

QRP and the Small Wonder Labs Rockmite

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What is QRP

- Low Power Operation
 - 5 W or less (CW)
 - 10 W or less (SSB)
- Typical Modes
 - CW
 - Better for weak signals
 - QRSS
 - SSB

| BAND | CALLING FREQUENCY | MODE | NOTES |
|------|-------------------|------|------------------|
| 160 | 1 810 MHz | CW | |
| 80 | 3 560 MHz | CW | |
| 80 | 3 710 MHz | CW | Novice |
| 80 | 3 985 MHz | SSB | |
| 40 | 7 030 MHz | CW | |
| 40 | 7 110 MHz | CW | Novice |
| 40 | 7 285 MHz | SSB | |
| 30 | 10 106 MHz | CW | |
| 30 | 10 116 MHz | CW | Replacing 10 106 |
| 20 | 14 060 MHz | CW | |
| 20 | 14 285 MHz | SSB | |
| 17 | 18 096 MHz | CW | |
| 17 | 18 130 MHz | SSB | |
| 15 | 21 060 MHz | CW | |
| 15 | 21 110 MHz | CW | Novice |
| 15 | 21 385 MHz | SSB | |
| 12 | 24 906 MHz | CW | |
| 12 | 24 950 MHz | SSB | |
| 10 | 28 060 MHz | CW | |
| 10 | 28 110 MHz | CW | Novice |
| 10 | 28 885 MHz | SSB | |

QRP vs QRO



A note on Power

- Start a transmission with 5 Watts and receive a signal report of **S-5**
- Now double your transmitting power to 10 Watts
 - Equals one-half S unit improvement at the receiver
 - **S 5.5**
- Double transmitting power to 20 Watts
 - Equals one S unit improvement at the receiver (over original signal)
 - **S 6**
- Double it again to 40 Watts
 - Equals 1.5 S unit improvement at the receiver (over original signal)
 - **S 6.5**
- Double it once more to 80 Watts
 - Equals 2 S unit improvement at the receiver (over original signal)
 - **S 7**
- If you are receiving a station that is transmitting at 80 Watts at S9 and they reduce power to 5 W you will still receive them at S7

| S-reading | HF μV (50 Ω) |
|-----------|------------------------------------|
| S9+10dB | 160 |
| S9 | 50.2 |
| S8 | 25.1 |
| S7 | 12.6 |
| S6 | 6.3 |
| S5 | 3.2 |
| S4 | 1.6 |
| S3 | 0.8 |
| S2 | 0.4 |
| S1 | 0.2 |

Less may be more

- Miles per Watt

- Miles Per Watt (MPW) = Distance (Miles) / Transmission Power (Watts)

- The long-distance low power record is held by KL7YU and W7BVV using one micro-watt (0.000001 W) over a distance of 1,650 mile 10-meter path between Alaska and Oregon in 1970. This is the equivalent of 1.6 billion miles per Watt.
- NASA's deep space missions typically achieve mile-per-watt ratings of more than 500 million miles. One example was the 8-watt signal from Pioneer 10. The craft's signal traveled 6.8 billion miles to earth for a rating of 850 million miles per Watt

The Rockmite

- Invented by Dave Benson, K1SWL in July 2002
 - Small Wonder Labs
 - Featured in April 2003 QST
 - Ceased production in November 2013
- New version, *Rockmite II* available from Rex Harper, W1REX
 - www.qrpme.com
 - \$40

Rockmite specs

- 500mW power output at 12V supply.
- Supply voltage range 8-15V
- Available Frequencies:
 - 3560 kHz
 - 3579 kHz
 - 7015 kHz
 - 7030 kHz (QRP calling frequency)
 - 7040 kHz
 - 7122 kHz
 - 10106 kHz
 - 14060 kHz
- Built-in Iambic keyer, 5-40 WPM
- Built in sidetone, 700 Hz
- Automatic T/R offset, reversible

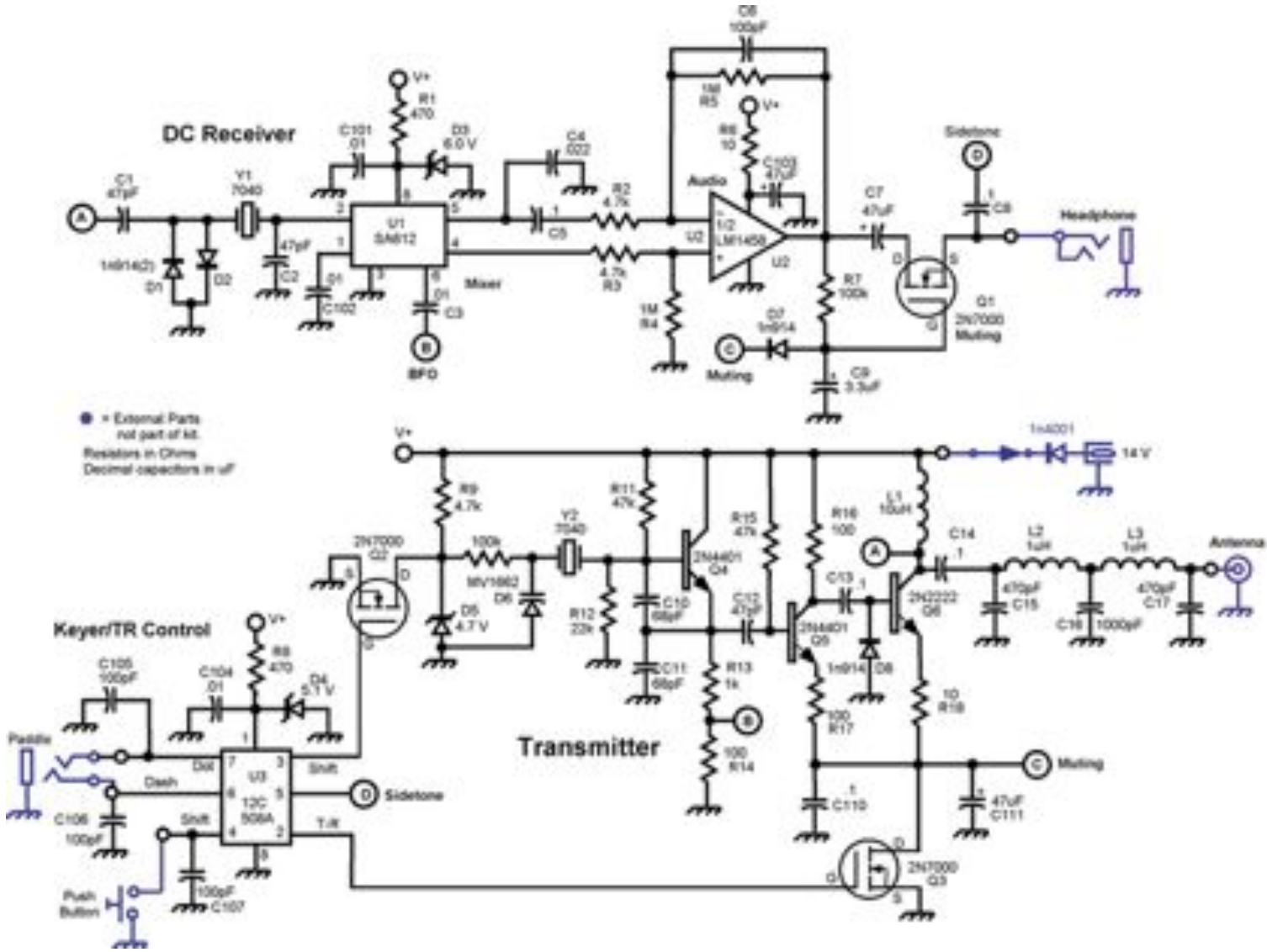
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Assembling the Rockmite

- 68 components
 - One SMD IC
 - SA602AD - Double-balanced mixer and oscillator
 - Two 8 pin DIP IC
 - LM1458 - Dual Op-Amp
 - 12C508A - PIC microcontroller (keyer)
 - Upgrade to PicoKeyer
 - Two message memory and other enhancements
 - 6 transistors
 - Assorted other discrete components including 2 crystals



Schematic



Assembling the Rockmite - Tools

- Soldering iron
- Solder
- A PanaVise is very helpful
- Hakko Solder Tip Cleaner
 - YOU NEED THIS!



Assembling the Rockmite

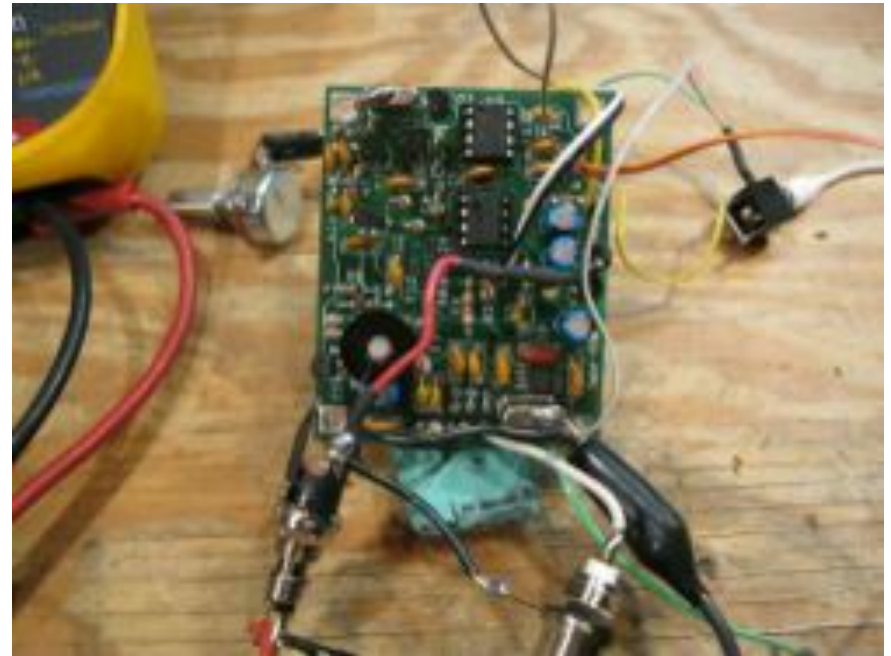
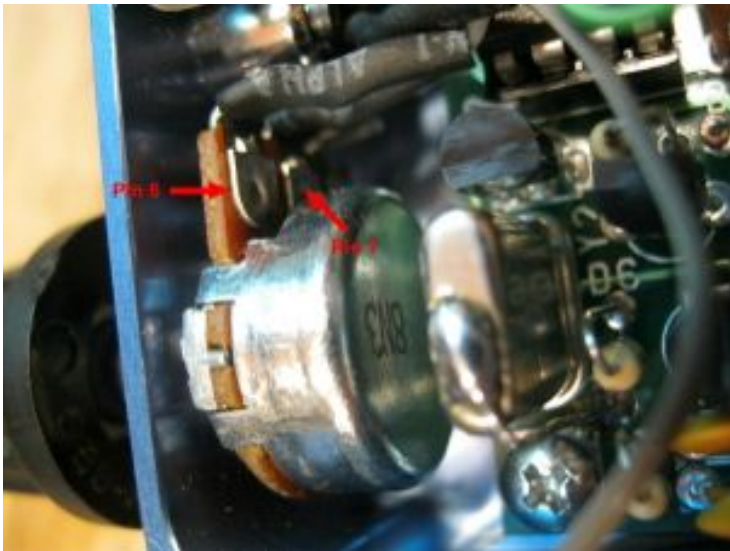


- Take your time placing components
- Watch orientation
- *No solder bridges required*
- Neatness pays in the end



Assembling the Rockmite

- Add in the external components
- One mod
 - AF Gain



- Connect power, antenna, and speaker
- IT WORKED!

Assembling the Rockmite

- Packaging
 - You can fit it into an Altoids tin if you wish
 - American Morse Equipment MityBox
 - Built for the Rockmite
 - Matching paddle
 - Porta Paddle II

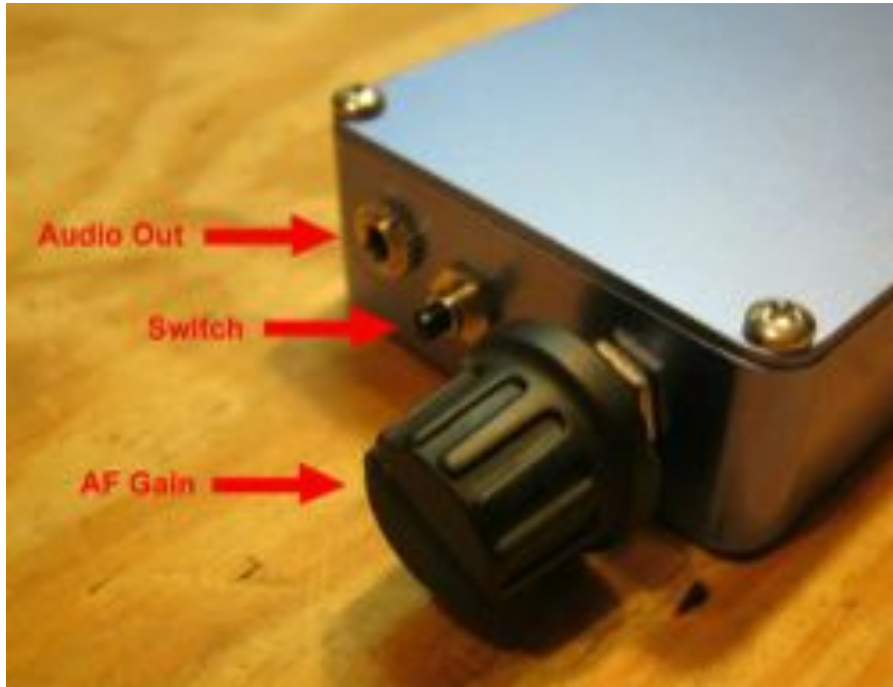


Assembling the Rockmite

- Getting it all to fit in the MityBox was quite challenging!



Assembling the Rockmite



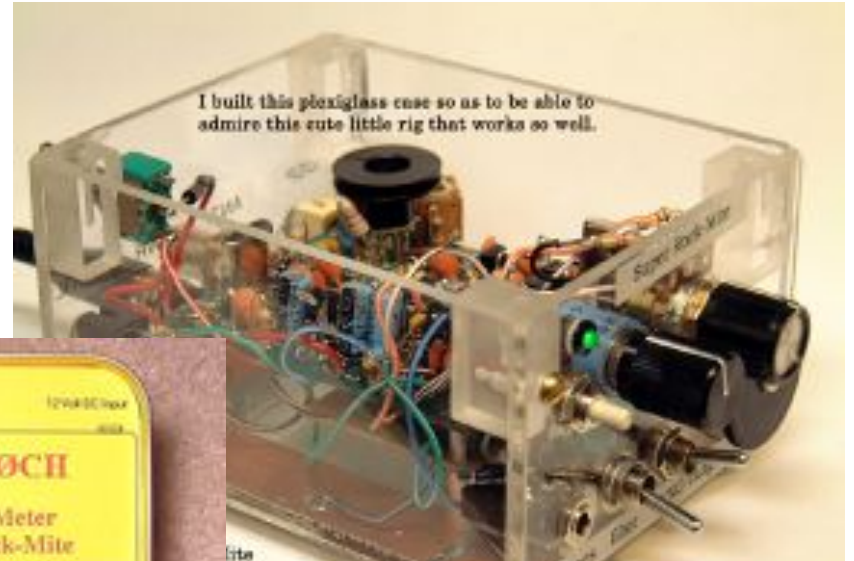
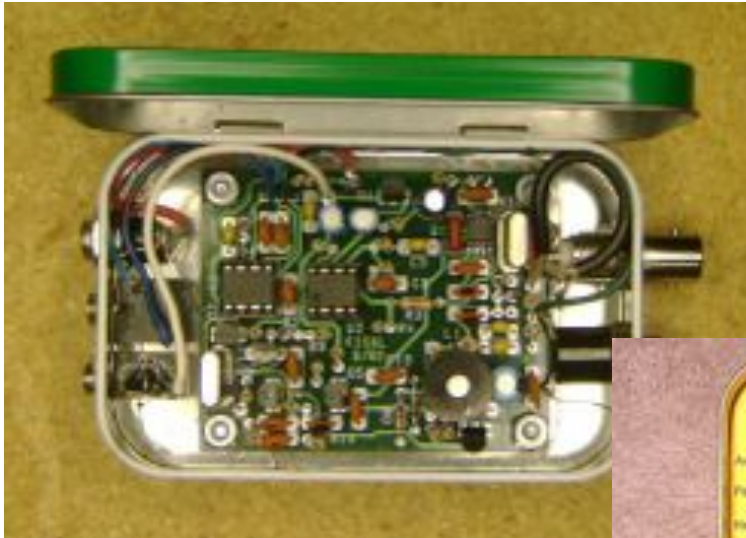
Operating the Rockmite



- W9SIZ making a contact with the Rockmite

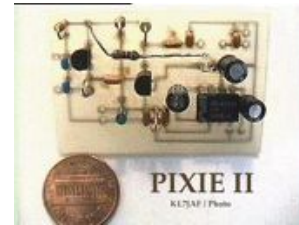


Rockmites



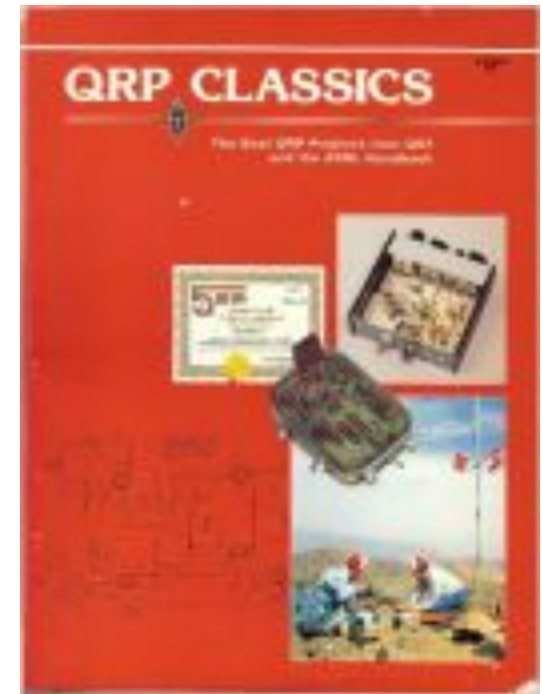
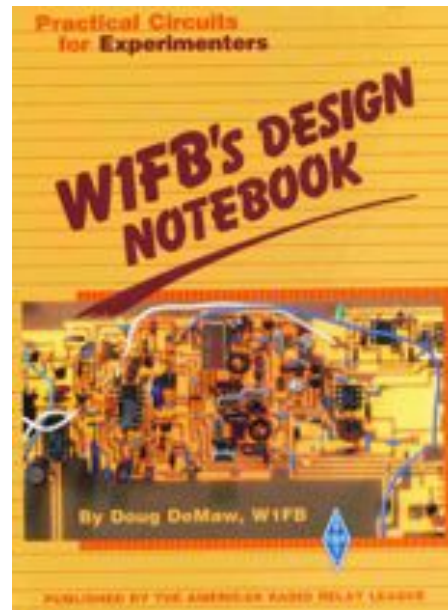
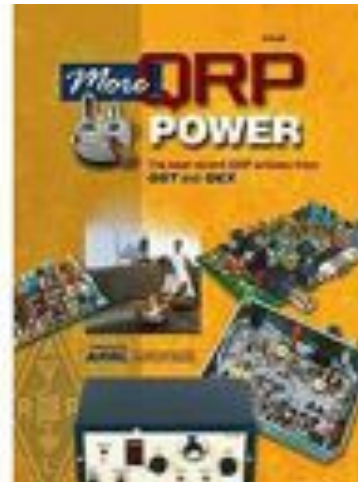
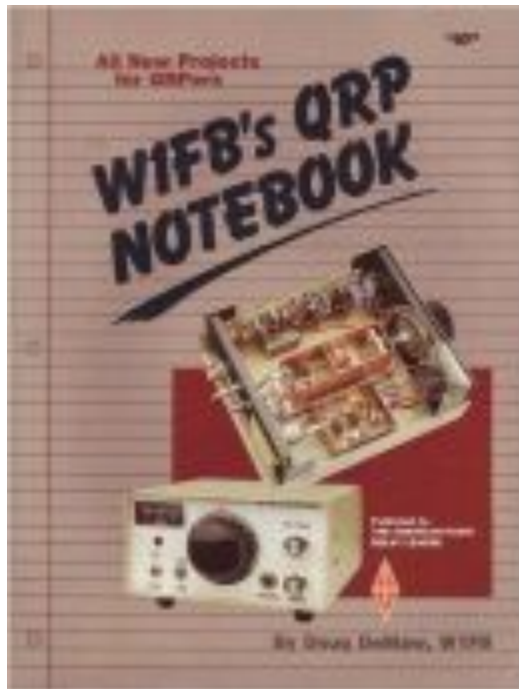
Other QRP Radios and Equipment

- Elecraft
 - KX1, KX3, K1, K2
- TenTec
 - Argonaut VI
- Oak Hills Research
 - OHR 100A
- ICOM 703 and Yaesu 817
- Heathkit HW-7,8,9
- Hendricks QRP Kits
- Pixie
- QRPME.com
- NorCal QRP Club
- *And lots more*



Some QRP Books

- Books by Doug DeMaw, W1FB



QRP Organizations

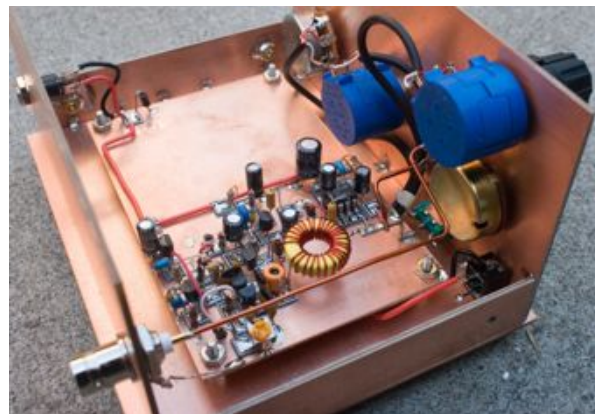
- QRP ARCI – QRP Amateur Radio Club International
 - <http://www.qrparci.org/>
- North American QRP CW Club
 - <http://www.naqcc.info/index.html>
- GQRP
 - <http://www.gqrp.com/>

Websites and Blogs

- RockMite Yahoo Group
 - https://groups.yahoo.com/neo/groups/Rock-Mite_Group/info
- Dave Richards – AA7EE
 - <http://aa7ee.wordpress.com/>
- AE5X
 - <http://www.ae5x.com/blog/>
- W2LJ
 - <http://w2lj.blogspot.com/>
- K4UPG
 - <http://k4upg.com/>
- K4EQ
 - <http://www.k4eq.net/p/qrp.html>

What's next...

- Emtech ZM-2 antenna tuner
- And another Rockmite (20M)
- And a Small Wonder Labs SW-40
- And a WBR 40 M Regen Receiver
- And...



Not all QRP...



- Kenwood Hybrid station
 - TS-830S
 - <http://www.k4eaa.com/>

AR