DMR: PROGRAMMING NOTES FOR ANYTONE AND ALINCO RADIOS

Presentation for the Providence Radio Association, W1OP
September 28, 2021 by Dom Mallozzi,N1DM
WHAT IS THE PURPOSE OF THIS PRESENTATION

QUITE A FEW PEOPLE HAVE HAD QUESTIONS ABOUT THE DMR SYSTEM AND DMR PROGRAMMING. AFTER A BIT OF INTRODUCTION I WILL COVER THOSE QUESTIONS.

THIS PRESENTATION WILL HOPEFULLY FULL IN SOME OF THE ‘BLANKS’ FROM OUR PREVIOUS PRESENTATIONS
Digital Mobile Radio

DMR IS A COMMERCIAL SYSTEM THAT HAS BEEN ADOPTED BY HAMS.

THERE ARE MANY RADIO SUPPLIERS.

HAM SYSTEMS ARE SHOWING UP EVERYWHERE WORLDWIDE.
ADVANTAGES

• ONE REPEATER CAN SUPPORT TWO SIMULTANEOUS CONVERSATIONS USING TIME SHARING (EACH VOICE PATH IS CALLED A TIME SLOT)

• EACH TIME SLOT CAN SUPPORT VARIOUS GROUPS OF USERS (CALLED TALK GROUPS)
The Magic of TDMA

HOW TO GET TWO CONVERSATIONS ON ONE RF CHANNEL

THE REPEATER SYSTEM HAS TWO ALTERNATING TIME SLOTS. ONE USER GROUP USES TIME SLOT 1 WHILE THE OTHER USES TIME SLOT 2.

OTHER THAN PROGRAMMING THE TIME SLOT IN THE RADIO, THE RADIO AND THE SYSTEM FIGURES OUT HOW TO DO THIS.
WHAT DO YOU NEED TO START PROGRAMMING YOUR RADIO

- Correct CPS (Customer Programming Software) for your radio (see next slide)
- A list of DMR talk groups you want to add
- Info on repeater you want to add
  - Frequencies and color code for DMR
  - For Analog FM you need frequencies and CTCSS/PL
- Zones you want to use for various channels. (Zones are link banks in police scanners)
- Any contact ID’s you want to add
- Any special functions you want to activate.
WHAT DO YOU NEED TO START PROGRAMMING YOUR RADIO

WHERE DO YOU GET ALL THAT STUFF?

INFO ON REPEATERS IS FREE AND AVAILABLE AT:

- FOR DMR GO TO WWW.RADIOIOD.NET
- FOR FM GO TO WWW.NEREPEATERS.COM
WHAT DO YOU NEED TO START PROGRAMMING YOUR RADIO

HERE IS WHAT THE ‘RPTR MAP’ TAB DISPLAYS ON RADIOD
WHAT DO YOU NEED TO START PROGRAMMING YOUR RADIO

- FOR DMR GO TO WWW.RADIOID.NET
- FOR FM GO TO WWW.NEREPEATERS.COM
WHAT DO YOU NEED TO START
PROGRAMMING YOUR RADIO

Callsign: W1OP
Frequency: 447.72500
Offset: -5.000
ColorCode: 2

NEDECN
Johnston, Rhode Island

Time Slot #1 - Group Call 1 = World Wide*
Time Slot #1 - Group Call 13 = WW English*
Time Slot #1 - Group Call 3 = North America
Time Slot #1 - Group Call 3172 = Northeast
Time Slot #1 - Group Call 8801 = NETAC1*
Time Slot #1 - Group Call 8804 = CAPENET*
Time Slot #1 - Group Call 3109 = CT Statewide*
Time Slot #1 - Group Call 3125 = MA Statewide
Time Slot #1 - Group Call 310 = TAC310*
Time Slot #1 - Group Call 311 = TAC311*
Time Slot #1 - Group Call 113 = UA English 1*
Time Slot #1 - Group Call 123 = UA English 2*
Time Slot #1 - Group Call 759 = SKYWARN
Time Slot #1 - Group Call 9998 = Parrot*

TALK GROUPS WITH AN * AFTER THE NAME ARE ON DEMAND (PTT) WHICH MEANS YOU ACTIVATE THEM BY USING A PTT CLICK. THEY STAY ON FOR ABOUT 3 TO 5 MINUTES IF NO ACTIVITY IS PRESENT.

Time Slot #2 - Group Call 3181 = New England Wide
Time Slot #2 - Group Call 8 = Region North*
Time Slot #2 - Group Call 3144 = RI Statewide
Time Slot #2 - Group Call 8802 = NETAC2*
Time Slot #2 - Group Call 9 = Local Site
ANYTONE AND ALINCO CPS

• BOTH ALINCO AND ANYTONE HAVE MULTIPLE CPS VERSIONS. IF YOU GO TO THE RADIO’S MENU AND SELECT THE “SETTINGS” TAB YOU WILL SEE THE FIRMWARE VERSION OF YOUR RADIO. DO THIS BEFORE CONNECTING THE PROGRAMMING CABLE TO THE RADIO.

• FOR ANYTONE THE LAST TWO DIGITS OF THE FIRMWARE VERSION MUST AGREE WITH THE LAST TWO DIGITS OF CPS FOR IT TO WORK CORRECTLY.

• FOR EXAMPLE IF YOU HAVE FIRMWARE 2.34 YOU MUST USE A CPS THAT ENDS IN 34 LIKE CPS 1.34.
FIRST THING TO DO

ALWAYS DOWNLOAD THE CURRENT RADIO CODEPLUG AND SAVE IT IN CASE YOU MAKE A BIG (OR EVEN A SMALL) BOO BOO SO YOU CAN GET THE RADIO BACK TO WHERE IT STARTED.

THAN SAVE THE CODEPLUG UNDER A NEW NAME FOR THE CHANGES YOU ARE MAKING.
**SECOND THING TO DO**

**WHAT DOES CPS LOOK LIKE FOR A NEW RADIO?**

<table>
<thead>
<tr>
<th>No.</th>
<th>Radio ID</th>
<th>Name</th>
</tr>
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<tbody>
<tr>
<td>1</td>
<td>12345678</td>
<td>My Radio</td>
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<tr>
<td>2</td>
<td></td>
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<td>3</td>
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</tbody>
</table>
SECOND THING TO DO

HERE IS HOW TO ENTER YOUR RADIO ID INTO CPS

IF YOU DOUBLE LEFT CLICK ON THE ID NUMBER YOU WILL GET THE DIALOGUE BOX TO THE LEFT THAT ALLOWS YOU TO MODIFY THE ID NUMBER AND NAME
SECOND THING TO DO

AFTER EDITING WE NOW HAVE W1GS’S ID AND NAME
FIRST THING TO DO

WHAT DOES CPS LOOK LIKE FOR A NEW RADIO?

THE CHANNEL MENU SHOWS SOME PROGRAMMED CHANNELS ON A NEW RADIO. THESE ARE THE CHANNELS THE FACTORY USES TO TEST THE RADIO AFTER IT IS BUILT. YOU JUST PROGRAM OVER THESE AS YOU ADD CHANNELS.
ORDER OF PROGRAMMING OPERATIONS FOR DMR

- PUT YOUR DMR ID IN THE RADIO
- ADD NEW TALK GROUPS
  - YOU NEED TO DO THIS SO THEY SHOW UP IN THE PICK LIST WHEN YOU ADD A NEW CHANNEL
- ADD NEW CHANNELS
- ADD NEW SCAN LISTS
- ADD NEW RECEIVE GROUPS
- ADD NEW ZONES
- ASSIGN BUTTONS ON RADIO TO SPECIFIC FUNCTIONS (LIKE TURNING SCAN ON AND OFF)
WHAT DO THE PROGRAMMABLE BUTTONS DO

- THIS ALLOWS YOU TO CUSTOMIZE YOUR RADIO TO EASILY TURN ON FUNCTIONS YOU USE ALL THE TIME. FOR EXAMPLE SCAN ON AND OFF
- DEPENDING ON THE RADIO YOU HAVE THERE MAY BE UP TO 40 AVAILABLE FUNCTIONS
- SOME ARE RADIO SPECIFIC LIKE THOSE FOR BLUETOOTH. OBVIOUSLY IF YOU RADIO DOES NOT HAVE BLUETOOTH THESE OPTIONS ARE NOT AVAILABLE ON THE PICK LISTS.
ASSIGNING A BUTTON TO USE

EACH BUTTON HAS 2 AVAILABLE ASSIGNMENTS.

- **SHORT KEY** – IF YOU PUSH THE BUTTON FOR LESS THAN 1 SECOND THIS CHOICE IS DONE

- **LONG KEY** – YOU MUST HOLD THE BUTTON DOWN LONGER THAN 2 SECONDS FOR THIS FUNCTION TO WORK
ASSIGNING A BUTTON TO USE

FROM THE ‘PUBLIC’ SECTION OF THE CPS, SELECT ‘OPTION SETTING’ AND ‘KEY FUNCTION’ TAB TO GET TO THIS SCREEN.

ALL SELECTIONS USE PULL DOWNS.
ASSIGNING A BUTTON TO USE

<table>
<thead>
<tr>
<th>Channel Type</th>
<th>Channel Name</th>
<th>Contact</th>
<th>Radio ID</th>
<th>Optional Signal</th>
</tr>
</thead>
<tbody>
<tr>
<td>A-Analog</td>
<td>Channel 1</td>
<td>Contact1</td>
<td>My Radio</td>
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<tr>
<td>D-Digital</td>
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<tr>
<td>Turbo</td>
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<td>25K</td>
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<tr>
<td>Off</td>
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</tbody>
</table>

**Optional Setting**

- **Work Mode**: BT, STE, GPS/DMR, VFO, Power Save
- **Key Function**: Key Lock, Short Key P1, Short Key P2, Short Key P3, Short Key P4, Short Key P5, Short Key P6, Short Key F1, Short Key F2, Short Key F3, Short Key F4, Short Key F5, Short Key F6, Short Key F7, Short Key F8, Short Key F9, Short Key F10, Short Key F11, Short Key F12, Long Key P1, Long Key P2, Long Key P3, Long Key P4, Long Key P5, Long Key P6, Long Key P7, Long Key P8, Long Key P9, Long Key P10, Long Key P11, Long Key P12, Long Key F1, Long Key F2, Long Key F3, Long Key F4, Long Key F5, Long Key F6, Long Key F7, Long Key F8, Long Key F9, Long Key F10, Long Key F11, Long Key F12, Short Key Push(CH selector), Keypad Lock, Keyboard Lock, Side Key Lock, Forced Lock Key, Long Key Push(CH selector)
- **OK**
- **Cancel**
WHAT DO THE PROGRAMMABLE BUTTONS DO

THE BUTTONS LABELLED P1 THROUGH P6 ARE THE PROGRAMMABLE BUTTONS WE ARE DISCUSSING
WHAT DO THE PROGRAMMABLE BUTTONS DO

EXAMPLES OF SOME AVAILABLE FUNCTIONS

- SCAN
- TALK AROUND – ALLOWS YOU TO SWITCH TO SIMPLEX ON A REPEATER CHANNEL
- VFO/MR
- NUISANCE DELETE – TEMPORARILY LOCK OUT A BUSY CHANNEL ON SCAN
- DIGITAL MONITOR
- MONITOR (USED ON FM ONLY)
ASSIGNING A BUTTON TO USE FOR ‘NUISANCE DELETE’

NUISANCE DELETE ALLOWS YOU TO TEMPORARILY REMOVE A BUSY CHANNEL FROM THE SCAN LIST.

YOU MUST ASSIGN IT TO A KEY.

IT TYPICALLY RESETS EITHER WHEN YOU USE THE FUNCTION KEY AGAIN OR WHEN THE RADIO IS TURNED OFF.
WHAT DO THE PROGRAMMABLE BUTTONS DO

FUNCTIONS TO **AVOID**

- **ENCRYPT/SCRAM** – **ENCRYPTION IS ILLEGAL IN HAM RADIO, NEVER EVEN TRY THIS**
- **WORK ALONE (OR MAN DOWN)**
- **SMS** – **IS TEXTING WHICH IS CURRENTLY DISCOURAGED ON NEDECN’S NETWORK**
WHAT DOES A DMR CHANNEL INCLUDE

EACH CHANNEL HAS THE FOLLOWING ELEMENTS:

- NAME
- INPUT AND OUTPUT FREQUENCIES
- COLOR CODE
- TALK GROUP
- SCAN LIST (OPTIONAL)
- RECEIVE GROUP (OPTIONAL)

- DON’T PROGRAM BOTH A SCAN LIST AND A RECEIVE GROUP ON THE SAME CHANNEL
WHAT IS THE DIFFERENCE BETWEEN A **SCAN LIST** AND A **RECEIVE GROUP** LIST?

A **SCAN LIST** DOES WHAT IT DOES ON EVERY HAM HT, IT ALLOWS YOU TO SCAN A PRESELECTED LIST OF CHANNELS. YOU CAN TURN IT ON AND OFF FROM A BUTTON ON THE RADIO.

A **RECEIVE GROUP** IS A LIST FOR A CHANNEL THAT IS IMBEDDED IN THE PROGRAMMING FOR THE CHANNEL SO WHENEVER YOU LISTEN TO THAT CHANNEL YOU ALSO HEAR THE TALK GROUPS IN THE RECEIVE GROUP LIST. **IT CANNOT BE TURNED OFF BY THE USER.**
WHY USE A RECEIVE GROUP

RECEIVE GROUP LISTS WERE MADE FOR COMMERCIAL USERS SO THAT A GROUP OF USERS COULD BE PAGED WHILE THEY WERE ON THEIR OWN TALK GROUPS.

IN HAM RADIO IT IS TYPICALLY USED SO WHEN YOU ARE ON A TIME SLOT YOU HEAR EVERYONE ELSE ON THAT TIME SLOT SO YOU DO NOT BREAK UP QSO'S OF OTHER USERS ON DIFFERENT TALK GROUPS IN THE SAME TIME SLOT.
ANOTHER WAY TO HEAR ALL ACTIVITY

SOME RADIOS NOW OFFER A ‘PROMISCUOUS MODE’ IN DMR OPERATION. IT LETS YOU LISTEN TO ALL TALK GROUPS ON ANY TIME SLOT ON ANY COLOR CODE.

AMONG RADIOS OFFERING THIS IS THE NEW RFINDER M1.
ORDER OF PROGRAMMING OPERATIONS

FM IS EASY

- ADD NEW CHANNELS FREQUENCIES AND PL (OR DPL) AND A NAME
- ASSIGN NEW CHANNEL TO A ZONE
- YOU CAN MIX DMR AND ANALOG CHANNELS IN A ZONE
WHERE TO GET DIGITAL CONTACT LISTS

THERE ARE A BUNCH OF WAYS TO GET DIGITAL CONTACT LISTS

• DIRECTLY FROM WWW.RADIOID.NET
• FROM THE N0GSG WEBSITE APPLICATION
• OTHER COMMERCIAL SITES
Where to get digital contact lists

N0GSG’S CONTACT MANAGER IS THE BEST WAY TO GET CONTACT LISTS

IT WORKS WITH MOST RADIOS
IT BRINGS IN THE FILE AS A EXCEL SPREADSHEET

IT ALLOWS YOU TO PARSE FILES BY USING SEARCH TOOLS. THIS IS ESPECIALLY GOOD WHEN YOU RUN OUT OF CONTACT SPACE IN YOUR RADIO.

HE ALSO HAS A PROGRAMMING TOOL
Hotspots

_HOTSPOTS_ ARE A VERY LOW POWER (<10 MW) RADIO THAT USES YOUR INTERNET CONNECTION TO TALK ON THE NETWORK. IT ALLOWS YOU TO USE YOUR HT OR MOBILE WHEN OUT OF RANGE OF A REPEATER.

HOTSPOTS OPERATE AS SIMPLEX REPEATERS.

THE NEDECN NETWORK LIMITS WHAT TALK GROUPS CAN BE ACCESSED FROM HOTSPOTS. OTHER NETWORKS LIKE BRANDMEISTER ALLOW YOU ACCESS TO ANY TALKGROUP ON THEIR NETWORK.
Hotspots

WHAT FREQUENCY CAN I PUT MY HOTSPOT ON?

I SUGGEST YOU USE CHANNELS IN THE 440 RANGE NOT 2M. TRY TO STAY IN THE RANGES 433-435 MHz AND 438-439 MHz.

NEVER USE FM SIMPLEX CHANNELS LIKE 446.000 MHz.

NEVER USE THE GOVERNMENT RESTRICTED CHANNELS 439.025 TO 441.250 MHz.

ALSO AVOID THE ATV, WEAK SIGNAL AND SATELLITE AREAS: BELOW 433 MHz AND 435 TO 438 MHz.
FAQ

WHAT ARE REPEATER TIME OUT TIMERS SET FOR? IT VARIES BY REPEATER BUT 3 MINUTES (180 SEC) IS THE NORM. I HAVE SET THE TIME OUT TIME (TOT) ON MY RADIOS TO 165 SECONDS SO I DO NOT OWE ANYONE A DRINK FOR TIMING OUT THE REPEATER.

HOW MUCH ACTIVITY IS THERE ON DMR? THE BUSIER REPEATERS ON THE SYSTEM (LIKE SOUTHBOROUGH) ARE SHOWING ABOUT 30 TO 45 MINUTES PER DAY.
FAQ

- CAN I ADD AN AMPLIFIER TO MY RADIO? NOT EASILY, THE AMPLIFIER Needs TO BE ABLE TO SWITCH ON AND OFF VERY QUICKLY AND THAT IS HARD TO DO FOR MANY AMPLIFIERS. BAOFENG CURRENTLY MARKETS SINGLE BAND AMPLIFIERS, BUT I HAVE NO EXPERIENCE WITH THEM.

MAK E SURE YOU BUY THE ‘D’ VERSION WHICH IS FOR DMR. THE ONE WITOUT THE ‘D’ SUFFIX ONLY DOES FM

BTECH AMP-U25D Amplifier (Supports DMR) UHF (400-480MHz), 20-40W Output (2-6W Input), Analog and Digital Modes, Compatible with All Handheld Radios: BTECH, BaoFeng, Kenwood, Yaesu, ICOM, Motorola
FAQ

- WHY ARE THERE MULTIPLE NETWORKS? GROUPS LIKE NEDECN, BRANDMEISTER AND CT-ARES SET UP NETWORKS THAT MET THEIR NEEDS. THEY ARE ALL GOOD AND HAVE THEIR OWN ADVANTAGES AND DISADVANTAGES.

- NEDECN WAS SET UP PRIMARILY TO BE A REGIONAL SYSTEM COVERING NEW ENGLAND AND THE CANADIAN MARITIME PROVINCES.

- BRANDMEISTER IS A ON-DEMAND NETWORK LIKE D-STAR AND ALLOWS YOU TO CHOOSE FROM 1000’S OF TALK GROUPS.
FAQ

- WHAT HAPPENS WHEN THE DMR REPEATER LOOSES ITS NETWORK CONNECTION? THE LOCAL CHANNEL ON THE REPEATER ALWAYS WORKS.

- WHAT IS AN EASY WAY TO CHECK IF THE DMR REPEATER IS ON THE NETWORK? THERE ARE 2, GO TO THE PARROT AND TRY IT, IF THE PARROT IS WORKING THE REPEATER IS ON THE NETWORK. THE SECOND IS TO GO TO NEDECN AND CHECK NETWATCH(NewEng-TRBO (nedecn.org)) AS YOU TRANSMIT. IF YOU SEE YOUR CALL COME UP THE REPEATER IS ON THE NETWORK.
FAQ

WHAT IS AN EASY WAY TO CHECK IF THE DMR REPEATER IS ON THE NETWORK?

IF YOU GO TO PEER WATCH ON NEDECN AT

cb.nedecn.org:42420/PeerWatch

(this is case sensitive)

YOU WILL SEE THIS SCREEN IF THERE IS NO ACTIVITY.
**FAQ**

- **WHAT IS AN EASY WAY TO CHECK IF THE DMR REPEATER IS ON THE NETWORK?**

  If I transmit on local to the AE1C Southboro UHF repeater, you see this. The red bar under the repeater ID number indicates it is on the network, the green bar under the name is an indication this is the repeater receiving a signal.
FAQ

• WHAT IS AN EASY WAY TO CHECK IF THE DMR REPEATER IS ON THE NETWORK?

WHEN SOMEONE TRANSMITS ON NEW ENGLAND WIDE YOU SEE THIS.

THE GREEN BAR INDICATES I WAS TRANSMITTING TO THE SYSTEM ON SOUTHBORO UHF.

THE RED BARS ON THE OTHER REPEATERS INDICATE THEY ARE TRANSMITTING.
Some DMR Web Sites
(check out the links below)

- [http://dmr-marc.net/](http://dmr-marc.net/) (WW Net)
- [http://nedecn.org](http://nedecn.org) (New England)
- [http://www.maine-dmr.org/](http://www.maine-dmr.org/) (Maine DMR... very good introductory material)
## Some DMR Terminology

<table>
<thead>
<tr>
<th>DMR TERM</th>
<th>WHAT IS IT / HAM TERM</th>
<th>NOTES</th>
</tr>
</thead>
<tbody>
<tr>
<td>TIME SLOT</td>
<td>In DMR each RF channel has two time slots. You must define which one you need to use for a particular application.</td>
<td>Time slots are assigned by repeater system. You must comply with the repeater system assignments.</td>
</tr>
<tr>
<td>DIGITAL CONTACT</td>
<td>A DMR talks to a repeater or another user by defining a assigned digit number between 1 and 16776415 that is sent with every transmission.</td>
<td>Every talk group and user has a unique Digital Contact number. The DMR-MARC website explains how they are assigned.</td>
</tr>
<tr>
<td>RADIO ID</td>
<td>Every radio in a DMR system MUST HAVE a radio ID. This is put in general settings</td>
<td>You must get an ID from Radioid.Net before you start programming a radio</td>
</tr>
<tr>
<td>CODE PLUG</td>
<td>It is the programming file for a radio.</td>
<td>It includes all settings for that radio</td>
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<tr>
<td>ZONE</td>
<td>Scan Bank</td>
<td>In older radios a Zone can only have 16 entries, more recent radios have unlimited zone list size.</td>
</tr>
<tr>
<td>COLOR CODE</td>
<td>Digital PL</td>
<td>Color Code acts like Digital PL</td>
</tr>
<tr>
<td>NUISANCE DELETE</td>
<td>Scan Lock Out, Busy Channel Lockout</td>
<td>This locks out a channel in a scan bank that you temporarily don't want to hear. It will reset when the radio is turned off.</td>
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<tr>
<td>SUBSCRIBER</td>
<td>Mobile, portable or base station</td>
<td>Any radio on the system other than the repeater itself is referred to as a subscriber</td>
</tr>
<tr>
<td>TOT (Time out timer)</td>
<td>Time out timer</td>
<td>If you transmit for longer than this setting the radio will cut you off and give you an error tone.</td>
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</tbody>
</table>
# Some DMR Terminology

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<tr>
<td>ENTITLEMENT KEY</td>
<td>A option code that adds a function to the software</td>
<td>Used to allow traditional (wideband) FM on Motorola radios</td>
</tr>
<tr>
<td>ROAM LIST</td>
<td>This is the list that establishes the repeaters that are checked in a roaming grouping</td>
<td>This is limited to 16 repeaters for any list for older radios. System only works with Motorola radios.</td>
</tr>
<tr>
<td>ALIAS</td>
<td>This is a text assigned to a Digital ID that displays on the radio whenever that ID is received.</td>
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</table>
Questions?

Contact

- Dom Mallozzi, N1DM
dmallozzi@aol.com