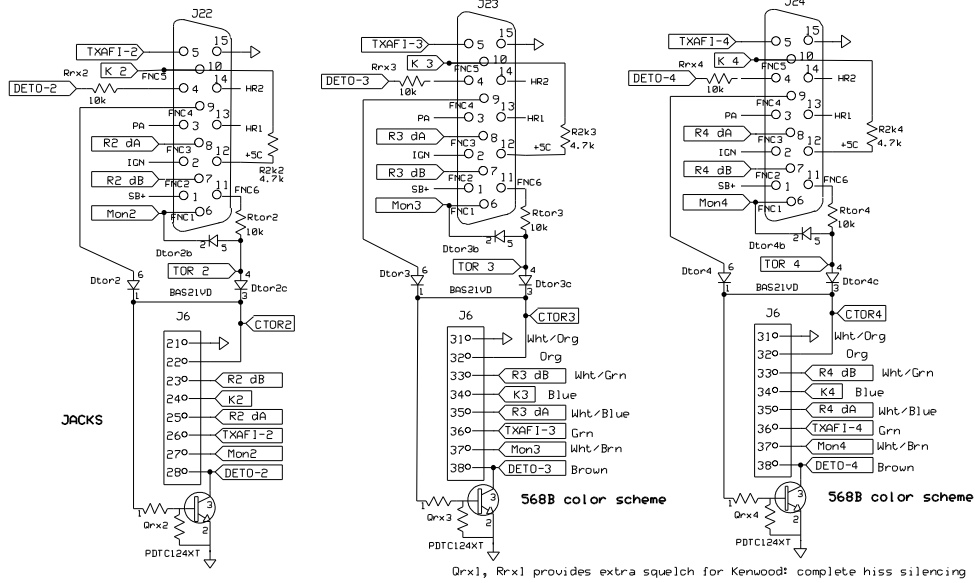


Kenwood CTOR cables - see next page for Scramble version

DB15HD's show pins at radio end; RJ45's are box ends
J21 is on Scramble Cable page

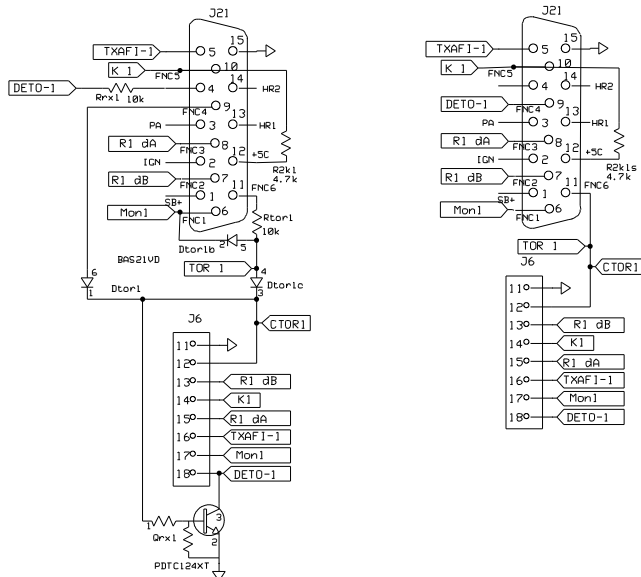
Dtor & Rtor added to mix TOR and COR (TOR does not send COR in MON)
R2k4 added to prevent keying if desk power dies; dead +5 in hub loads PTT
These parts on 16x13mm PCB in DB15HD shell



STM Radio		
Kenwood Cables		
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Non-scramble cable
No radio mod required
same as page 1

Scramble cable (radio mod required)
Can be used for tone-activated repeater but not carrier-only repeater

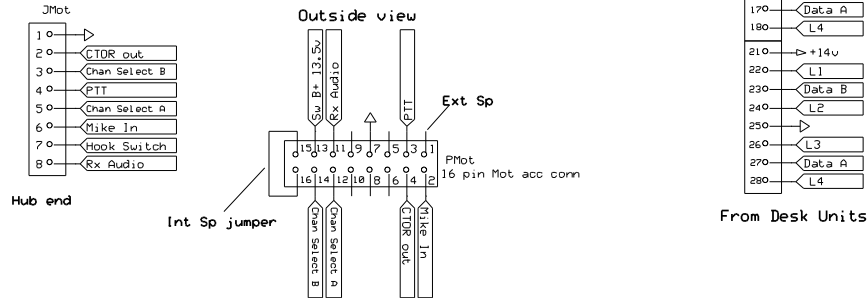


Note Rx audio on pin 9
No COR programmed; TOR not programmed
Radio does squelching; Qsqx not active
Program TOR if tone-operated repeat is needed, else let radio do all squelching
Radio modified to send audio out from speaker (IC705 pin 1) to pin 9 through 1uF, + to IC705
Min volume programmed to "4"

Audio is still present on pin 4 but it will not be unscrambled

STM Radio		
Kenwood Scramble cable		
Stan Jones	Rev 1.0 1/26/2016	Page 2

Send 14v to desks, let them regulate it: line may sag 2v

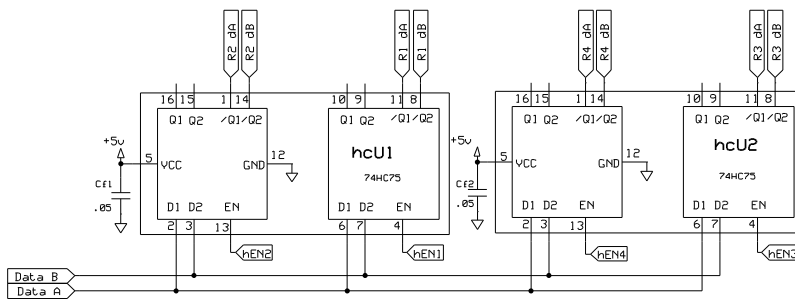


16 pin plug will also fit center pins on CDM models BUT
 CDM's CTOR may pull up to only 3.5v; if so, prog as active high and add a digital NPN inverter
 Inverter and its pull up can be here or in hub (preferably in cable; pull up to B+ pin 13)
 To prevent hub-power-off keying radio, connect PTT to B+ with 22k. No series diode needed.

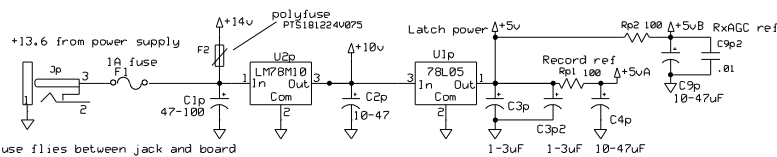
Program Rx Audio to de-emphasised muted
 This is also post-descramble
 CTOR is not used if no repeater
 CTOR may be open collector on some models
 If so, add a pullup

STM Radio		
Motorola Cable, Desk Jacks		
Stan Jones	Rev 1.0 11/29/2016	Page 3

PCB layout dictates which latch goes to which radio



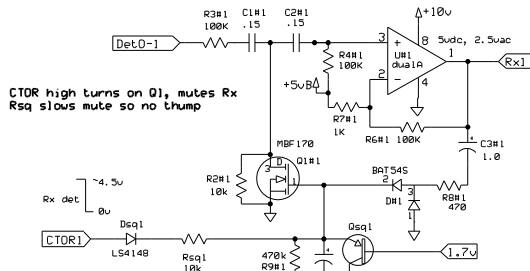
Outputs have internal diodes to +5, so if power dies in hub, radios lock to 00 channel 4
 In case hub dies but radios have power, unplug control cables to the radios and use panel mikes



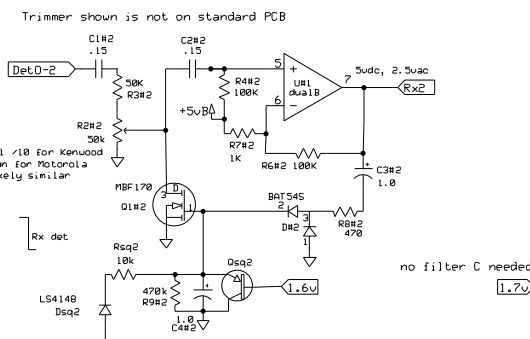
Main fuse flies between jack and board
 or can be external in power cord
 5v is lightly loaded, even by latches, so 78L05 OK
 5v in desk drives some LED's but L05 still OK
 If any mounted gooseneck, put preamp in line between desk and mike

STM Radio		
Hub Channel Set, Power Dist		
Stan Jones	Rev 1.0 11/29/2013	Page 4

R2#s divide input 1/10, also rolls off low end with C1# to reduce PL hum
 10k gives AGC knee with ~1k deviation Rx by TK7302
 May need to use trimmer if different radios have much different output (see #2 ckt)

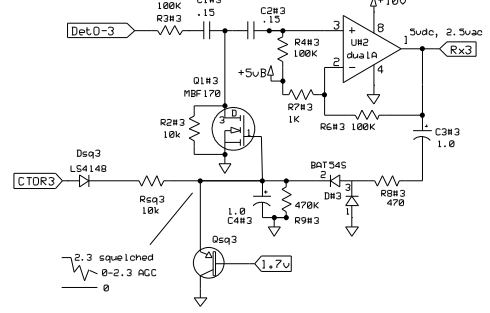


CTOR high turns on Q1, mutes Rx
 Rsq slows mute so no thump

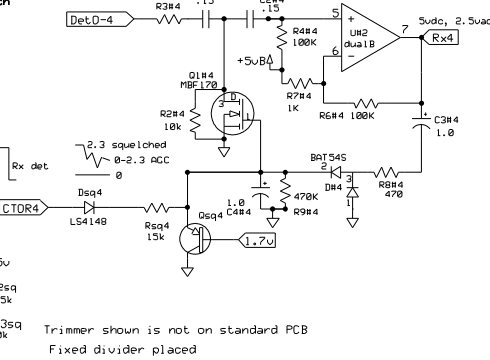


CTOR goes low, C4 discharges slowly (1/3s), unmutes softly
 TK790 CDR/TDR is open-collector; provide in cable if not using radio's squelch

Trimmer shown is not on standard PCB
 Optimal /10 for Kenwood
 Unknown for Motorola
 but likely similar

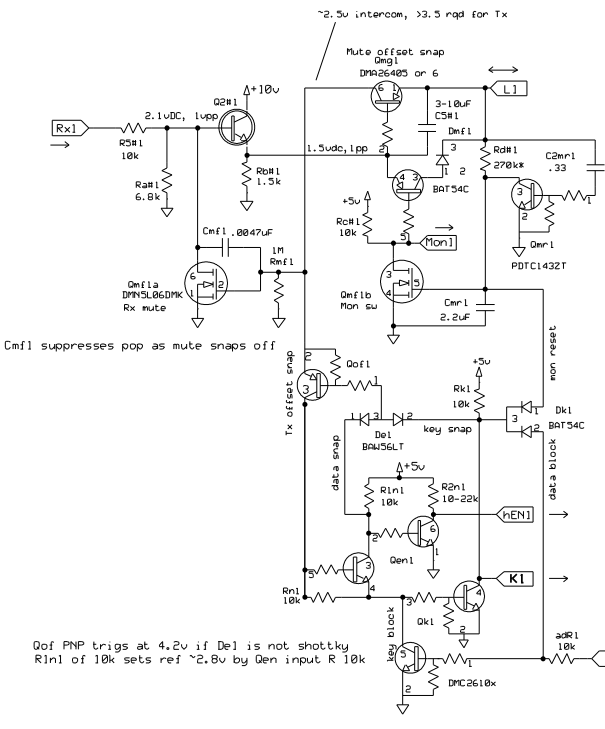


If no PNP (sq2.5u) unmute is delayed longer than desired (>.5s)

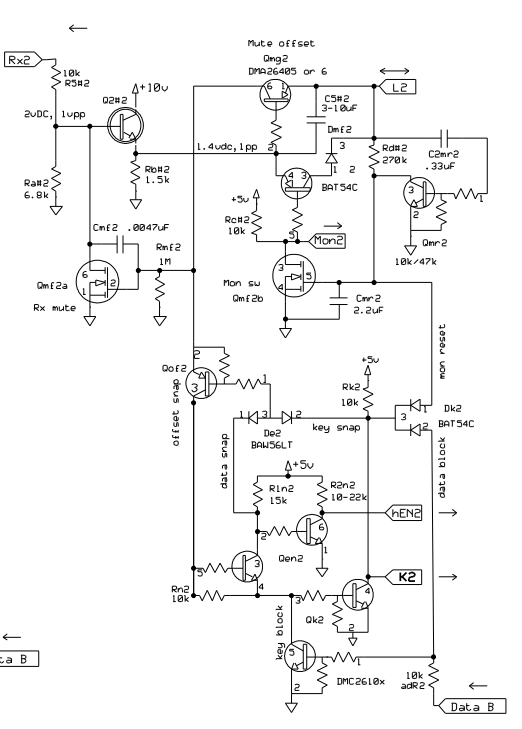


Trimmer shown is not on standard PCB
 Fixed divider placed

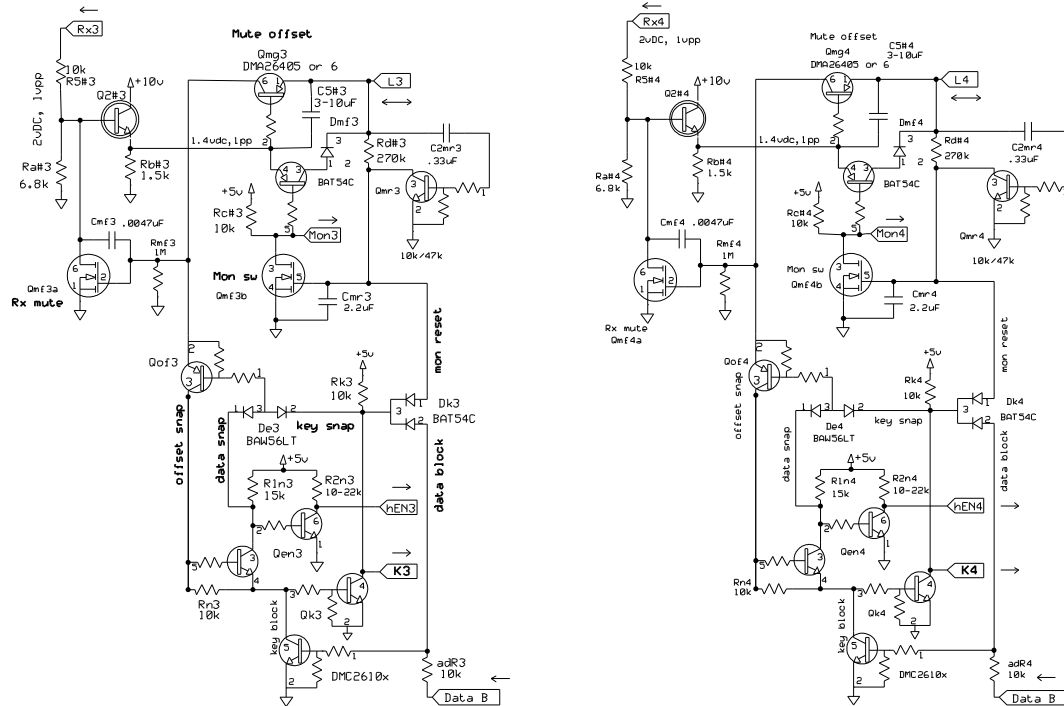
STM Radio		
RxAGC and CTOR Switches		
Stan Jones	Rev 1.0 4/14/2014	Page 5



Data B acts as AnyData, is either 1.5v (channel 1, 2) or 4.5v (3, 4)



STM Radio		
Priority/Mon Logic 1, 2		
Stan Jones	Rev 1.0 5/6/2014	Page 6



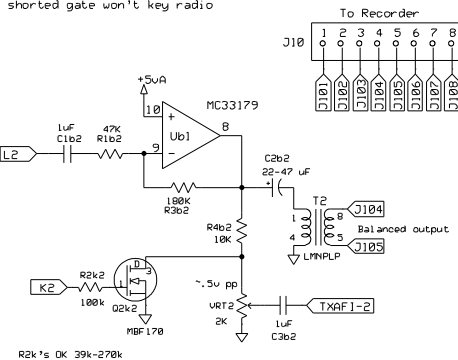
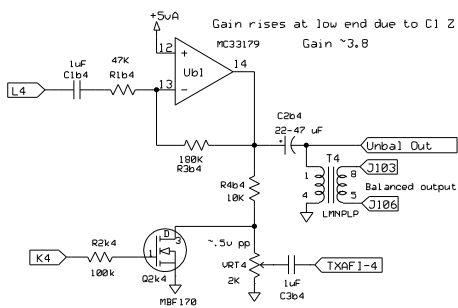
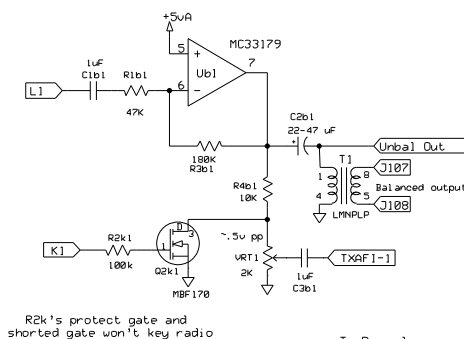
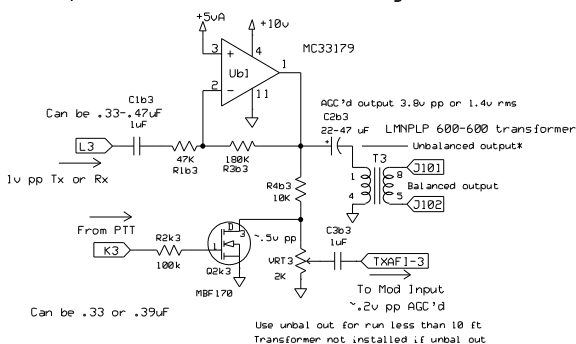
Rk pullups can be higher (15-22k) as another pullup is in the cable, taken to the radio's +5v. This prevents PIT when hub powered down.

STM Radio

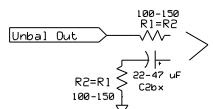
Priority/Mon Logic 3, 4

Stan Jones Rev 1.0 7/23/2014 Page 7

U1 pin 1 feeds radio 3 due to PCB layout



*UNBALANCED OUTPUT CAN STILL LOOK BALANCED TO OTHER END IF CONNECTED THIS WAY:



(Shock protection set by C2's)
Output (audio not symmetrical BUT impedances ARE)
R2 may need to be > R1 to match Zout of op-amp
This design per Jensen engineer

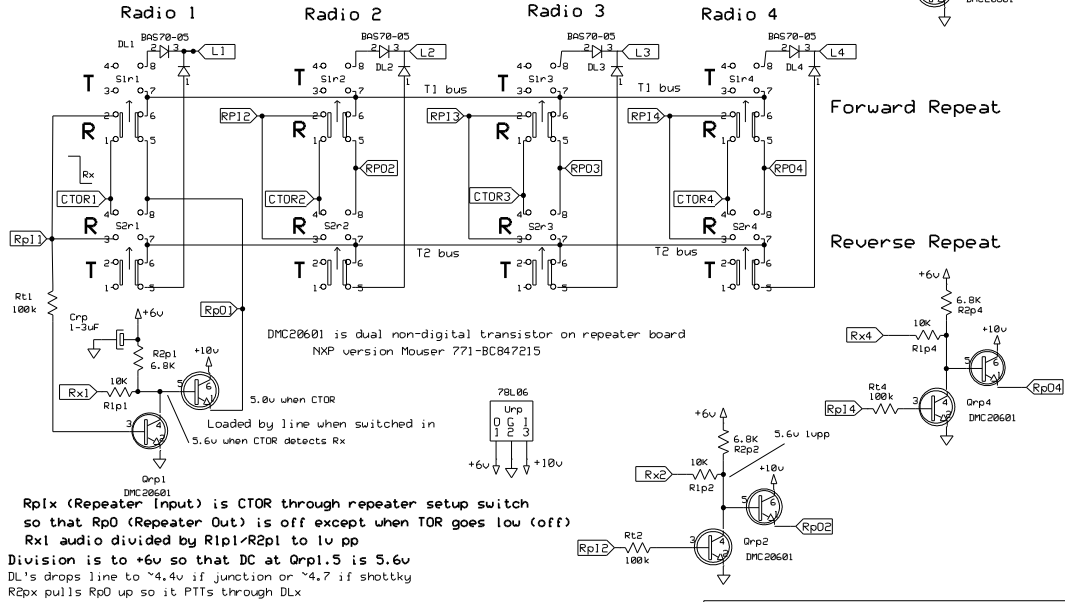
STM Radio

Record Buffers

Stan Jones Rev 1.6 6/14/2013 Page 8

TOR = Tone Operated Relay (KW is only active low, +5 off)
 Sample setup: S1r1 to R, S1r2 to T, S2r1 to T, s2r2 to R to crossrepeat radios 1 and 2
 S2 settings do the same thing in reverse when radio 2 receives
 When RPO keys line, desk units are blocked as if repeat is another desk
 Desks see red "stop" light and hear mod on Tx line and Rx on the other line
 OS203013MT8QN1 slide DP3T (DPDT with center off)

"T" means "gets keyed"
 "R" means "does keying"

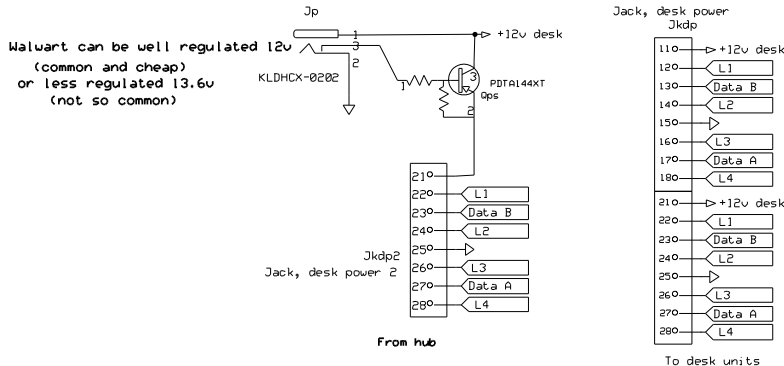


"R" connects CTOR to RPI and RPO to T bus
 "T" connects T bus to line through diode (shottky can reduce dc drop)
 Two switched to T: no clash due to diodes. Audio passes diodes, which conduct.
 Two switched to R: no clash if Rx at different times, else distorted mixing

STM Radio		
Repeater Switching		
Stan Jones	Rev 1.0 3/28/2014	Page 9

Desk units take raw 13.6 and each have own 7810 inside

If the walwart is unplugged hub power connects to the desk side



Without power jack, this is just a line splitter, saves running two wires to hub
 But if the wire is over 100 feet likely better to run two wires, as power may sag on one
 Or use jack with walwart at desk

STM Radio		
Jack Splitter / Power tap		
Stan Jones	Rev 2 12/19/2014	Page 10

