



TECHNICAL NOTE TN-1011

Terminal Application Operation

15 September 2005

Applicability

This document has been compiled for assistance with Terminal operation and diagnostics of Tait Orca, T2000, TM8100, TM8200, TP9100 and TM9100 product.

1. Introduction

Terminal / Hyperterminal / TeraTerm or associated PC based applications have proved a useful tool in the interrogation, diagnostics and calibration of Tait radio product for servicing by technicians.

This Technical Note will cover some of the aspects of setting up, configuration and operation with regards to the main Tait product range.

For all demonstration screen shots displayed in this technical note Terminal or Hyperterminal have been used.

Please note that additional information is available in the relevant service manuals with regards to CCTM commands and Error codes.

2. Setup and Connectivity

Terminal Application Notes and Baud Rates

Terminal applications address the radio via a pre-assigned COM Port from the PC via the appropriate cable to the programming port of the radio.

If the radio is set up for normal programming operation for use with Tait PGM applications then this configuration is also suitable for operating a terminal application.

It is imperative that initial connection settings are entered correctly for each product including the correct COM port of the PC.

Baud rates at which terminal application should be set up are as follows:

T2000: 4800 bits/sec (No parity, 1 stop bit, 8 bit data, no flow control).

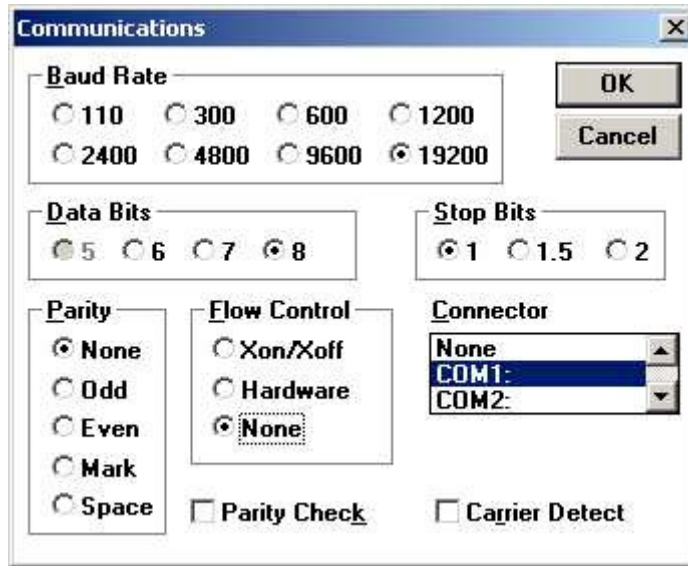
ORCA: 9600 bits/sec (No parity, 1 stop bit, 8 bit data, no flow control).

TM8000: 19200 bits/sec (No parity, 1 stop bit, 8 bit data, no flow control).

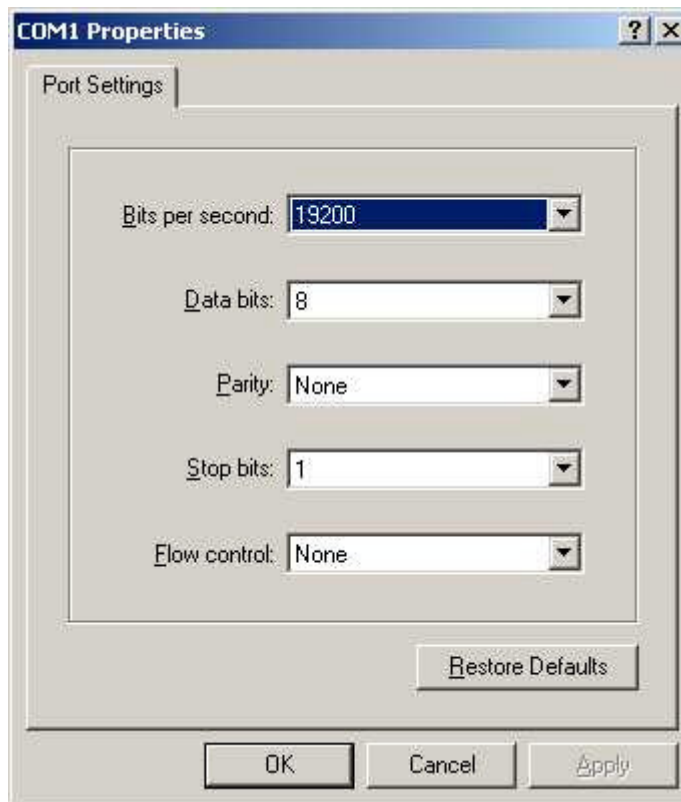
Screen shot examples of these settings for TM8100/TM8200 are outlined as follows:

Examples

Terminal:



Hyperterminal:



3. CCTM Commands

Terminal Commands

CCTM is Computer Controlled Test Mode.

It provides a method of operation allowing Manufacturing and Tait Service Engineers to test the integrity of the radio hardware and its basic functionality. Once CCTM operation has commenced, communication with the radio through the serial port consists of one or more transactions (where a transaction is a command to the radio followed by a response from the radio).

Note that the radio never initiates transactions, but just responds to commands it receives, however, it is possible for the radio to generate certain error messages at any time.

All radio keys, inputs, displays, and tones, which are under software control, are disabled when the radio is in CCTM.

The radio will use the programmed configuration parameters unless overwritten by specific CCTM commands.

For the radio to be effectively addressed by the terminal application a RESET character (^) [Shift 6] must be sent, followed shortly after by the TEST MODE character (%) [Shift 5].

This gives a response character 'V' and communication between terminal application and radio is established.

Relevant CCTM commands to interface with the radio are listed for each product as below:

Tait Orca CCTM Commands:

Function	Description	CCTM Code	Parameters
Signalling	Set modem to send zeros	10	none
	Set modem to send ones	11	none
	Set modem to send preamble	12	none
	Disable modem signalling	15	none
	Read modem receive string (continuous)	14	none
	Disable all signalling	15	none
	Enable subaudible signalling	16	none
	Read subaudible signalling decode	17	Returns 0 – signal not detected, 1 – signal detected
Mute	Force Rx audio muted	20	none
	Force Rx audio unmuted	21	none
	Mute DSP input	22	none
	Unmute DSP input	23	none
	Let squelch control Rx audio	24	none
	Read RX_BUSY status	25	Returns 0 – busy inactive, 1- busy active
	Relax RX mute control	26	none
Rx/Tx	Inhibit PA (transmit mode)	30	none
	Enable PA (transmit mode)	31	none
	Set radio to Rx	32	none
	Set radio to Tx	33	none
	Set transmit to low power	34	none
	Set transmit to mid power	135	none
	Set transmit to high power	35	none
	Set transmit to max power	36	none
	Set transmit to no power	137	none
	Activate economy mode	42	none
	Deactivate economy mode	43	none
	Read battery level	46	Returns: 0 to 255
	Read temperature level	47	Returns: 0 to 255
	Set keypad test on	50	none
	Set keypad test off	51	none
Set display test on	52	Returns: 0 to 255	
Set display test off	53	none	

Function	Description	CCTM Code	Parameters
Rx/Tx	Read averaged RSSI level	63	Returns: 0 to 255
	Read L1 threshold	64	Returns: 0 to 255
	Read L2 threshold	65	Returns: 0 to 255
Miscellaneous	Select normal micro clock	70	none
	Select birdie micro clock	71	none
	Read synth lock status	72	Returns: 0 - not in lock, 1 - in lock
	Disable internal speaker	74	none
	Enable internal speaker	75	none
	Stop the MCU clock	79	none
	Select wide band	84	none
	Select medium band	85	none
	Select narrow band	86	none
Select city squelch	88	none	
Select country squelch	89	none	
Radio Info	Read radio serial number	94/131	Returns: 6 digit number (hex)
	Read radio software version number	96	Returns:4 digit
	Read radio type	130	Returns: Radio type(P or M), Frequency band (B-J), Channel spacing (1 or 2)
	Read DSP software version number	132	Returns: 4 digit number (hex)
	Read radio hardware version number	133	Returns:4 digit number
	Read main database version	160	Returns:4 digit number
	Read calibration database version	160	Returns:4 digit number
	Read last system error	204	none
Synth	Load absolute synth frequency	101	See service manual
	Load synth reference divider	102	8 to 16383
	Load synth prescaler	103	0= 64/65, 1= 128/129
Config	Set volume pot	110	0 to 255
	Set transistor gate bias	111	0 to 255
	Set TCXO mod	112	0 to 255
	Set VCO	113	0 to 255
	Set Tx power level	114	0 to 255
	Set TCXO coarse frequency	115	0 to 255
	Set TCXO fine frequency	116	0 to 255
	Set Rx front end tuning	117	0 to 255
	Set squelch threshold	118	0 to 255
	Set CTCSS modulation	120	0 to 32767
	Set DCS modulation	121	0 to 32767
	Set FFSK modulation	122	0 to 32767
	Set Selcall modulation	123	0 to 32767
	Set DTMF modulation	124	0 to 32767
	Set voice modulation	125	0 to 32767
	Force DCS signalling (023 tone)	126	none
	Force CTCSS signalling (67.0Hz)	127	none
	Force Selcall signalling (2000Hz,2 seconds)	128	none
	Force DTMF signalling (tone A)	129	IN: 1 - start encoding, 0 - stop encoding
	Read calibrated volume setting	136	Returns: 0 - 255
	Select bottom microphone	138	none
	Select top microphone	139	none
	Disable both microphones	140	none
	Enable both microphones	141	none
	Set G-STAR modem to send zeros	150	none
	Set G-STAR modem to send ones	151	none
	Set G-STAR modem to send preamble	152	none
	Send G-STAR message	153	none
	Set ANR on	170	none
	Set ANR off	171	none
	Set reciprocal gain	172	0 to 32767

Tait T2000 CCTM Commands:

Function	Description	CCTM Code	Parameters
Signalling	Set modem to send zeros	10	none
	Set modem to send ones	11	none
	Set modem to send preamble	12	none
	Disable modem Tx	13	none
	Read modem Rx state	14	none
	Disable subaudible signal	15	none
	Enable subaudible signal	16	none
	Read signalling decode status	17	Returns 0 - signal not detected, 1 - signal detected
Mute	Force Rx audio muted	20	none
	Force Rx audio unmuted	21	none
	Mute microphone audio	22	none
	Unmute microphone audio	23	none
	Let squelch control Rx audio	24	none
	Read RX_BUSY status	25	Returns 0 - busy inactive, 1- busy active
	Relax RX mute control	26	none
Rx/Tx	Inhibit PA (transmit mode)	30	none
	Enable PA (transmit mode)	31	none
	Set radio to Rx	32	none
	Set radio to Tx	33	none
	Set PA to low power	34	none
	Set PA to high power	35	none
	Set PA to max power	36	none
	Relax PA power control	37	none
Power Supply	Activate economy mode	42	none
	Deactivate economy mode	43	none
	Set radio state for current measurement	44	none
	Cancel current measurement state	45	none
RSSI	Set L1 threshold	61	Returns: 0 to 255
	Set L2 threshold	62	none
	Read averaged RSSI level	63	Returns: 0 to 255
	Read L1 threshold	64	Returns: 0 to 255
	Read L2 threshold	65	Returns: 0 to 255
Miscellaneous	Select normal micro clock	70	none
	Select birdie micro clock	71	none
	Read synth lock status	72	Returns: 0 - not in lock, 1 - in lock
	Relax micro clock control	73	none
Special	Set 'sticky' MTM	92	none
	Clear 'sticky' MTM	93	none
	Read serial number	94	Returns: 6 digit number (hex)
	Read current channel number	95	Returns: 3 digit number

TM8100/TM8200/TP9100/TM9200 CCTM Commands

Command Label	Code	Inputs	Outputs	Comments	Error Code
TEST MODE BAUD RATE	11	rate with rate: 0=19200, 1=115200, 2=28800	returns nothing; 1/2 sec delay for prompt	<u>Example : 11 1</u> <u>The baudrate of CCTM is now</u> <u>115200baud</u> Valid for the TM81xx TM82xx TP9xxx TM9xxx	Returns nothing
DISABLE ALL SUB-AUDIBLE SIGNALLING	15	N/A	returns nothing	<u>Disable All subaudible Signalling</u> Valid for the TM81xx TM82xx TP9xxx TM9xxx	Returns nothing
ENABLE SUBAUDIBLE SIGNALLING	16	N/A	returns nothing	<u>Enable Sub-aud signalling</u> Valid for the TM81xx TM82xx TP9xxx TM9xxx	Returns nothing
READ SUBAUDIBLE SIGNALLING STATUS	17	N/A	0 : no valid sub audible signalling 1 : receiving valid sub aud signal	<u>Get Sub-aud signalling status</u> Valid for the TM81xx TM82xx TP9xxx TM9xxx	
START ROUTE_MIC_AUDIO TO SPEAKER	18	N/A	returns nothing	<u>Route mic audio to speaker</u> Valid for the TM81xx TM82xx TP9xxx TM9xxx	Returns nothing
STOP ROUTE_MIC_AUDIO TO SPEAKER	19	N/A	returns nothing	<u>Unroute mic audio to speaker</u> Valid for the TM81xx TM82xx TP9xxx TM9xxx	Returns nothing
FORCE RX AUDIO MUTED	20	N/A	returns nothing	<u>Force Rx Audio Muted</u> Valid for the TM81xx TM82xx TP9xxx TM9xxx	Returns nothing
FORCE RX AUDIO	21	N/A	returns nothing	<u>Force Rx Audio Unmuted</u>	Returns

Command Label	Code	Inputs	Outputs	Comments	Error Code
UNMUTED				Valid for the TM81xx TM82xx TP9xxx TM9xxx	nothing
MUTE AUDIO MICROPHONE	22	N/A	returns nothing	<u>Mute Audio Microphone</u> Valid for the TM81xx TM82xx TP9xxx TM9xxx	Returns nothing
UNMUTE AUDIO MICROPHONE	23	N/A	returns nothing	<u>Unmute Audio Microphone</u> Valid for the TM81xx TM82xx TP9xxx TM9xxx	Returns nothing
SQL CONTROL RX AUDIO MUTING	24	N/A	returns nothing	Valid for the TM81xx TM82xx TP9xxx TM9xxx	Returns nothing
READ RX BUSY STATUS	25	N/A	0 : busy not detected 1 : busy detected	<u>Read Rx busy status</u> Valid for the TM81xx TM82xx TP9xxx TM9xxx	Returns nothing
RELAX RX MUTE CONTROL	26	N/A	returns nothing	<u>Relax Mute Control</u> Valid for the TM81xx TM82xx TP9xxx TM9xxx	Returns nothing
SET RADIO TO RX	32	N/A	returns nothing	<u>Set Radio to Receive</u> Valid for the TM81xx TM82xx TP9xxx TM9xxx	Returns nothing
SET RADIO TO TX	33	N/A	returns nothing	<u>Set Radio to Transmit</u> Valid for the TM81xx TM82xx TP9xxx TM9xxx	Returns nothing
READ SUPPLY VOLTAGE	46	N/A	Returns: supply voltage in milliVolts (uint16)	<u>Read Supply Voltage</u> Valid for the	Returns nothing

Command Label	Code	Inputs	Outputs	Comments	Error Code
				TM81xx TM82xx TP9xxx TM9xxx	
READ RSSI LEVEL	64	N/A	returns int16 which is the Instantaneous RSSI in 0.1 dBm	Valid for the TM81xx TM82xx TP9xxx TM9xxx	
READ SYNTH LOCK STATUS	72	N/A	returns (0..1){3,3} with the PLL, FCL, LO2 statuses as a 3-character string; 0=unlocked, 1=locked (example: '110' means PLL and FCL are locked; LO2 is not)	<u>Read Synth Lock status</u> Valid for the TM81xx TM82xx TP9xxx TM9xxx	Returns nothing
REPORT SYNTH LOCK STATUS	73	0 disable reporting 1 enable reporting	returns nothing	<u>Reports the status of the synth lock (0=out of lock, 1=locked) as dictated by reception of IO_SYNTH_IN_LOCK_MESSAGE_CODE and IO_SYNTH_OUT_OF_LOCK_MESSAGE_CODE messages</u> Valid for the TM81xx TM82xx TP9xxx TM9xxx	Returns nothing
SELECT WIDE BAND	84	N/A	returns nothing	<u>Set to Wide Band (Filter, Squelch...)</u> for the analogue mode Valid for the TM81xx TM82xx TP9xxx TM9xxx	Returns nothing
SELECT MEDIUM BAND	85	N/A	returns nothing	<u>Set to Medium Band (Filter, Squelch...)</u> for the analogue mode Valid for the TM81xx TM82xx TP9xxx TM9xxx	Returns nothing
SELECT NARROW BAND	86	N/A	returns nothing	<u>Set to Narrow Band (Filter, Squelch...)</u> for the analogue mode Valid for the TM81xx TM82xx TP9xxx TM9xxx	Returns nothing
SET BUSY DETECT TYPE	87	1. Nothing 2. type with type: 0=noise mute	1. Returns 0 [no busy] or 1 [busy detect] 2. returns nothing	<u>Set Busy Detect Type</u> Valid for the	Returns nothing

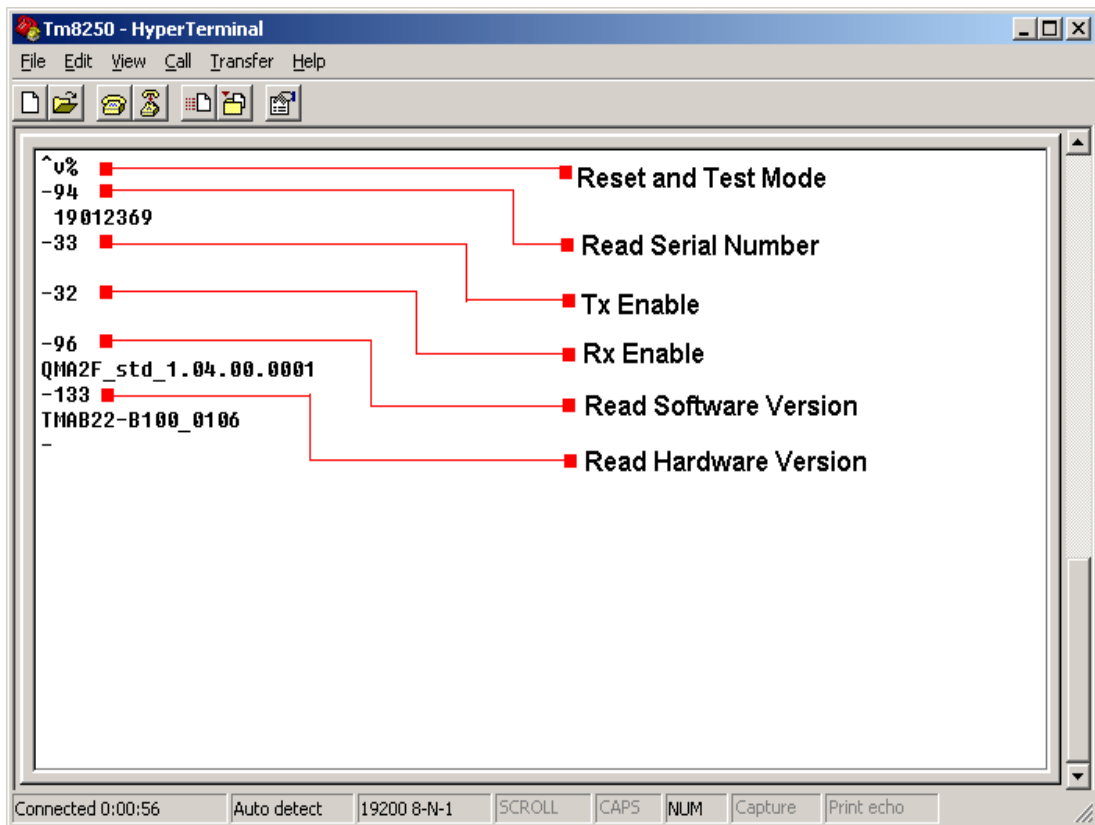
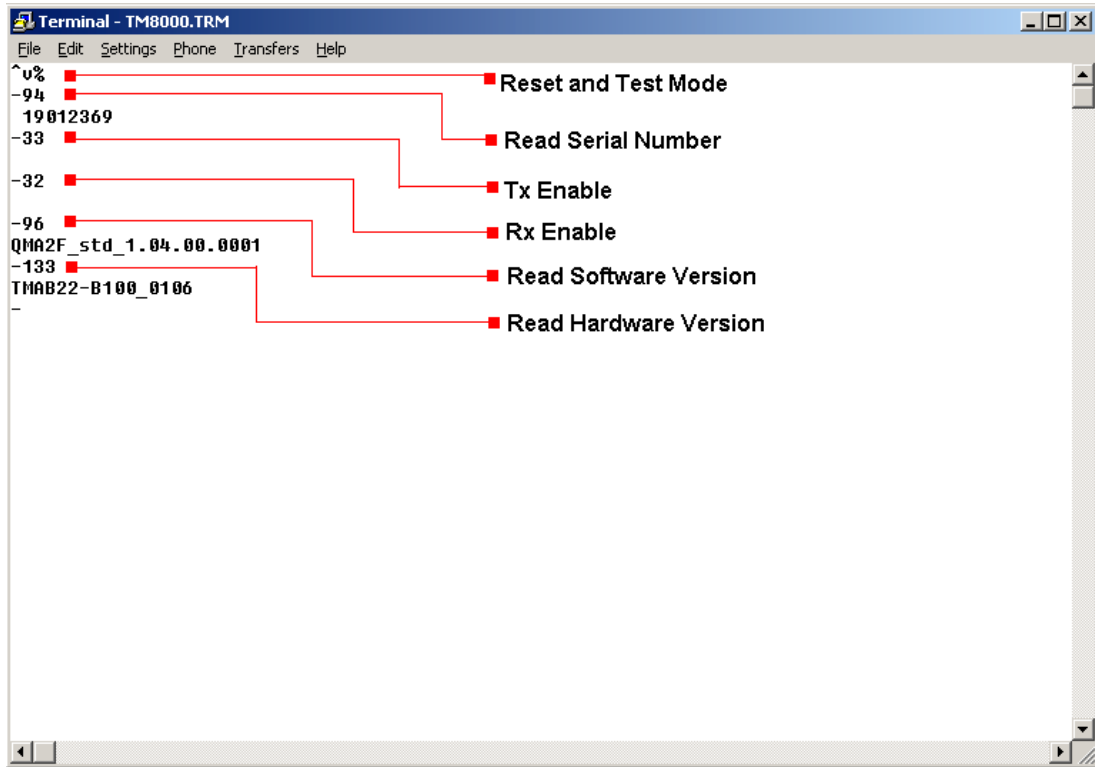
Command Label	Code	Inputs	Outputs	Comments	Error Code
		(squellch), 1=RSSI none		TM81xx TM82xx TP9xxx TM9xxx	
SET BUSY DETECT LEVEL	88	1. Nothing 2. level with level: 0, 1, 2 map to country, city, hard	1. returns (0..2) - 0, 1, 2 map to country, city, hard 2. returns nothing	<u>Set Busy Detect Level</u> Example : 88 2 set the level to hard Valid for the TM81xx TM82xx TP9xxx TM9xxx	Returns nothing
READ RADIO SERIAL NUMBER	94	N/A	radio serial no	<u>Read radio serial number</u> Valid for the TM81xx TM82xx TP9xxx TM9xxx	Returns nothing
READ SOFTWARE VERSION	96	N/A	s/w version no as a string- (QMA1F_x_y with x a 3 character ID and y an 8 digit version nb)	<u>Read software version number (radio firmware)</u> Valid for the TM81xx TM82xx TP9xxx TM9xxx	Returns nothing
READ BOOTCODE VERSION	97	N/A	boot code version no as a string- (QMA1B_x_y with x a 3 character ID and y an 8 digit version nb)	<u>Read boot code version</u> Valid for the TM81xx TM82xx TP9xxx TM9xxx	Returns nothing
READ FPGA VERSION	98	N/A	fpga version no as a string (QMA1G_x_y with x a 3 character ID and y an 8 digit version nb)	<u>Read fpga version</u> Valid for the TM81xx TM82xx TP9xxx TM9xxx	Returns nothing
READ HARDWARE VERSION	133	N/A	h/w version as a string example : « TMAB34-H500_0102 » for « TMAB32-H500 » see the product code TMS procedure « 0102 » is the HW version.	<u>Read hardware version no</u> Valid for the TM81xx TM82xx TP9xxx TM9xxx	Returns no error
READ FLASH SERIAL NUMBER	134	N/A	flash serial number (4 int16s; as 16 hex digits)	<u>Read FLASH serial number</u> Valid for the TM81xx	Returns no error

Command Label	Code	Inputs	Outputs	Comments	Error Code
				TM82xx TP9xxx TM9xxx	
SELECT MICROPHONE	138	mic with mic: for the mobile 0=control head mic, 1=aux mic for the portable 0=internal mic, 1- accessory mic	returns nothing	<u>Select Microphone</u> Valid for the TM81xx TM82xx TP9xxx TM9xxx	Returns nothing
CLEAR LAST SYSTEM ERROR	203	1. nothing (Clear last system error) 2. [c,C] Clear last soft error 3. [A, a] Clear last system error AND last soft error	returns nothing	<u>Clear Last System Error</u> Example : 203 A Clear last system error and last software error Valid for the TM81xx TM82xx TP9xxx TM9xxx	Returns nothing
READ LAST SYSTEM ERROR	204	N/A	Sys Err : x Y With x the error number and Y the data	<u>Read Last System Error</u> , Reads the last system error and TBD data associated with it Valid for the TM81xx TM82xx TP9xxx TM9xxx	Returns nothing
SET BANDWIDTH	303	bandwidth with bandwidth: 1=Narrowband voice, 2=Mediumband voice; 3=Wideband voice; 4=Narrowband THSD, 5=Wideband THSD	returns nothing	<u>Select Bandwidth</u> Valid for the TM81xx TM82xx TP9xxx TM9xxx	Returns nothing
REPORT FORWARD POWER	318	N/A	returns uint16 (forward power [0..1200 mV])	<u>Read Forward Power</u> Valid for the TM81xx TM82xx TM9xxx	No error
REPORT REVERSE POWER	319	N/A	returns uint16 reverse power [0..1200 mV]	<u>Read Reverse Power</u> Valid for the TM81xx TM82xx TM9xxx	No error
LED TEST	325	For the portable only : [0,2] with 0= off, 1= Red and 2=green	returns nothing	<u>Test the LEDs.</u> Valid for the TP9xxx	Returns nothing

Command Label	Code	Inputs	Outputs	Comments	Error Code
SET TX POWER LEVEL	326	level with level: 0->5 map to 0=Off, 1=VERYLOW 2=low, 3=med, 4=HIGH, 5=MAXIMUM [Mobile only]	returns nothing	<u>Set Tx Power Level</u> Valid for the TM81xx TM82xx TP9xxx (except from level 5 – not supported) TM9xxx	Returns nothing
SET NOISE BLANKING	386	state with state: 1=on, 0=off	returns nothing	<u>Control Noise Blanker</u> Valid for the TM81xx TM82xx TM9xxx	Returns nothing
SET TEST CHANNEL	400	Channel with * channel # '*' is an alias for 400 channel is a valid channel number (uint16)	Returns nothing	<u>Change Channel</u> Valid for the TM81xx TM82xx TP9xxx TM9xxx	C03 if an error occurs
GENERATE AUDIBLE INDICATOR	513	0-999 with Only 1-85 currently represent valid tones	returns nothing	<u>Play programmed audible indicator.</u> If the indicator is programmed to repeat then this command will cause the indicator to continue indefinitely. Valid for the TM82xx TP9xxx TM9xxx	Returns nothing
DISPLAY ALL LED TEST ON OFF	1000	0 1 with 0 = Off and 1=On	returns nothing	<u>ControlHead</u> <u>Sequentially assert and deassert all LEDS indicators</u> Valid for the TM82xx TM9xxx	Returns nothing
INDICATOR ON OFF	1001	lednum state with lednum : 0=F1, 1=F4, 2=YellowLED, 3=GreenLED, 4=RedLED, and state 0 1, 0=Off and 1=On	returns nothing	<u>ControlHead</u> <u>Turn an indicator (LED) on or off</u> Valid for the TM82xx TM9xxx	Returns nothing
INDICATOR INTENSITY	1002	Intensity With intensity 0=Off, 1=low, 2=Med, 3=High	returns nothing	<u>ControlHead</u> <u>Set the indicator intensity</u> Valid for the TM82xx TM9xxx	Returns nothing
SET BACKLIGHT	1003	Intensity With Intensity 0=Off, 1=low, 2=Med, 3=High	returns nothing	<u>ControlHead</u> <u>Activate key backlight at specified intensity</u> Valid for the	Returns nothing

Command Label	Code	Inputs	Outputs	Comments	Error Code
				TM82xx TM9xxx	
LCD BACKLIGHT	1004	Intensity With Intensity 0=Off, 1=low, 2=Med, 3=High	returns nothing	<u>ControlHead</u> <u>Activate LCD backlight at specified intensity level</u> Valid for the TM82xx TM9xxx	No error
SET LCD BACKLIGHT CONTRAST	1005	Contrast With Contrast [0-15]	returns data bytes	<u>ControlHead</u> <u>Set LCD backlight contrast</u> Valid for the TM82xx TM9xxx	Returns nothing
SET LCD ELEMENTSALL ON/OFF	1006	State With State 0=Off, 1=On	returns nothing	<u>ControlHead</u> <u>Set LCD elements all On/Off</u> Valid for the TM82xx TM9xxx	returns nothing
NOTIFY KEYPAD PRESSES	1009	Notify With Notify 0=Off, 1=On	keypress	<u>ControlHead</u> <u>Notify of keypresses</u> Valid for the TM82xx TM9xxx	returns nothing
SELECT MICROPHONE	1011	Micselect With Micselect 0=frontpanel, 1=covert	returns nothing	<u>ControlHead</u> <u>select Microphone</u> Valid for the TM82xx TM9xxx	returns nothing
READ CTRL HEAD SERIAL NUMBER	1018	N/A	radio serial no (sent as a 32-bit integer even if the SN is actually a 27 bit word)	<u>Enable on the control head the serial number verification.</u> The command should extract the SSN from the OTP Block for the Control Head Valid for the TM82xx TM9xxx	returns nothing

Examples: (Test Radio TM8250)



Compliance Issues None

CSO Instruction **CSO's** – Please inform all technical staff, and appropriate dealers of this Technical Note

4. Issuing Authority

Name and Position of Issuing Officer Chris Thomson
Technical Support

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