



"We were born to do this, to come together. Not to sit on our duffs and wait for someone to help us."

---- Quote from a TV interview on September 1, 2007 by some little old lady helping rebuild after tornados struck northern Wisconsin. Don't expect to hear *that* mentioned on the big "news" networks.

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Note:

1. Bit 23 exists only in the 1A ESS switch.

Some existing network management indicators now reflect conditions in the 4-wire network. These indicators are machine congestion level level 1 for MF and DP receivers, machine congestion level 2 for MF and DP receivers, and MF and DP receivers being queued.

LEGEND:

DP – DIAL PULSE, MF = MULTIFREQUENCY H – 1, IF FORMAT OF THE BLOCK IS AS SHOWN H – 0, IF THE BLOCK IS IN THE OLD FORMAT

- MF MULTIFREQUENCY MTDN MISCELLANEOUS TRUNK SIGNAL DISTRIBUTOR NUMBER

TGN - TRUNK GROUP NUMBER WRDN - WORD NUMBER.

Fig. 8—Unit Type 56, Member Number 2 Auxiliary Block (Note 1)

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Note: 1. Bit 23 exists in the 1A ESS switch only.

LEGEND:

ALT – PERCENTAGE OF ALTERNATE ATTEMPTS DIR – PERCENTAGE OF DIRECT ATTEMPTS OVF – PERCENTAGE OF OVERFLOW ATTEMPTS

CT - CANCEL-TO INDICATOR SK - SKIP INDICATOR

- SK SKIP INDICATOR CF CANCEL-FROM INDICATOR IR 1 IF THE CONTROL IS AN IMMEDIATE REROUTE PR PRIORITY EQUAL TO MACHINE CONGESTION LEVEL BINARY CONVERSION RR 1 IF THE CONTROL IS A REGULAR REROUTE RO IS USED WITH OVF TO INDICATE THE PERCENT OF OVERFLOW TRAFFIC TO REROUTE RD IS USED WITH DIR TO INDICATE THE PERCENT OF DISCONT DOULTE THAFFTO INDICATE THE PERCENT OF DISCONT DOULTE THAFFTO INDICATE THE PERCENT OF DISCONT DOULTE THAFFTO INDICATE THE PERCENT OF
- DIRECT ROUTED TRAFFIC TO REROUTE RA IS USED WITH ALT TO INDICATE THE PERCENT OF Alternate Routed traffic to reroute
- RRTGA

1, 2, OR 3 TGN'S CAN BE USED AS TO TRUNK Groups (TTG) in a reroute control RRTGB

RRTGC

WRDN = NUMBER OF WORDS IN AUXILIARY BLOCK CAN BE 4, 5, OR 6.

Fig. 9—TGC Unit Type 46 Auxiliary Block (Note 1)

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Fig. 10—Single Reroute Control Slot Layout—NMSIRR

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NMC = 1 IF TRAFFIC USING THIS 3-DIGIT TRANSLATOR MAY BE AFFECTED BY NETWORK MANAGEMENT CODE BLOCKING (1E7/1AE7 AND EARLIER) OR CALL GAPPING (1E8/1AE8 AND LATER) AND CALLING LINE IDENTIFICATION.

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Fig. 12—3-Digit Index to NPA Translator (Note 1)

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Fig. 15—Flexible Trunk Group Control Block Layout (Sheet 1 of 2) (Note 1)

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Note: See matrix to determine control percentage and associated bit code for trunk group control direct-routed, alternate-routed, or overflow traffic.

*2 \times (NMFLXC+1), THIS FORMULA BUILDS THE NUMBER OF SUBBLOCKS FOR THIS TABLE

† MANUAL/AUTOMATIC INDICATOR; 0 = MANUAL, 1 = AUTOMATIC

LEGEND:

X DDR - X DIRECT-ROUTED TRAFFIC TO BE CONTROLLED X ALT - X ALTERNATE-ROUTED TRAFFIC TO BE CONTROLLED X OVF - X OVERFLOW TRAFFIC TO BE CONTROLLED D - DISPOSITION OF AFFECTED CALLS

D - DISPOSITION OF AFFECTED CALLS PRE,DRE - THRESHOLDS NMFLXC - SET CARD THAT PROVIDES THE QUANTITY OF FLEXIBLE TRUNK GROUP CONTROL SLOTS NMFLEX - ADDRESS OF FIRST WORD IN FLEXIBLE CONTROL SLOTS BLOCK NOET - NUMBER OF EQUIPPED TRUNKS (USED ONLY ON TR-ACT INPUT MESSAGE) RR - REROUTE TYPE: IMMEDIATE REROUTE IF BIT = 1; REGULAR REROUTE IF BIT = 9 RI - REROUTE INDICATOR (BIT = 1, REROUTE EFFECTIVE) SR - SPRAY REROUTE (BIT = 1, SPRAY REROUTE EFFECTIVE) D TWDEY - DEDDITES INT TMOREY TWIN SORARY REROUTE TABLE

RR INDEX - REROUTE SLOT INDEX INTO SPRAY REROUTE TABLE (NMSPRR) OR SINGLE REROUTE TABLE (NMSIRR) PEG - TRAFFIC PEG COUNT BIT (USED ONLY FOR TRUNK GROUP CONTROLS)

2W - TWO-WAY TRUNK GROUP INDICATOR BIT FTG TGN - "FROM TRUNK GROUP" TRUNK GROUP NUMBER

Fig. 15—Flexible Trunk Group Control Block Layout (Sheet 2 of 2) (Note 1)

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NETWORK MANAGEMENT SUBSYSTEM PROGRAMS				
PROGRAM ACRONYM	TITLE	PR-NUMBER 1"ESS"	PR-NUMBER 1A "ESS"	
CLID	Calling Line Identification List Administration	PR-1A087	PR-6A087	
EDAS	Engineering Administrative and Data Acquisition PR-1A091 PR-6A091 Interface			
EDVF	EDAS Translation Verification Routines	PR-1A091	PR-6A880	
NMEA	EADAS/NM Interface	PR-1A092	PR-6A092	
NMGT	Network Management	PR-1A080	PR-6A080	
NMIN	Network Management Indicators	PR-1A080	PR-6A904	
NMMP	Network Management Maintenance	PR-1A052	PR-6A052	
NMRR	Network Management Reroute Control	PR-1A080	PR-6A906	
NMTC	Network Management Toll Code Blocking	PR-1A080	PR-6A907	
NMTD	Transmit Dynamic Overload Control Signals	PR-1A080	PR-6A908	
NMTG	Network Management	PR-1A080	PR-6A909	
NMSC	Network Management Selective Incoming Overload Control	PR-1A1341	PR-6A1341	
NMCG	Network Management Call Gapping	PR-1A1343	PR-6A1343	

TABLE A

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TABLE B

TTIA PROGRAM INTERFACE

NETWORK MANAG	EMENT SUBSYSTEM	
PROGRAM	GLOBAL	TTY INPUT MESSAGE (RESPONSE)
NMMP	NMMRST	DOC-RESTORE (restores loop out-of-service bit)
	NMTDEX	DOCX-EX (executes daily exercise on DOC transmitter)
NMRR	NMRRST	RR-STATUS (lists network management prepro- grammed reroute controls)
NMEA	NMDRST	DR-STATUS (lists all DOC receiver loops out-of- service)
	NMDTST	DT-STATUS (lists all DOC transmit loops out-of- service)
	NMEATA	TG-ADDCNT (adds TGN to block 63 traffic counts)
	NMEATD	TG-DEACT (removes TGN from block 63 traffic counts)
	NMTGST	TG-STATUS (lists all active block 63 traffic counts)
NMTD	NMDCME	DOC-EXC (excludes DOC signal from transmission)
	NMDCMR	DOC-REM (removes DOC signal from transmission)
	NMDCRA	DOC-CLEAR (removes all manual controls of DOC signal)
	NMDCMS	DOC-SND (sets up DOC-signal _y data for transmission)
	NMDCST	DOC-STATUS (lists status of all DOC signals)
	NMDMC3	LST-THREE (lists MC3 signal data)
	NMDPD1	DPD-MCONE (lists MC1 trunk dial pulse receiver data)
	NMDPD2	DPD-MCTWO (lists MC2 trunk dial pulse receiver data)
	NMMFD1	MFD-MCONE (lists multifrequency receiver data)
	NMMFD2	MFD-MCTWO (lists multifrequency receiver data)
	NMRPD1	RPD-MCONE (lists MC1 revertive pulse receiver data)
	NMRPD2	RPD-MCTWO (lists MC2 revertive pulse receiver data)
	NMRTD1	RTD-MCONE (lists MC1 real time congestion data)
	NMRTD2	TRD-MCTWO (lists MC2 real time congestion data)

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TABLE B (Contd)

TTIA PROGRAM INTERFACE NETWORK MANAGEMENT SUBSYSTEM PROGRAM GLOBAL TTY INPUT MESSAGE (RESPONSE) NMIN NMSTDT TGN-DATA (lists TGNs to which no-circuit indicators are assigned NMTG NMCFAT CF-ACT (activates CANCEL-FROM flexible trunk group control) NMCTAT CT-ACT (activates CANCEL-TO flexible trunk group control) NMFXDT $\label{eq:FLEX-DEACT} FLEX-DEACT \, (deactivates \, flexible \, trunk \, group \, control$ or flexible trunk group peg and overflow counter) NMFXRA FLEX-CLEAR (removes all active flexible trunk group controls and flexible trunk group peg and overflow counters) NMFXST FX-STATUS (lists all active flexible trunk group controls and flexible trunk group peg and overflow counters) NMPPDT PP-DATA (lists translation information associated with each preprogram control) NMPPMA PP-ACT (activates preprogram control) NMPPME PP-EXC (excludes preprogram control from activation via DOC signal) NMPPMR PP-REM (deactivates a preprogram control; restores a preprogram which is excluded from activation via DOC signals NMPPRA PP-CLEAR (deactivates all preprograms currently active and restores all preprograms excluded from activation via DOC signals) NMSKAT SK-ACT (activates SKIP flexible trunk group control) NMTGCT TG-ACT (activates flexible trunk group peg and overflow counter on trunk group) NMTRAT **TR-ACT** (activates TRUNK RESERVATION flexible trunk group control) CLID CLENTR CI-ENTER (places directory number on CLID list) CLRMVE CI-REMOVE (removes directory number from CLID list) CLLIST CI-LIST (lists CLID entries)

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TABLE B (Contd)

TTIA PROGRAM INTERFACE

NETWORK MANAGEMENT SUBSYSTEM		
PROGRAM	GLOBAL	TTY INPUT MESSAGE (RESPONSE)
NMSC	NMSCIM	 NMG-SILC (A, R, or S) A (assign) — Assigns a trunk group control to a specified trunk group number (TGN) R (remove) — Removes one (specify TGN) or all (specify All) trunk group control(s) S (status) — Lists all (specify All) or one (specify TGN) active trunk group controls for SILC.
NMCG	CGACRQ . CGRMRQ CGRARQ CGSTRQ	Activates a call gapping control Removes a call gapping control Clears all call gapping controls Status of active call gapping controls

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TABLE C

ECMP PROGRAM INTERFACE

NETWORK MANAGEMENT SUBSYSTEM		
PROGRAM	GLOBAL	ECMP INTERFACE CONDITION
NMMP	NMMDEX	Entered once every 24 hours to determine what main- tenance actions should be performed
NMGT	NMCBRC	Return entry after real-time break
NMTD	NM10SC	10-second entry to determine validity of acknow- ledgements
	NM5MIN	5-minute entry to zero machine congestion traffic and print exception message if counts are nonzero
NMIN	NMSTST	10-second entry to control SC relays in network management indicator circuit
NMSC	NMSCAC	Audit for SILC control signals

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ROGRAM ENTERED)	PROGRAM (ENTERED FROM)	GLOBAL SUBROUTINE (ENTERED)
DAS	EDVF	EDASEG
		EDASND
		EDASTG
	NMEA	EANMAN
DVF	EDAS	EDTGNS
		EDVCHC
		EDVCRT
		EDVCTG
		EDVFYC
		EDVFYH
		EDVHC5
		ED1TNG
MEA	EDAS	NMEAAP
	NMCG	NMEAT1
	THE CO	NMEAT2
		NMEAT3
		NMEAT4
		NMEAT5
		NMEAT6
		NMEAT44
		NMEAT52
	NMSC	NMEAS0
		NMEAS1
		NMEAS2
		NMEAS3
		NMEAS4
		NMEAS5 NMEAS6
		NMEAS6 NMEAS54
		DISC47
	NMGT	NMEAAU
	,	NMEASC
		NMEAT1
		NMEAT2
		NMEAT3
		NMEAT4
		NMEAT5
		NMEAT6
		NMEA44
		NMEA52

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PROGRAM (ENTERED)	PROGRAM (ENTERED FROM)	GLOBAL SUBROUTINE (ENTERED)
NMEA (Contd)	NMIN	NMEATF
	NMMP	NMEA50
-	NMTC	NMEAT1
		NMEAT2
	NMTD	NMEA51
		NMEA54
		NMET25
		NMET26
		NMET27
		NMET28
		NME24B
		NME24C
		NME24D
		NME24E
	NMTG	NMEARR
		NMEAT7
		NMET10
		NMET11
		NMTRS
		NMEAT8
		NMET12
		NMET13
		NMET15
		NMET16
		NMET17
		NMET18
		NMET19
		NMET20
		NMET21
		NMET22
	NMMP	NMEA50
NMGT	NMEA	NMAD4N
		NMCBSG
		NMTKNG
		NMTKNO
		NMZSLT
	NMTD	NMAUD4
		NMPR08
		NMTKNG
		NMTKNO

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TABLE D (Contd)

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TABLE D (Contd) NETWORK MANAGEMENT SUBSYSTEM PROGRAM INTRARELATIONSHIP GLOBAL SUBROUTINE PROGRAM (ENTERED) PROGRAM (ENTERED FROM) (ENTERED) NMGT NMTG NMAUD6 NMOLLR (Contd) NMOLLS NMPR08 NMTKNG NMTKNO NMAUD6 NMRR NMTC NMOLLR NMOLLS NMSTCB NMOLLR NMCG NMOLLS NMTKNG NMIN NMTKNO NMMP NMTD NMDXFL NMSINT NMRT11 NMEA NMRR NMRRUP NMGT Ÿ NMTG NMARCS NMFXRR NMRCNT NMRRAF NMRRC1 NMRRPC NMRRPD NMRRPL NMRRPP NMGT NMAUDE NMTC NMTCNG CLID NMSEND NMTD NMGT NMAUT6 NMDBP1 NMDBP3 NMDCAG NMDCAR NMEA NMDDSG

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TABLE D (Contd)

NETWORK MANAGEMENT SUBSYSTEM PROGRAM INTRARELATIONSHIP

PROGRAM (ENTERED)	PROGRAM (ENTERED FROM)	GLOBAL SUBROUTINE (ENTERED)
NMTG	NMGT	NMAUT1 NMPAA1 NMPAR1 NMPPST
	NMRR	NMDOUT NMFXRR NMGETT
	NMEA	NMDTSG NMFXRR
NMSC	NMGT	NMSCAC

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TABLE E

NMGT GLOBAL SUBROUTINES

GLOBAL	INTERFACE PROGRAM	FUNCTION	
NMAD4N	NMEA	Entry point within NMAUD4.	
NMAUD1	SADT	Performs audit 32 (pointer relationship for trunk group controls) on a periodic basis.	
NMAUD4	NMTD	Performs audit on calling line identification code control slots.	
NMAUD6	NMTG NMRR	Performs audit on DOC call store.	
NMCBCI	ICRV ICAL	Determines if dialed DN is in CLID list when RC area contains network management entry.	
NMCBCO	ORDL	Determines if dialed DN is in CLID list when RC area contains network management entry.	
NMCBRC	ECMP	Resets real-time break indicator and restores scratch area.	
NMCBSG	NMEA	Locates EADAS code block in CLID list.	
NMGTMSGS	MCTWADMN	Prints code block list status message (1A ESS switch).	
NMMCTH	SADA	Performs audit 3; calculates receiver threshold values.	
NMOLLR	NMTG NMTC	Turns off OUTGOING LOAD CONTROL lamp.	
NMOLLS	NMTG NMTC	Turns on OUTGOING LOAD CONTROL lamp.	
NMPPAA	CHGD	Activates trunk group control.	
NMPPAR	CHGD	Deactivates trunk group control.	
NMPRO8	NMTG NMTD	Prints TTY output message NM08.	
NMSDOC	ЕСМР	Determines current DOC signal levels.	
NMSEGA	SARG	Performs audit on segment work indicators.	
NMSTCB	NMTC	Make null the current free list.	
NMTKNG	NMTG NMTD NMIN NMEA	Returns NG TACK in a segment message.	
NMTKNO	NMTG NMTD NMIN NMEA	Returns NO TACK if TTY program does not accept request.	

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TABLE E (Contd)

NMGT GLOBAL SUBROUTINES

GLOBAL	INTERFACE PROGRAM	FUNCTION
NMTYPE	NMTG	Identifies slot type.
NMT1T2	MAUD	Audits T1 and T2 bits for DOC scan points.
NMZSLT	NMEA	Sets up Z register.
NMAFT	TRBT	Entry for a call that overflows a trunk group that has a cancel-from conrol active.
NMAUT1	NMCG NMGT	Audit of NM-PT indicator relationship.
NMBEF	TRBT	Entry when outgoing load control bit is set in the trunk group head cell.
NMCKSL	CIDR	Check for flexible control slots.
NMCKTW	CIDR	Determine if truck group is 1-way or 2-way.
NMDOUT	NMRR	Segment entry point for PP-DATA message.
NMDTSG	NMEA	Segment entry point for PP-DATA message.
NMFXSG	NMEA NMRR	Segment entry point for FX-STATUS message.
NMGETT	NMRR	Entry point to obtain control type on PP-DATA message.
NMSTSG	NMEA	Segment entry point for a PP-STATUS message.
NMCGOR	ORDL	Determine if dialed DN is in call gapping or CLID list when RC area contains network management entry.
NMCGIC	ICRV ICAL	Determine if dialed DN is in call gapping or CLID list when RC area contains network management entry.
NMCGCI	ORDL ICAL	Determine if dialed 10XXX (access code) is on a call gapping list when RC area contains network managment entry.

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TABLE F

NMRR GLOBAL SUBROUTINES

GLOBAL	INTERFACE PROGRAM	FUNCTION
NMFXRR (1A ESS Switch Only)	NMTG	Determine if flexible control is immediate or regular reroute.
NMRRAF	NMTG	Process a preprogrammed/flexible reroute control on a call that overflows the FTG.
NMRRCT	TAND HLOP CINM	Process network management affected tandem calls.
NMRRCO	ADPB GRDL	Process network management affected calls.
NMRRC1	NMTG	Deactivate a preprogrammed reroute slot.
NMRRIT	NMTG	Check call that has trunk group control active to determine if it is a reroute attempt.
NMRRPA	NMTG	Initialize the reroute control slot for a prepro- gram reroute activation.
NMRRPD	NMTG	Check for reroute on PP-DATA message.
NMRRPC	NMTG	Deactivate a preprogrammed reroute slot.
NMRRPL	NMTG	Audit reroute control items in preprogram trunk group control words.
NMRRPP	NMTG	Call processing interface for preprogrammed reroute control.
NMRRSL	NMTG	Verify a preprogram reroute slot is available for a manual activation.
NMRRUP	NMGT	Zero counter of cancelled rerouted calls if 5 minutes have passed.
NMRTAF	TRBT	Initialized peg counter of cancelled rerouted calls.

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TABLE G

NMTD GLOBAL SUBROUTINES

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GLOBAL	INTERFACE PROGRAM	FUNCTION
NMAUT6	NMGT	Performs audit 32.
NMDBP1	NMGT	Determines MSN DOC assignment.
NMDBP3	NMGT	Determines MSN MC3 assignment.
NMDCAG	NMGT	Entry for unit type 56 loss of MC1/MC2/MC3 acknowledgements.
NMDCAR	NMGT	Entry for unit type 56 receipt of MC1/MC2/MC3 acknowledgements.
NMDCME	TTIA	Entry for TTY input message, DOC-EXC. Causes DOC signal to be excluded from being sent.
NMDCMR	TTIA	Entry for TTY input message, DOC-REM. Causes manual control of DOC signal to be removed.
NMDCMS	TTIA	Entry for TTY input message, DOC-SND. Causes DOC signal to be sent.
NMDCRA	TTIA	Entry for TTY input message, DOC-CLEAR. Removes DOC manual control signals.
NMDCSG	NMEA	Determines DOC loop states.
NMDMC3	TTIA	Entry for TTY input message, LST-MC3.
NMDCST	TTIA	Entry for TTY input message, DOC-STATUS. Prints status of DOC loops.
NMDDSG	NMEA	Causes NM22 DOC segment printout.
NMDPD1	TTIA	Entry for TTY input message, DPD-MCONE. Causes printout of translation data identifying loops or offices to which DOC signals are sent upon crossing the threshold for machine congestion level (dial pulse receiver congestion).
NMDPD2	TTIA	Entry for TTY input message, DPD-MCTWO. Causes printout of translation data identifying loops or offices to which DOC signals are sent upon crossing the threshold for machine congestion level 2 (dial pulse receiver congestion).
NMHPOB	TNKC	Entry point for POB queueing.
NMIPOB	-	Entry point for successful POB activation.
NMMCSG	-	Prints machine congestion peg and usuage exception traffic message.
NMMFD1	TTIA	Entry for TTY input message, MFD-MCONE. (MC1 MF receiver translation).
NMMFD2	TTIA	Entry for TTY input message, MFD-MCTWO (MC2 MF receiver translation).

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TABLE G (Contd)

NMTD GLOBAL SUBROUTINES

GLOBAL	INTERFACE PROGRAM	FUNCTION
NMRPD1	TTIA	Entry for TTY input message, RPD-MCONE (MC1 revertive pulse receiver translation).
NMRPD2	TTIA	Entry for TTY input message, RPD-MCTWO (MC2 revertive pulse receiver translation).
NMRTD1	TTIA	Entry for TTY input message, RTD-MCONE (MC1 real-time congestion).
NMRTD2	TTIA	Entry for TTY input message, RTD-MCTWO (MC2 real-time congestion).
NMSEND	NMGT	Determines change in state of DOC loops. Checks for change in state if the machine congestion level has changed or if a manual request has been processed.
NMTDTT	-	Audits T1 and T2 bits for DOC transmit circuit scan points during phase 3.
NM10SC	ЕСМР	10-second entry to determine validity of acknowledgements.
NM5MIN	ЕСМР	5-minute entry to zero machine congestion traffic and print exception mes- sage if counts are nonzero.

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TABLE H

NMEA GLOBAL SUBROUTINES

GLOBAL	INTERFACE PROGRAM	FUNCTION
NMDRST	TTIA	Transmits response to TTY input message DR STATUS.
NMDTST	TTIA	Checks for EADAS DT STATUS request in EADAS output buffer.
NMEAAP	EDAS	Updates EADAS status discretes that are updated at the poll entry.
NMEAAU	NMGT	Audits block 63 trunk group count traffic slots.
NMEASC	NMGT	Updates status discretes on a scan basis.
NMEATA	TTIA	Adds trunk group number to block 63 traffic counts in response to TTY input message TG-ADDCNT.
NMEATD	TTIA	Removes trunk group number from block 63 traffic counts in response to TTY input message TG-DEACT.
NMEATF	TFCT RADR NMTG NMIN	Transmits illegal response to EADAS/NM.
NMEAT1	NMTC NMGT	Transmits response to TTY input message CB-ACT.
	NMCG	Transmits response to TTY input message CG-ACT.
NMEAT2	NMTC NMGT	Transmits response to TTY input message CB-REM.
	NMCG	Transmits response to TTY input message CG-RMV.
NMEAT3	NMTC NMGT	Transmits response to TTY input message CB-CLEAR, PP-CLEAR, DOC-CLEAR.
	NMCG	Transmits response to TTY input message CG-CLEAR, PP-CLEAR, DOC-CLEAR.
NMEAT4	NMGT	Generates output header for TTY input message CB-ST.
	NMCG	Generates output header for TTY input message CG-ST.
NMEAT5	NMGT	Loads segment of CB-STATUS message.
	NMCG	Loads segment of CG-STATUS message.
NMEAT6	NMGT	Transmits EADAS CB-ST message.
	NMCG	Transmits EADAS CG-ST message.
NMEAT7	NMTG	Transmits response to TTY input messages SK, CT, CF, TR-ACT.
NMEAT8	NMTG	Transmits response to TTY input message FLEX-DEACT.

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TABLE H (Contd)

GLOBAL	INTERFACE PROGRAM	FUNCTION
NMEA44	NMGT	Sets EADAS discrete 44 indicating audit removed code block.
NMEA45	NMTG	Set EADAS discrete 45 indicating audit removed flexible control.
NMEA50	NMMP	Sets EADAS discrete 50 indicating DOC transmit circuit has failed or has been destroyed.
NMEA51	NMTD NMMP	Sets up to insert discrete 51.
NMEA52	NMTC NMGT	Sets EADAS discrete K1 for TTY change in code blocking status.
	NMCG	Sets EADAS discrete KI for TTY change in call gapping status.
NMEA53	NMTG	Sets EADAS discrete 53 indicating TTY change in preprogram status.
NMEA54	NMTD NMSC	Sets up to insert discrete 54.
NMETR	EDAS	Determines transfer point when a continuation poll is received.
NMET10	NMTG	Transmits response to TTY input message FX-STATUS.
NMET11	NMTG	Loads segment of FX status data into EADAS output buffer.
NMET12	NMTG	Releases FX-STATUS message to EADAS.
NMET13	NMTG	Transmits response to TTY input message PP-ACT.
NMET15	NMTG	Transmits preprogram status busy message.
NMET16	NMTG	Generates output header in response to TTY input message PP-STATUS.
NMET17	NMTG	Adds segment of PP-STATUS message into EADAS output buffer.
NMET18	NMTG	Transmits PP-STATUS message data to EADAS.
NMET19	NMTG	Transmits response to TTY input message PP-DATA.
NMET20	NMTG	Loads header for PP-DATA in EADAS output buffer.
NMET21	NMTG	Loads segment of PP-DATA message into EADAS output buffer.
NMET22	NMTG	Transmits EADAS buffer containing PP-DATA message.
NMET23	NMTD	Transmits response to TTY input messages DOC-SND, DOC-EXC, DOC- REM to EADAS.
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TABLE H (Contd)

NMEA GLOBAL SUBROUTINES

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GLOBAL	INTERFACE PROGRAM	FUNCTION
NMET25	NMTD	Transmits response to TTY input message DOC-STATUS if call register is in use or no DOC function is in office.
NMET26	NMTD	Loads header for DOC-STATUS in EADAS output buffer if request can be processed.
NMET27	NMTD	Loads segment of DOC-STATUS message data in EADAS output buffer.
NMET28	NMTD	Transmits DOC-STATUS data to/NM. EADAS/NM.
NME24A	-	Loads header in response to TTY input messages DPD-,MFD-,RPD-,RTD-, and LST
NME24B	NMTD	Loads NG in EADAS output buffer in response to DOC data input message.
NME24C	NMTD	Loads header in EADAS output buffer for DOC data message.
NME24D	NMTD	Loads segment in EADAS output buffer for DOC data message.
NME24E	NMTD	Transmits DOC data message to EADAS center.
NMIHNO	RADR	Transmits RADR-INHIBIT NG response to EADAS center.
NMIHOK	RADR	Transmits RADR-INHIBIT OK message to EADAS center.
DISC47 NMEAS0 NMEAS1 NMEAS2 NMEAS3 NMEAS4 NMEAS5 NMEAS6	NMSC	Sets up to insert discrete 47.
NMRDAL	RADR	Loads output buffer with data indicating whether or not test calls are being allowed to determine receiver delay.
NMTGST	TTIA	Lists all active block 63 TGN counts.
NMT7RP	NMTG	Loads output buffer with data indicating a flexible control is being replaced.
NM13RP	NMTG	Loads output buffer with data indicating a preprogram control is being replaced.

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Radar Circuits

CHAPTER 68 **Radar Circuits**

MULTICHANNEL MONITOR—Automatically detects single signal coming from large number of separate sources and identifies source, as required in doppler radar sets that must search bank of sharp filters placed side by side, to detect target, while antenna scans field of search. Positive signal reaching detector is amplified to drive Miller integrator V1-V2. As V1 goes negative, it disconnects one channel at a time (by driving its disconnecting diode D1 below 0 v) until live channel is reached. Detector output is then cut off, and C1 stores level at which disconnect occurred.—R. Kronlage, Monitoring Multiple Inputs Simultaneously, Electronics, 32:35, p 50-51.





difference frequency between transmitted and received frequencies into mph and displays at 2,455 Mc and is accurate within 2 mph up to 100 mph.—J. Barker, Radar Meter Helps Radar Circuits

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DELAY LINE AMPLIFIER FOR CLUTTER SIMU-LATOR—Used with ultrasonic delay line and 30-Mc Gaussian noise source to simulate actual clutter received during consecutive radar sweeps. Input 1 is amplified version of delay line output signal, which is added to noise input 2 in common plate load of V1 and V2, for amplification by V3. These three tubes together with tuned input to delay line form staggered Butterworth triple centered on 30 Mc, with half-power band-width of 2.75 Mc. Third input permits insertion of pulse for precise synchronizing to repetition frequency of clutter simulator. -J. Atkin, H. J. Bikel, and M. Weiss, Realistic Simulation of Radar Clutter, Electronics, 32:39, p 78-81.



COHO JITTER MONITOR—Automatically monitors coherent oscillator frequency and pro-

vides visible indication of amount of jitter, as measure of mti system capability.—C. Clark, Checking Jitter in Moving Target Radar, Electronics, 32:29, p 56–58.



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TWO-DIMENSIONAL TARGET SIMULATOR— Two signals, one representing angular position of target and the other angular position of radar antenna, are fed to azimuth coincidence circuit. When signals coincide, indicating that antenna is pointing at target, delayed pulses representing a target are passed to radar ppi by azimuth gating circuit.—J. I. Leskinen, Four Ways to Simulate Radar Targets, Electronics, 31:23, p 82–86.

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NARROW-BAND RADAR AMPLIFIER—Twin-tee feedback loop tuned to modulating frequency between 60 and 400 cps is used with video crystal and chopper of low-cost c-w radar receiver. Minimum detectable level is —55 dbm.—R. Fleming, Modulation Techniques Cut Radar Cost, Electronics, 35:35, p 56–58.



SSB COHERENT RADAR OSCILLATOR—Phase information of each transmitted pulse is stored in coherent oscillator V3 for use as

reference voltage for analyzing doppler return from targets. Other stages are amplifiers. Oscillator tank is L1-C1-C2. This oscillator has good free-running stability and is easily locked in phase with 30-Mc input pulse.—J. B. Theiss, More Target Data with Sideband Coherent Radar, *Electronics*, 36:3, p 40–43.



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250-KW MODULATOR-Ten silicon diodes replace five vacuum tubes in artificial linetype modulator for airborne radar operating at peak power of 250 kw.—M. G. Gray, Using Silicon Diodes in Radar Modulators, Electronics, 32:24, p 70-72.

RADAR POWER AMPLIFIER—Handles pulses in range of 100 to 500 microsec at 2.2 Mc. Class B final stage Q2 delivers 105 w to pi loading network serving as 51-ohm load.-S. Horowitz and L. Humphrey, Satellite Sounder and Telemeter Chart Ionosphere Electron Density, Electronics, 34:25, p 50-53.





conductor modulator minimizes power drain and thereby reduces heating in transponder, while providing r-f output pulse having exDiven, Solid-Stage Modulator Feeds Subminiature Transponder, Electronics, 33:27, p 48-51.

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HYBRID 30-MC I-F—Bandwidth is 6 Mc, noise figure is below 2.5 db, and gain is enough to give 1 v peak-to-peak noise output into 1,000-ohm load when using two transistorizad video stages following the five transistorized i-f gain stages.—J. Scott, D. Randise, and R. P. Lukacovic, Portable Radar Traces Battlefield Deployment, *Electronics*, 33:12, p 67–70.



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DISTANCE-MARK GENERATOR—Uses switched Hartley oscillator, pentode amplifier-shaper, and series-triggered blocking oscillator to generate 20-mile distance marks in airborne search radar.—NBS, "Handbook Preferred Circuits Navy Aeronautical Electronic Equipment," Vol. 1, Electron Tube Circuits, 1963, p N8–2.



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SWEEP GENERATOR—Accepts pulse from monostable mvbr and generates signal for sweep resolver of ppi radar. Voltage rises at constant rate during mono off time, and is held at zero during on time. Cascaded emitter-follower Q7-Q8 provides impedance match to output. Q9-Q10-Q11 provide required power for sweep resolver while preventing thermal runaway at normal temperatures.—C. E. Veazie, Transistorized Radar Sweeps Circuits Using Low Power, *Electronics*, 32:26, p 46–47.



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YOKE DRIVER—Used to clamp sweep signal voltage to reference voltage during clamping time at end of sweep, while removing clamp during sweep. Diodes DI-D2 and D3-D4, connected in opposite polarity to each signal line, serve as clamp circuit.—C. E. Veazie, Transistorized Radar Sweep Circuits Using Low Power, Electronics, 32:26, p 46-47.

TIMING PULSE SHAPER—Monostable mvbr converts timing signal to narrow pulse whose width is accurately controlled by R-C network. Use of emitter-follower Q4 between triggered transistor Q3 and R-C network assures fast rise and fall times.—C. E. Veazie, Transistorized Radar Sweep Circuits Using Low Power, *Electronics*, 32:26, p 46–47.





COSINE-SQUARED PULSE GENERATOR—Generates pulse whose width is half the duration of one input sine-wave cycle. Cosine-

squared pulse output is fed into balanced modulator in conjunction with 30-Mc signal, and resulting burst is used as input to syn-

chrodyne klystron.—K. H. Chase and J. L. Pierzga, Reducing Mutual Radar Interference, Electronics, 32:28, p 39–43. RADAR CIRCUITS



variation of diode modulator, clipper diodes D9 and D10 are connected to far end of pulse-forming network, for improved performance. Choke L in plate circuit of thyratron limits rate of rise of thyratron current.-M. G. Gray, Using Silicon Diodes in Radar Modulators, Electronics, 32:24, p 70-72.



LOG AMPLIFIER—Has highly linear logarithmic output over 30-db dynamic range. Used in obtaining antenna patterns on operating radar system. Output current is directly proportional to pulse repetition frequency and





VARIABLE SWEEP LENGTH—Operates with sweep lengths varying by factor of 8 to 1. Supplies 1,100 v at 160 ma for 0.5-mile range and 400 v at 270 ma for 4-mile range.---R. F. P. Smith, Airport Radar Has High Resolution, Electronics, 32:14, p 64-69.



DISTANCE-MARK GENERATOR-Uses switched Hartley oscillator, mvbr-type trigger shaper, and parallel-triggered blocking oscillator to generate distance marks in airborne search radar. RLC unit is switched to change mark spacing.—NBS, "Handbook Preferred Circuits Navy Aeronautical Electronic Equipment," Vol. 1, Electron Tube Circuits, 1963, p N8-1.



STRONG-NOISE-SUPPRESSING AUDIO AMPLI-FIER—Feedback circuit limits amplitude of low-frequency signals such as those produced by wind-moved tree branches, to prevent masking vehicular target signals in portable doppler radar. Low-pass filtering compensates for poor bass response of human ear, permitting detection of slow-moving targets such as walking man.—J. Scott, D. Randise, and R. P. Lukacovic, Portable Radar Traces Battlefield Deployment, Electronics, 33:12, p 67-70.





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HIGH-POWER PULSE GENERATOR—Power transistors and saturable transformers serve in place of hydrogen thyratrons for generating pulses with 1-megawatt peak power for sonar and radar. Low-voltage capacitor is first charged to voltage that is regulated on pulse-to-pulse basis rather than from regulated supply. Capacitor is then discharged through saturable step-up transformer L1 to charge high-voltage capacitor, which in turn is discharged through magnetron load.—R. T. Maguire, SCR's to Pulse Radar, *Electronics*, 37:3, p 14–15.

DISTANCE-MARK GENERATOR—Uses switched Hartley oscillator, pentode amplifier-shaper, and series-triggered blocking oscillator to generate 1-mile distance marks in airborne search radar. Frequency dividers are used for 10- and 20-mile marks.—NBS, "Handbook Preferred Circuits Navy Aeronautical Electronic Equipment," Vol. 1, Electron Tube Circuits, 1963, p N8–2.





PULSE-WIDTH DISCRIMINATOR—Cuts scanning loss from interfering radars in half, by blanking video signal only if it falls within notch

developed by gating circuits. Gives marked improvement in acquisition capability.—K. H. Chase and J. L. Pierzga, Reducing Mutual Radar Interference, Electronics, 32:28, p 39–43.

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DISTANCE-MARK GENERATOR—Uses switched Hartley oscillator, amplifier-shaper, and parallel-triggered blocking oscillator to generate distance marks for 10 and 40 miles in airborne search radar.—NBS, "Handbook Preferred Circuits Navy Aeronautical Electronic Equipment," Vol. 1, Electron Tube Circuits, 1963, p N8–3.



DISTANCE-MARK GENERATOR—Uses switched Hartley oscillator, gated-beam amplifiershaper, and series-triggered blocking oscillator to generate distance marks for 2, 5, and and 25 miles in airborne search radar.—NBS, "Handbook Preferred Circuits Navy Aeronautical Electronic Equipment," Vol. 1, Electron Tube Circuits, 1963, p N8–3.



VIDEO SWITCH—Used to either pass or blank out video signals going to ppi visual display. Blanking gate input pulse is applied to switch if video fails to identify itself as signal from associated radar set.—L. Turf, Video Switch for Radar, *EEE*, 11:2, p 24–25.



ELECTRONIC SWITCH FOR RADAR INDICA- markers on ppi. TOR—Used to produce aircraft identification ages supplies ga

markers on ppi. Coincidence of binary voltages supplies gating signals for switch.—J. B. Beach, Coincidence Diodes Gate Electronic Switch, Electronics, 32:8, p 66–68.



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RADAR PULSER—Magnetic discharge and pulse shaping networks are used instead of thyratrons or vacuum-tube amplifiers to reduce size and weight while increasing reliability.—A. Krinitz, Using Magnetic Circuits to Pulse Radar Sets, *Electronics*, 32:27, p 42–43.



HARD-TUBE MODULATOR—Supplies 0.02microssec 180-kw modulating pulses at prf of 14,400 pps. Hard tube is used because hydrogen thyratron of adequate power-handling capability would not deionize rapidly enough at this prf.—R. F. P. Smith, Airport Radar Has High Resolution, *Electronics*, 32:14, p 64-69.





VARIABLE TIME-INTERVAL STANDARD—Produces two delayed pulses for establishing accurate time intervals from 1 to 10,000 microsec. Delays are adjustable in 1-microsec increments, with continuous interpolation

between steps. Crystal-controlled oscillator and fast preset counters reduce time-delay errors. Useful in calibrating radar and loran timing circuits, oscilloscopes, and marker generators, as well as for precision pulse code modulation and for calibrating delay lines. —D. Broderick, D. Hartke, and M. Willrodt, Precision Generator for Radar Range Calibration, Electronics, 32:14, p 58–60.


BLOCKING-OSCILLATOR MODULATOR—High permeability of ferrite-core transformer allows use of few coil turns, keeping capacitance at minimum so narrow pulses are produced.—C. D. Hardin and J. Salerno, Miniature X-Band Radar Has High Resolution, *Electronics*, 32:5, p 48–51.



PRF GENERATOR—Blocking oscillator operates in range of 200 to 2,000 pps, as radar repetition-rate generator having frequency stability of about 5%.—NBS, "Handbook Preferred Circuits Navy Aeronautical Electronic Equipment," Vol. 1, Electron Tube Circuits, 1963, p N5–2.



DISTANCE-MARK GENERATOR—Uses switched Hartley oscillator, mvbr-type trigger shaper, and parallel-triggered blocking oscillator to generate 1.67-mile distance marks in airborne search radar. Blocking-oscillator frequency dividers are used to get 5- and 10mile marks.—NBS, "Handbook Preferred Circuits Navy Aeronautical Electronic Equipment," Vol. 1, Electron Tube Circuits, 1963, p N8-2.



DISTANCE-MARK GENERATOR—Uses switched Hartley oscillator, monostable mybr-type trigger shaper, and parallel-triggered blocking oscillator to generate distance marks for 2, 5, and 25 miles in airborne search radar. RLC unit is switched to change mark spacing. --NBS, "Handbook Preferred Circuits Navy Aeronautical Electronic Equipment," Vol. 19, Electron Tube Circuits, 1963, p N8–1.



NARROW-BAND BALANCED MODULATOR— Yields two sidebands and carrier while balancing out original video signal. Gang switch permits use of six different carrier frequencies if sufficient telephone-line bandwidth is available. Sideband filters remove upper sideband and part of carrier to provide vestigial sideband operation.—H. W. Gates and A. G. Gatfield, Scan Converter Aids Phone-Line Radar Relay, *Electronics*, 32:16, p 48–51.

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DOUBLE-PULSE GENERATOR-Used in responder-interrogator range computer to produce pair of 15-microsoc-wide pulses spaced 30 microsoc. Monostable mvbr receives two triggers, one through 30-microsoc delay line, and produces 15-microsoc pulse for each trigger received.-H. Vantine, Jr., and E. C. Johnson, Modified Transceivers Compute Distance, Electronics, 31:37, p 94-98.

centering servo is only control required for local-oscillator klystron in wide-band receiver

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of short-pulse radar system.—C. D. Hardin and J. Salerno, Miniature X-Band Radar Has High Resolution, *Electronics*, 32:5, p 48–51.

PULSED X-BAND MAGNETRON—Differentiator forms sharp 2-microsec pulse at trailing edge of each sawtooth waveform generated by R-C charging circuit and Shockley pnpn diode. Pulse triggers thyratron to discharge pulseforming network, and new pulse is stepped up to 4,500 v by pulse transformer for magnetron.—J. Scott, D. Randise, and R. P. Lukacovic, Portable Radar Traces Battlefield Deployment, *Electronics*, 33:12, p 67–70.





FLYBACK BLANKING—Amplifies blanking pulse from monostable mybr sweep circuit to level required for blanking crt screen. Q26, normally nonconducting, is driven to saturation by blanking pulse, thereby applying high negative voltage to crt control grid.— C. E. Veazie, Transistorized Radar Sweep Circuits Using Low Power, *Electronics*, 32:26, p 46–47.



LINE SWEEP GENERATOR FOR ENCODER—Circuit is basically negative-feedback linearized R-C sawtooth generator in which charging voltage is held constant while negative end

of sweep-forming capacitor is driven negative. Amplifier V8-V9A-V10A is direct-coupled throughout. Loop-stabilizing networks pass high-frequency components.—H. W. Gates and A. G. Gatfield, Scan Converter Aids Phone-Line Radar Relay, *Electronics*, 32:16, p 48–51. RADAR CIRCUITS



etition-rate generator having frequency stability of about 5%. Has positive grid return, although this may decrease frequency stability if heater voltage drops below rated value. --NBS, "Handbook Preferred Circuits Navy Aeronautical Electronic Equipment," Vol. 1, Electron Tube Circuits, 1963, p N5-2.



BOXCAR DETECTOR—Diodes conduct during range gate interval of 0.2 microsec in portable doppler radar, to connect video signal to filter circuit.—J. Scott, D. Randise, and R. P. Lukacovic, Portable Radar Traces Bathefield Deployment, *Electronics*, 33:12, p 67–70.



DISTANCE-MARK GENERATOR—Uses switched Hartley oscillator, mvbr-type trigger shaper, and parallel-triggered blocking oscillator to generate distance marks for 2, 5, and 25 miles in airborne search radar. RLC unit is switched to change mark spacing.—NBS, "Handbook Preferred Circuits Navy Aeronautical Electronic Equipment," Vol. 1, Electron Tube Circuits, 1963, p N8–2.



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Overview

This is a "beginner" project to construct a simple 2600 Hz tone generator using the DTMF generator chip inside an old 2500-type telephone. Touch-Tone telephones back in the 1980s included a common 8-pin tone generator chip and a 3.58 MHz "colorburst" crystal to create the dual-frequency audio tones used in Touch-Tone dialing. While there were several manufactuers of these DTMF generator ICs, they all pretty much followed the same basic pinout. The 3.58 MHz crystal oscillator input is divided down to produced eight different ("high" and a "low") audio tones via the chip's digital-to-analog converter. These eight tones are what make up the "Touch-Tones" you hear when dialing a telephone. Since the DTMF generator IC has *fixed* internal clock dividers, the only way to change the chip's audio frequency output is to change the frequency of the crystal driving it. For example, the ROW4 key input is (usually) sent to a fixed "divide-by-3828" counter. If we change the 3.58 MHz crystal to a 10 MHz crystal, the "new" output audio tone will be 2612 Hz, instead of the usual 935 Hz tone. This new tone is within tolerance of the normal 2600 Hz signalling tone used in old telephone long distance signalling networks, or even for "over-the-air" signalling in some radio systems. Don't confuse this device with a "blue box." Those generate the additional multi-frequency tones which were used in analog telephone signalling systems. This device will only generate a single 2600 Hz, and is mostly for fun and experimentation.

Construction Notes & Pictures



Good to your local thrift store and buy up every telephone you can find. Also pick up some Altoids.



Keep taking apart the telephones until you find one with a 8-pin IC that looks something like in the above picture. This particular telephone set (ITT 2500-type) used a Texas Instruments TCM5094 Tone Encoder. This was a good find, as the datasheet is readily available on the Internet. You'll quickly discover that finding datasheets to old, obsolete chips can be nearly impossible. A useful feature of the TCM5094 is that it has a "Signal Tone Enable" pin for generating only single tone output frequencies. Since not all DTMF generator ICs will have this feature, we'll be using the "press two keys at once" method to generate a single output audio tone.



Here is an example of a "generic" DTMF generator IC. This is a HMC HM9187 Tone Dialer, and has the same basic pinout and internal clock dividers as the TCM5094.



Make the circuit up as shown. A LM386 can replace the NJM2113 with minor circuit revisions. You'll also need to track down a 10 MHz crystal and its associated loading capacitors. You'll also have to track down a low-profile 8 or 16 ohm speaker. The speaker from an old Motorola bag-style cellular phone will work perfectly.

A JRC NJM2113 (or Motorola MC34119) audio power amplifer was chosen for it ease of setting the amplifier gain, its low–noise, and the fact that a parallel capacitor across the gain–setting resistor can be used to filter the output tone of any digital stepping noise.



Build and test the circuit with an audio frequency counter or oscilloscope. The (speaker) output sine wave should have very little distortion. The audio frequency counter is reading "2.612 kHz."



Punch or drill out holes in the Altoids tin for the speaker and the switches. Step drill bits work perfectly for drilling the thin metal.



Mount the circuit board and speaker as shown above. Pieces of art foam secure the battery. Two little metal clips hold the speaker to the lid of the Altoids tin.



Completed view. It's a little ragged, but still a fun beginner project.





Motorola DTR Radio Review



By "T"

The first warning I heard was Rambo asking Jimmy Dean "Want me to play 'Bubba Shot the Jukebox?" Looking like a more worn version of Willie Nelson, Rambo is a feral, slightly unhinged Army veteran of both Vietnam and Desert Storm. He's really useful at getting broken equipment working again in the field, and when you need a bodyguard when visiting such entertaining locales as Hartford and Bridgeport. At any other time he's best kept out of sight of the customers. He was in a foul mood today as he was getting sued by the families of a group of Norwalk youths who thought he was a homeless person when they tried to assault him. The police dropped the charges as it was five against one and self-defense, even if three of them are still in a coma. He was just finishing up his lunch with a copy of Edward Abbey's "The Monkey Wrench Gang," and listening to The Doors on his iPod at a volume that would bring Jim Morrison back from the dead. Having been exposed to too many loud noises while serving his country, Rambo needs to crank his iPod's volume up full bore despite having the earbuds jammed so far into his auditory canal that Jacques Cousteau couldn't find them. Jimmy, not being the brightest of bulbs, made the mistake of telling Rambo "Yea, that's a good song." That's when I dived over the workbench, as Rambo was in the process of pulling his .45 out from his toolbox in an attempt to silence Jimmy's annoying noise source. Afraid that the round would overpenetrate the boombox and fly off to hit some innocent person or piece of test equipment, I knock Rambo off his chair, and wrestle the .45 out of his hands while he's cursing at me in Vietnamese.

It started out innocently enough and with the best of intentions (much like a Warren Zevon song). How was I know what started as a simple exercise in boredom–induced technological funkenspiel would introduce me to the next quantum leap in portable personal communications systems. That's one of the more interesting things about this hobby. I was at the shop and had just been asked to stop harassing my co–worker Jimmy Dean. Jimmy likes both types of music, and therefore keeps his radio tuned to the local FM station that plays his particular genre of acoustical entertainment. Sometimes he likes to play his music at excessively high volume, and his co–workers are forced to defend themselves. In this instance, the implement of defensive destruction was an iPod playing Cruxshadows and E Nomine hooked up to a service monitor. After several loud inquiries of *"What the heck is that?!"*, the boss comes in and asks me to play nice. I actually was playing nice, as I made sure all the songs from The Mentors were not on my defensive playlist.

So I soon found myself on this slow day surfing Motorola's product website when I came across them. I'm always keeping an eye out for neat exotic communications equipment at hamfests, and when I saw the Motorola DTR portables I thought to myself "I have to check these things out!" The DTR series are one watt license-free handhelds operating in the 902-928 MHz band along with other Part 15 and ISM devices. Unlike other license-free radio services such as FRS, MURS, and CB that operate on a single analog FM or AM frequency per channel, the DTR series use digital frequency hopping spread-spectrum modulation (FHSS). This means they are less susceptible to interference, can't be received by police scanners, and have a longer communications range than analog single-frequency radios running a watt. Motorola in fact claimed a two-mile range with these units. FRS radio manufacturers also claim a two-mile range with their little half-watt 460 MHz handhelds, and anyone who has played with them knows that at best you can get is a half-mile to a mile tops, under most circumstances. How well would the DTR handhelds operate under a variety of circumstances? I would soon find out. After a few inquiries and a trip into the back storeroom, I soon found myself in possession of a pair of Motorola DTR650s. Jimmy went back to playing both of his favorite types of music. As I walk out into the shop floor, I hear someone with a Texas accent sing about the differences between divorces and horses, Jim Morrison telling everyone "This is the end. My only friend, the end." and Rambo asking Jimmy "Want me to play 'Bubba Shot the Jukebox?'"

Frequency hopping spread–spectrum is nothing new. The military has been using it for years with their SINCGARS (Single Channel Ground/Air Radio System) radios. Instead of staying on one frequency when transmitting, the radio "hops" through a number of different frequencies in a pseudo–random sequence. This reduces the vulnerability of the communications to interference and interception. Frequency hopping is also used on the ISM bands such as 902–928 MHz for telemetry and control, a.k.a. "SCADA" (Supervisory Control and Data Acquisition) systems. Many cordless phones operating in the 902–928 MHz and 2.4 GHz bands also use FHSS. In the latter two instances, it i used for spectrum efficiency as well as interference reduction. You may also find certain cutting–edge amateur radio operators experimenting with spread–spectrum communications on UHF and microwave ham bands, and the ubiquitous 2.4 GHz band. WiFi systems use spread–spectrum as well. While spread–spectrum communications are commonplace in industrial, government, military, and wireless networking applications, until the release of the DTR series radios there simply was not a unit that offered spread–spectrum voice communications in an inexpensive license–free package.

These radios are comparatively priced with less expensive portable radios and give a significant measure of privacy over handhelds operating on a "dot" frequency. If you were putting together a new portable radio system from scratch, it would be worth your while to invest in DTR radios. From a management standpoint, these radios have some neat features not found in similarly priced conventional portables that will enhance your communications system. These features will be addressed later in this article. These radios are license–free and truly plug–and–play. Their operation is uncomplicated. Scanning receivers cannot monitor them, and it is extremely unlikely that will change anytime soon. The DTR is a FRS radio on steroids, and just like FRS, MURS, and CB does not require a FCC license. Until now there was really no way to inexpensively experiment with spread–spectrum voice communications. A pair of DTR410s cost less than a digital trunk–tracking scanner.

Motorola makes three models of DTR radios for the U.S. market. The basic entry-level model is the DTR410. This features six "public talkgroups." For the purposes of keying-up and talking consider them the same as a channel on a FRS or CB radio. The other two are the DTR550 and DTR650. The DTR550 and DTR650 can operate in a private "unit-to-unit" mode, and the DTR650 can act as a supervisor radio enabling the user to do remote monitoring and disabling of other DTR units. Other than these firmware differences, they are all the same one watt 900 MHz FHSS radio.

The first thing I absolutely had to do with these things was to try a scanner on them. Ok, I used more than a scanner. To be more specific, I used a "Signal Stalker" scanner, frequency counter, spectrum analyzer, and an old Optoelectronics R-10 Interceptor on them. I started with the Signal Stalker. This little \$100 scannist's friend has, since its appearance on the scene, totally changed the way hobbyists look for frequencies. I turned it on, made sure the 800/900 MHz band was selected, and keyed up the DTR. Nothing. Nada. Zip. I then did a more traditional frequency search of 902-928 MHz and found a donut shop's drive-through, a couple baby monitors, and some ham radio operators on a local 927 MHz repeater. No test transmission from the DTR though. Neat! Next in line was the Optoelectronics R-10 Interceptor. Finally I heard something. Yes, this deceptively capable piece of intercept gear masquerading as an innocent piece of test equipment heard something! What did it hear? A popping "digital" sound that sounded nothing at all like audio. Not only is the DTR a frequency hopper, it also uses digital audio! After that test the frequency counter and spectrum analyzer results were anticlimactic. They confirmed what I already knew about the units. The frequency counter attempted to lock onto the signal, but didn't have a guick enough gate time, and just gave random readings around 900 MHz. The spectrum analyzer gave me a nice view of a FHSS signal.

One aspect of operation I noticed about the units was that they needed a fellow unit on the same "channel" in order to key up. Otherwise they give an error message when you attempt to key them. This is a neat feature, as if the radio keys up you can generally be assured that at least one person you are talking to is within range. It also allows you to do solo communication range tests if you're lacking a fellow hobbyist to play with you. In this case, I had help from a number of friends with these units.

First among them was Hank Frost. Hank is a fellow veteran with a similar interest in electronic communications who is my usual co-conspirator in playing with things technological. Hank is much like a technological spider sitting in a big electronic web (that is, if you can imagine the spider looking like an Alaskan Brown Bear). Hank has the disturbingly cool ability of taking common consumer electronics equipment and modifying them into interesting pieces of what he refers to as "test gear." It makes me wonder what he actually did in the Army, but when I ask him he just shrugs and says "Oh, this and that." After running the gauntlet of electronic security that separates his residence from the rest of the world, I present a DTR unit for his examination. He breaks out this piece of equipment that looked like it was put together from spare parts found in a TV shop. I ask him what it was and he replies "It was originally a satellite receiver." Further questions as to the "test equipment's" origin only elicit that it was originally from "a dude in Green Bay." After checking out the DTR for a few minutes, he hands it back to me and says "Nice for something off-the-shelf." I ask him if he wants to help evaluate it, and he replies "New Hampshire sounds good about now." The next Saturday, we're in a two-vehicle convoy heading up Interstate 91 on our way to Keene and parts beyond. This is a well-known route to us, being the way to get to the famous and now-defunct Hosstraders Hamfest that was held in Hopkinton, NH. Talking car-to-car, we were able to achieve about a two mile range between radios, thus living up to Motorola's range claims. Bouncing around the towns of Southern New Hampshire, the units consistently gave us a range of about a mile to a mile and a half. Hiking in the region's mountainous terrain, that range went down to about a half to three-quarters of a mile.

After playing with them a while up North, I gave The Lone Gunmen a call. The Lone Gunmen are a group of three friends and fellow electronics hobbyists who share my interest in exotic communications equipment. We decide on the most RF-intense, interference-plaqued, radio-unfriendly proving ground that's equidistant between the two of us: New York City. If they can perform there, they'll perform anywhere. With Frank Sinatra crooning in the iPod, I hop a train south and meet them at Grand Central Terminal. Soon were walking down Park Avenue looking for a suitable place to do a distance test. Motorola claimed an in-building range of 25 stories, and we wanted to see how they actually stacked up. There are few, if any, tall buildings in Manhattan you can just walk into and start ascending in order to do a radio test. We notice the tallest thing on the New York skyline, and figure "Why not?" I would have loved to take one of these up to the observation deck and attempted a 33 cm band DX record, but the line to the observation deck was oppressively long and we were carrying way too much interesting shit on our persons to deal with a security checkpoint. We walk into the "office" entrance and look around. Despite being one of New York's premier tourist attractions, the Empire State Building has a more mundane function of being home to thousands of law offices, accounting firms, and other businesses. Byers asks me for one of the radios and goes in. A few minutes later he keys up from the 25th floor with perfect audio quality. Then he keys up from the 30th floor with perfect audio quality. After the 51st floor the audio was getting "digitized" and unreadable. Impressed by the performance so far, we went on to have some fun. By this time it was getting close to 5 O'Clock, and it was first Friday.

For those of you who are unaware, a very well–known and infamous hacker magazine has held get–togethers on the first Friday of the month in New York City since 1987. The location is Citicorp Center on Lexington Ave. At this get together, you get computer hobbyists of all stripes, including a contingent of radio ninja wannabes with dual–band ham handie–talkies that like to screw with the security guards. The last time The Lone Gunmen and I were there, we sported VHF Saber handhelds and ran DES–XL on 151.88 MHz. The wannabe radio ninjas thought we were Feds as their Optoelectronics frequency counters could lock onto our signals, but all they heard was the open–squelch noise of an encrypted signal. We figured that tonight would be no different, and we were correct. We walked in with these radios on our hips, and the intrepid group of hamsters in training reach for their Signal Stalker police scanners. Their smug looks changed to that of utter confusion when they discovered that this time they couldn't lock on our signal. Langly yells at them *"Try a spectrum analyzer!"*, to which they reply *"What's that?"* Soon the word spread around the meeting that "The Feds are back!" Our mission of inducing paranoia completed, we proceed to sit down at a chair and loudly talk about our other favorite subjects: firearms and alcohol. And they all moved away from our table.

Why would you be interested in a proprietary frequency-hopping radio when there are other license-free radios available that cost less? From a hobbyist standpoint, these radios offer a very inexpensive means to play with practical spread-spectrum communications. Since these radios are still relatively new, experimenters have yet to work with them. Much like hobbyists have done with WiFi and other electronics gear, I expect to see a whole host of "mods" to become available for these excellent little radios. From the point of a group of individuals looking to implement a small portable radio system, the cost of these radios is the same as any medium-grade business band radio, but with the superlative quality that Motorola products are known for. Their use of FHSS provides a higher-level of privacy than a handheld operating on a "dot" frequency, and the added features of the higher-end units offer better functionality for a small business. In a similar vein, the higher privacy level would be valuable for such users as CERT, search and rescue, and disaster response teams for relatively private communications when mobile phone service is unavailable for whatever reason.

A few years ago, communications at this level would have been out of reach of most individuals and small businesses. The Motorola DTR series represents the next step on communications, and are a good value for a small group wanting some extra privacy and management ability for their communications or a hobbyist wishing to experiment with the new generation of wireless communications. If you fall into this category, the DTR series radios are highly recommended.

While scanner hobbyists may as expected decry the advent of such technology as the end of their voyeuristic hobby, the advantages of such technology as represented by the DTR series of radios outweigh such fatalistic rants. The communications hobby is a beautifully diverse pastime represented by intelligent and forward thinking individuals. Such individuals will see the DTR series of radios as having the potential to add new excitement to their hobby, and embrace it with open arms much the same way 802.11 wireless networking was embraced. Individuals and groups with a need for inexpensive private communications will likewise see the DTR radios as a useful tool for whatever their mission happens to be. As crowding becomes more of an issue on the RF bands, I expect to see more equipment utilizing spread–spectrum communications. So no matter where you might be in the wide world of radio, I would recommend you take a look at these radios. They are the future.



"Damn it! Don't scare away the teenaged boys!"

Disconnecting a BRI Line Under a DMS-100

Overview

This document covers the procedures for disconnecting a standard Basic Rate Interface (BRI) line in a Nortel DMS–100 switch.

Step One

Detach the BRI from the Line Equipment Number (LEN). The DET (detach) command will be used to remove the BRI from the LEN.

Note: "BRI1 4" and "9735650403" are used as an example.

```
_____
                                 _____
CT.
>SERVORD
SO:
>SLT
                 # Set Up Logical Terminal
SONUMBER: NOW 3 12 30 PM
>
                  # Hit 'Enter'
                  # Logical Terminal Identifier
LTID:
>BRI1 4
FUNCTION:
                 # Detach
>DET
COMMAND AS ENTERED:
SLT NOW 3 12 30 PM BRI1 4 DET
ENTER Y TO CONFIRM, N TO REJECT OR E TO EDIT.
>¥
_____
                        _____
```

Step Two

"Out" the directory number from from the BRI.

Note: You will not be prompted as to which key the appearance is on if multiple directory numbers exist on the BRI. They will be removed in order of *highest* to *lowest* key each time an "OUT DN" is done.

```
_____
CI:
>SERVORD
SO:
>OUT
                  # Remove service
SONUMBER: NOW 3 12 30 PM
                  # Hit 'Enter'
>
DN:
                  # Directory Number
>9735650403
LEN_OR_LTID:
>BRI1 4
INTERCEPT_NAME:
                  # Type of intecept
                  # Blank Directory Number
>BLDN
COMMAND AS ENTERED:
OUT NOW 3 12 30 PM 9735650403 BRI1 4 BLDN
ENTER Y TO CONFIRM, N TO REJECT OR E TO EDIT
>Y
  _____
                             _____
```

Step Three

Remove the BRI from the Logical Terminal Identifier (LTID). The REM command is used to remove the BRI from the LTID.

Note: The switch will not allow this step unless all of the call appearances have been first OUT'ed.

```
_____
CI:
>SERVORD
SO:
                    # Set Up Logical Terminal
>SLT
SONUMBER: NOW 3 12 30 PM
                    # Hit 'Enter'
>
                    # Logical Terminal Identifier
LTID:
>BRI1 4
FUNCTION:
>REM
                    # Remove
COMMAND AS ENTERED:
SLT NOW 3 12 30 PM BRI1 4 REM
ENTER Y TO CONFIRM, N TO REJECT OR E TO EDIT.
>Y
```

Step Four

Query the BRI line.

```
_____
_____
>QLT BRI1 4  # Query Logical Terminal
SNPA: 973
DIRECTORY NUMBER: 5650403
LT GROUP NO: 5
LTCLASS: BRAFS DEFAULT LOGICAL TERMINAL: N
EKTS: Y
       CACH: Y
SLBRI: N
CS: N12 PS: N
ELN: N
VERSION: FUNCTIONAL ISSUE: 2
TSPID: 973565040301
LEN: NWKI 00 0 00 99 TEI: DYNAMIC
CUSTGRP: USBANKRUTCYCRT SUBGRP:0 NCOS: 0 RING: Y
LINE CLASS CODE: ISDNKSET
MAXKEYS: 64
OPTIONS: AFC AIN TIID
 KEY DN CALLTYPE
     ___
         _____
 1
     DN 9735650403 VI & CMD
 KEY FEATURE
 ____
     _____
 1
     CRBL 1 1
     DBC DBC_SP
 1
    NDNAP 2
 1
     AFC DBC_SP
 2
  ____
              _____
```



double standard (Score:-1, Flamebait)

by Anonymous Coward on Wednesday Japuary 07, @06:10PM (#7907827)

There will be lots of posts here about how America is better than Europe at spaceflight and these will quickly get modded down.

Yet posts on other topics (e.g., foreign policy) about how Europe is better than America always get modded up.

Can someone explain this to me? [Reply to This]

Re:double standard (Score:0)

by Anonymous Coward on Wednesday January 07, @06:17PM (#7907932)

it's the slashbot mentallity. and by suggesting that america isn't the worst country in history you got modded down yourself. and so will i.

[Reply to This | Parent]

MacDonalds Coffee Lawsuit (Score:0) by Anonymous Coward on Wednesday January 07, @06:34PM (<u>#7908153</u>) Thats the thing I really don't get about *I*. Everyone who defends the case/decision gets modded "informative" and "insightfull" Anyone opposed is a troll,flamebait or 0 Is it that an evil corporation got reamed unfairly? [Reply to This | Parent]

the Brits have finally learned (Score:-1, Flamebait)

by Anonymous Coward on Wednesday January 07, @06:10PM (#7907830)

Well I hope the Brits have finally learned. We are way better than them at most everything, including their own sports (soccer) that we dont even try hard at, and <u>sending shit to Mars</u> [slashdot.org]. The only thing more laughable would be France trying to do something innovative or adventurous. Silly little French. [<u>Reply to This</u>]

Re:the Brits have finally learned (Score:0)

by Anonymous Coward on Wednesday January 07, @06:33PM (#7908137)

We are way better than them at most everything, including their own sports (soccer)

Riiiiight..

End of Issue #41



Any Questions?

Editorial and Rants



Oh look. How cute! The idiots at O'Reilly Media, Inc. are spreading the "DeCSS" source code. Now, mind you, these are the same assholes who will threaten to **sue you** if you post any of their shitty material on the Internet. The real kicker is that almost everything O'Reilly Media "publishes" is stolen from someone else to begin with!

They also consider a (digital) PDF copy of *MAKE* or the *Perl Cookbook* an "illegal number." Why don't they ever mention that?



Oh look. How cute! Now these same idiots, who will sue you, are supporting a Marxist/Communist killer! Let's see, this can work two ways. Here's my new slogan:

Make: Murder Kill All O'Reilly Media Employees



September 1, 2007 – From: apnews.myway.com

Translation: Niggers! Get the fuck out!



An Israeli police robot lifts the body of a Palestinian man killed by Israeli soldiers near the village of Netiv Haasara, south of Israel August 25, 2007. Two Palestinian gunmen who climbed over Israel's border fence with the Gaza Strip on Saturday attacked a military base and made their way towards a civilian community before soldiers tracked them down and killed them. REUTERS/Amir Cohen (ISRAEL) NOTE: THE SOFTNESS IN THE PICTURE IS DUE TO HEAT MIRAGE



Creeping in ... duo enter the mosque and one man urinates in hallway

September 3, 2007 – From: www.thesun.co.uk

"Someone must recognise them and we would urge people to come forward with information – this can be done anonymously."

If *anyone* turns these guys in, I'll personally track you down and kick you in the balls.



al–Gore recently said **1998** was the warmest year in the last one hundred. But, NASA has updated their temperature data because of a minor math error. Look what we have now:

Before

http://web.archive.org/web/20060110100426/http://data.giss.nasa.gov/gistemp/graphs/Fig.D.txt

<u>After</u>

http://data.giss.nasa.gov/gistemp/graphs/Fig.D.txt

1934 is now the warmest recorded year! Whoops!



GENERAL EISENHOWER OR GENERAL LIES AND POWER?

Cooking the Books for the White House

General Eisenhower is a man constantly at war with the facts. He believes that Nazi Germany is a direct threat to the United States. It was Japan that attacked us, not Nazi Germany.

Most importantly, General Eisenhower will not admit what everyone knows: America is in an unwinnable war on two fronts that are thousands of miles away. Even if America could win, we could have to keep thousands of troops in Europe for decades.

General Eisenhower has become General Lies and Power for not retreating and sending our troops home.

Paid for by the 'Twas Time To Move On Political Society