHz	0.25μV (-119dBm)	0.11μV (-126dBm)	0.09μV (-128dBm)
7 MHz	0.22μV (-120dBm)	0.1μV (-127dBm)	0.09μV (-128dBm)
10 MHz	0.32μV (-117dBm)	0.11μV (-126dBm)	0.09μV (-128dBm)
14 MHz	0.28μV (-118dBm)	0.13μV (-125dBm)	0.1μV (-127dBm)
18 MHz	0.32μV (-117dBm)	0.13μV (-125dBm)	0.1μV (-127dBm)
21 MHz	0.32μV (-117dBm)	0.14μV (-124dBm)	0.11μV (-126dBm)
24 MHz	0.32μV (-117dBm)	0.13μV (-125dBm)	0.1μV (-127dBm)
28 MHz	0.32μV (-117dBm)	0.14μV (-124dBm)	0.1μV (-127dBm)
50 MHz	0.4μV (-115dBm)	0.16μV (-123dBm)	0.11μV (-126dBm)

RadCom

Radio Society of Great Britain
Advancing amateur radio since 1913

June 18

Receiver

SSB/CW sensitivity: At 10 dB S/N, 0.16 µV typical at 1.8 – 30 MHz (preamp 1 on); 0.13 µV typical at 50 MHz (preamp 2 on), filter soft.

Noise figure: Not specified.

Receiver Dynamic Testing

Noise floor (MDS), 500 Hz bandwidth, IP+ on:

Preamp	*Off*	*1*	*2*
0.137 MHz	–116	–127	–133 dBm
0.475 MHz	–130	–137	–141 dBm
1.0 MHz	–131	–140	–142 dBm
3.5 MHz	–132	–140	–142 dBm
14 MHz	–130	–138	–142 dBm
50 MHz	–130	–138	–141 dBm

Preamp off/1/2, 14 MHz: 17/9/5 dB; 50 MHz, 17/9/6 dB.

QST

October 18

Transceiver reviews

ICOM IC-7610 MEASURED PERFORMANCE

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Receiver	Receiver Dynamic Testing
SSB/CW sensitivity: At 10 dB S/N, 0.16 µV typical at 1.8 – 30 MHz (preamp 1 on); 0.13 µV typical at 50 MHz (preamp 2 on), filter soft.	Noise floor (MDS), 500 Hz bandwidth, IP+ on:
	Preamp Off 1 2
	0.137 MHz –116 –127 –133 dBm
	0.475 MHz –130 –137 –141 dBm
	1.0 MHz –131 –140 –142 dBm
	3.5 MHz –132 –140 –142 dBm
	14 MHz –130 –138 –142 dBm
	50 MHz –130 –138 –141 dBm
Noise figure: Not specified.	Preamp off/1/2, 14 MHz: 17/9/5 dB; 50 MHz, 17/9/6 dB.

QST

October 18

Measuring receiver performance

Signal level for S9

Comparative indicator between 1830kHz 475kHz and 136kHz

Signal level for 6dB S+N:N

- Mode USB
- Bandwidth 2.4kHz
- Preamps off
- Attenuators off *
- NB and NR off


KENWOOD
COMMUNICATIONS
KENWOOD
KENWOOD
KENWOOD
YAESU
TS-990

Receiver sensitivity comparison for 160m, 630m and 2200m band

Receiver	1830kHz Level for S9	1830kHz 6dB S+N:N	475kHz Level for S9	475kHz 6dB S+N:N	136kHz Level for S9	136kHz 6dB S+N:N	Notes
ICOM IC756 Pro3	-75dBm	-122dBm	-66dBm	-114dBm	-64dBm	-110dBm	Fixed MF attenuator below apx. 1700kHz
ICOM 7300	-60	-110	-59	-105	-52	-87	The IC7300 has an increase in background noise which peaks at 320kHz but affects sensitivity at 630 and 2200m. The IC7300 can transmit around 8W on 475kHz
ICOM 7100	-73	-115	-69	-112	-64	-103	
ICOM 7610	-72	-116	-71	-114	-64	-97	Some background noise on 136kHz
ICOM 706Mk2G			-65	-109	-35	-82	160m not measured
ICOM IC735			-69	-106	-60	-94	160m not measured
Yaesu FT817			-60	-107	-50 IPO	-91 IPO	160m not measured
Yaesu FT857D	-85	-121	-83	-115	-70	-79*	136kHz S:N estimated as radio has S4 noise level at that frequency
Yaesu FTDX3000D	-65	-114	-64	-113	-56	-94	Radio set to IP0. Test on 135.4 to avoid birdie

Receiver	1830kHz Level for S9	1830kHz 6dB S+N:N	475kHz Level for S9	475kHz 6dB S+N:N	136kHz Level for S9	136kHz 6dB S+N:N	Notes
Yaesu FTDX5000MP	-72 * -60 dBm	-115 * -103dBm	-66 dBm	-103dBm	-66 dBm	-99 dBm	IP0 and preamps auto disabled below 1700kHz (* with Preamp 1)
Yaesu FT450D	-79	-116	-62	-94	-44	-83	Fixed attenuator below 1700kHz
Yaesu FTDX1200	-68 IPO -80 P1	-109 IPO -121 P1	-65 IPO -78 P1	-105 IPO -117 P1	-48 IPO -60 P1	-87 IPO -99 P1	P1 = Preamp 1 used for test
Kenwood TS590SG	-73	-117	-73	-115	-74	-116	Tested on 472 as birdie on 475
Kenwood TS990S	-67	-112	-66	-111	-65	-110	
Kenwood TS890S	-69	-115	-68	-112	-68	-112	
Kenwood TS2000			-79	-121	-79	-119	160m not measured
Kenwood TS850			-84	-125	-83	-123	160m not measured
Elad FDM-Duo SDR	-71	-116	-71	-116	-71	-115	
JRC JST135			-85		-83		S:N not possible as headphone socket non-functional

MF / LF Hardware from small manufacturers

MONITOR SENSORS

630m TRANSVERTER

Datasheet

Roger VK4YB

160m to 630m

Very Robust
VSWR / over drive / over current protection. 100% duty cycle

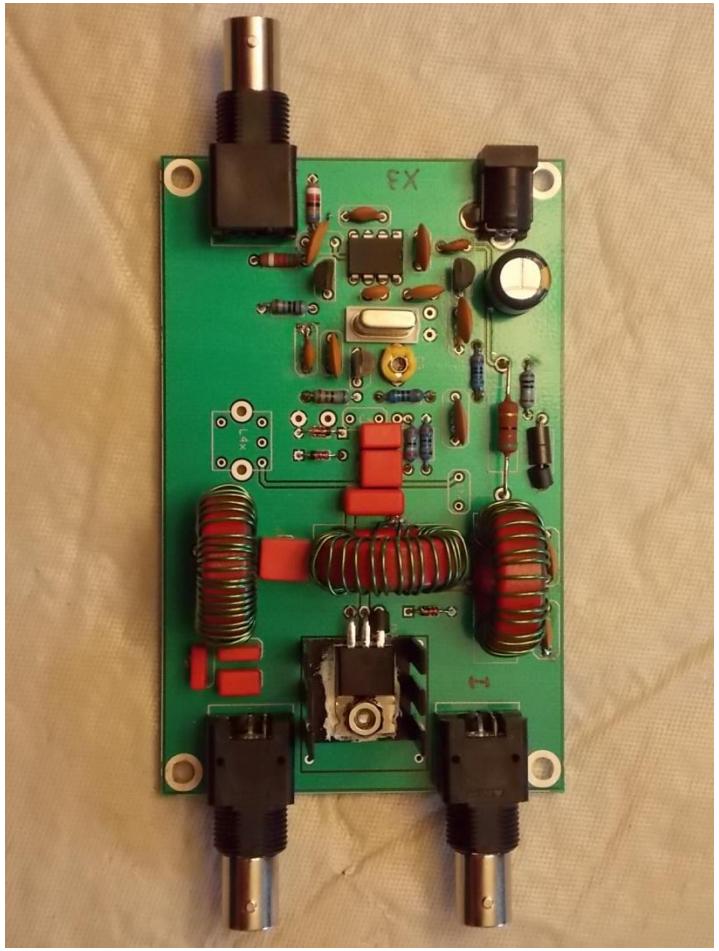
10 – 16V Supply / 50W RF output
Firmware upgradeable via USB

Linear amplifier

Priced at $600 US

MF / LF Hardware from small manufacturers

- MF Solutions TX Converter John-WA3ETD



- Available as a kit or built and tested
- Not suitable for linear modes
- 80m input 1.5W max RF input
- 136kHz version being developed
- 12V supply at 3A
- Output power 22 – 25 Watts
- $75 Kit $99 Built + shipping

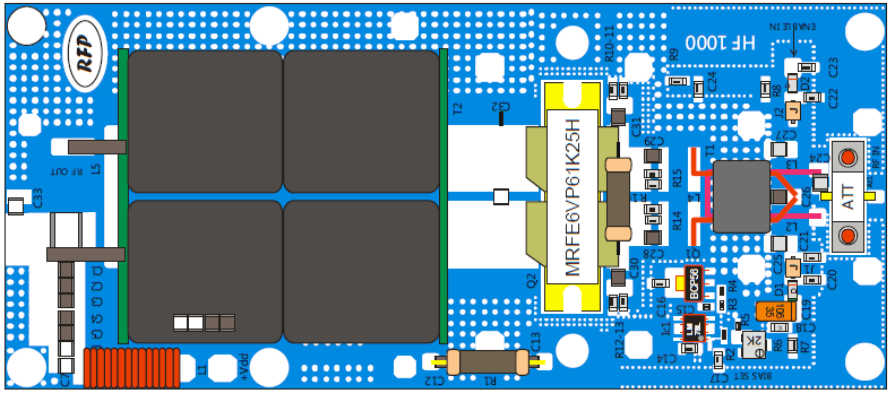
MF / LF Hardware from small manufacturers

Minikits Transverter

5 Watts output.
Kit with some SMD
Apx £70 + shipping from VK

Specifications	
Frequency Range:	472MHz to 479MHz (630m Band)
Local Oscillator:	3.2MHz (474kHz translates to 3.674MHz IF)
Stability:	Typically +/-1Hz (OK for WSPR)
RX Gain:	0dB +/- 2dB
RX Noise Figure:	Typically < 5dB (BFQ19 or DXT2222A)
TX IF Drive:	Up to 5 Watts +36dBm @ 3.6MHz
TX IF Gain:	0dB Minimum @ 3.6MHz input for +37dBm Output @ 475kHz
TX RF Output:	+37dBm (5 Watts) with 5 Watts +37dBm input @ 3.6MHz
TX Spurious Outputs:	<50dBc Refer to the Kits webpage
Operating Voltage:	+10 to +15vdc @ 130mA RX Stages, <1.5A TX Stages
Board Size:	107mm L x 73mm W x 25mm H

MF / LF Hardware from small manufacturers

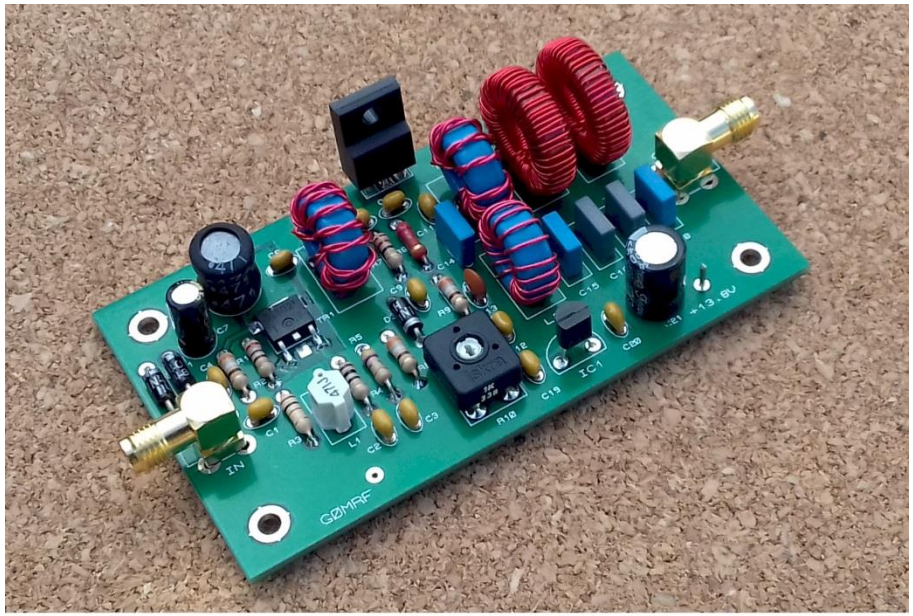


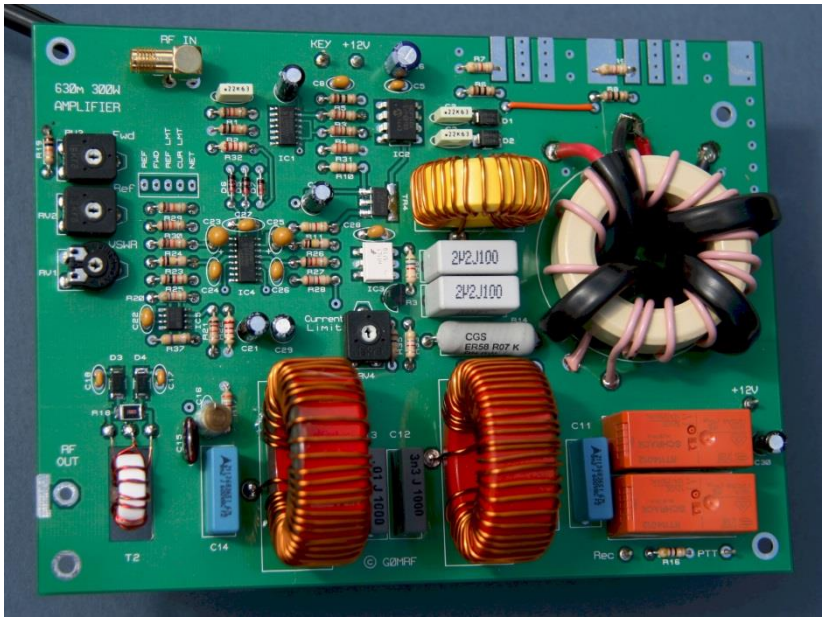
Linear Amp UK. Gemini HF-1K amplifier 472kHz at 200W+

ITB (Italy) offer a range of amplifier 'pallets' some of which work nicely on 630m. Check latest spec is OK before purchasing.

MF / LF Hardware designs - www.

www.g0mrf.com



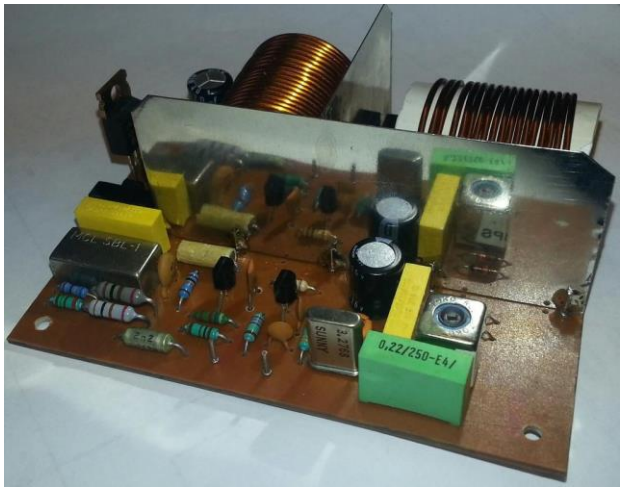


5 Watt linear amplifier kit. 80kHz to 2MHz
Input power +6dBm. 13.8V supply
Intended as a gain block for transceiver
DRV connectors or SDR radios £20

300 W class D amplifier circuit / kit.
Over current and reflected power protection
Fwd / Ref power meter drive.
28 – 32V supply.
Needs drive at twice operating frequency.

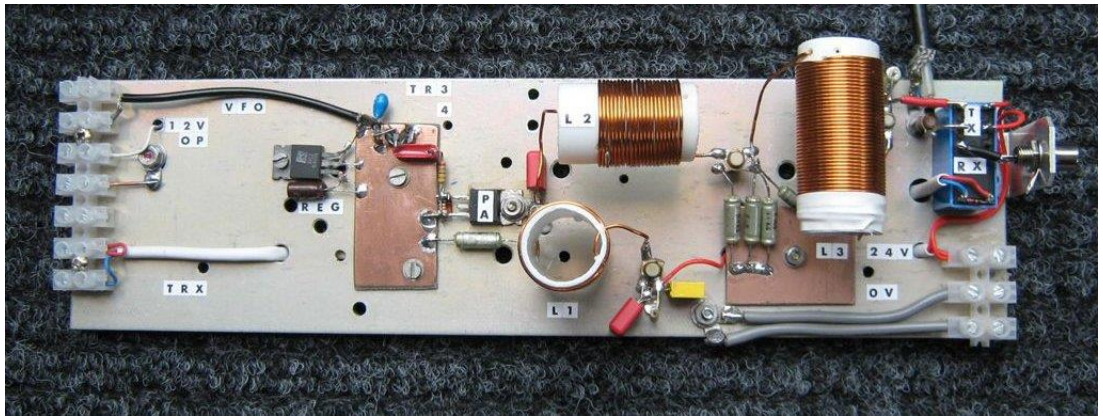
MF / LF Hardware designs - www.

Rally finds ! RF ammeters



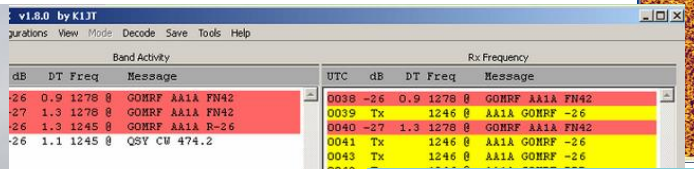
G3XBM transverter by M1GEO

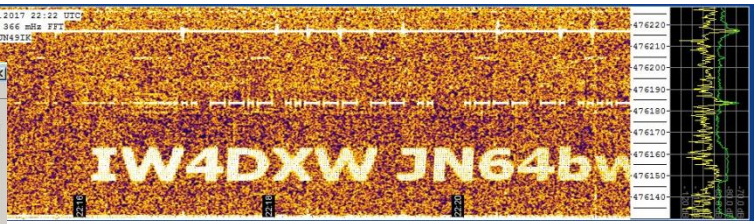
40 Variometers for sale !

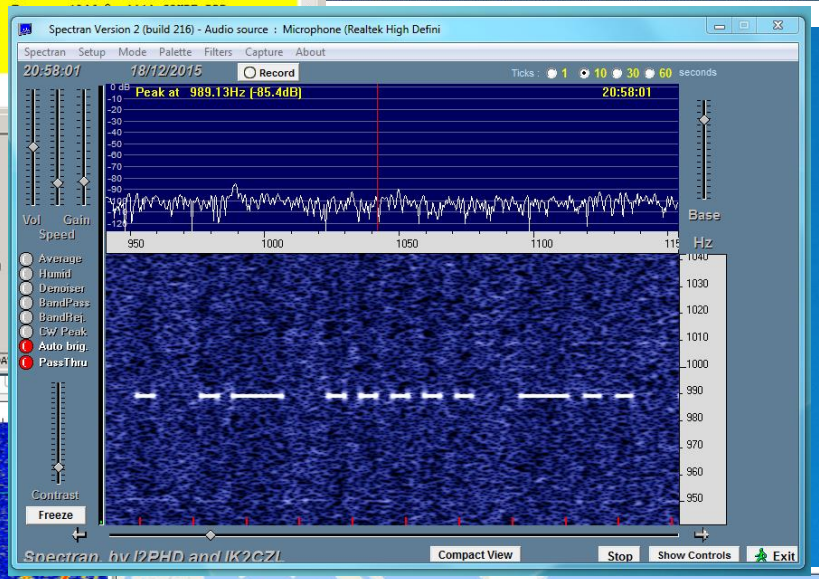


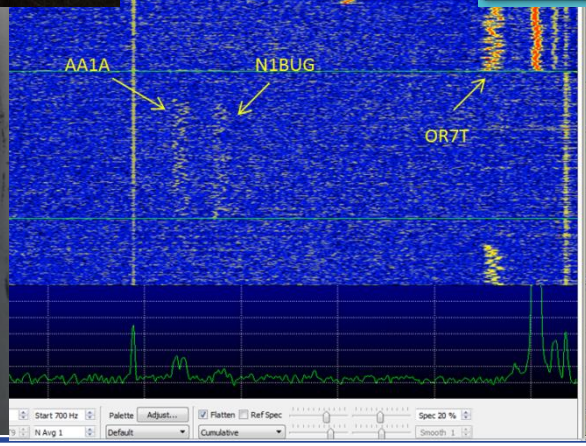
GW3UEP 100W Amplifier

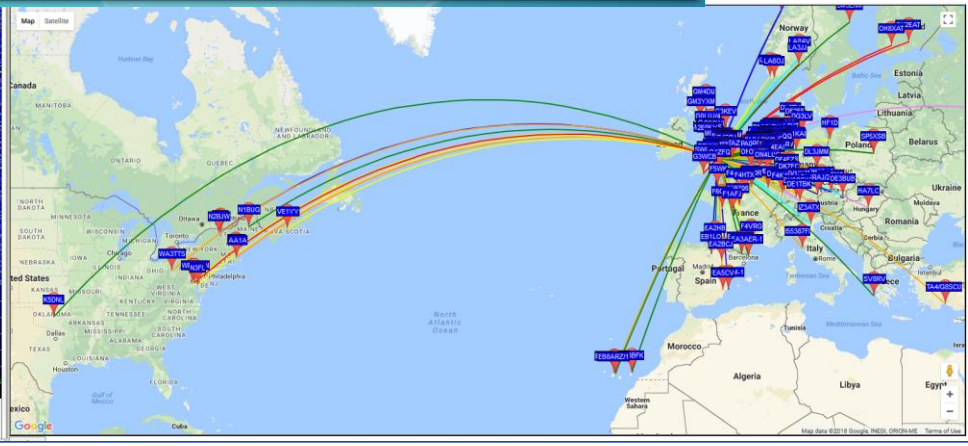
Time to get on the bands











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Find out more…

http://www.gw3uep.ukfsn.org

http://njdtechnologies.net/category/630-meter-daily-reports/

http://www.472khz.org

http://www.wireless.org.uk/

http://njdtechnologies.net/category/630-meter-daily-reports/

http://www.antennasbyn6lf.com/630m-antennas/

http://www.g0mrf.com/

https://sites.google.com/site/g3xbmqrp3/mflf/472khz_tvtr

http://www.linamp.co.uk/gemini_HF.html

https://italab.it/prodotti_uk.php?cat=3

www.rsgb.org

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LF Forum

Over to you..