



MT-3 RADIO SYSTEMS

PAGING MODULATOR INSTRUCTION MANUAL CI-PM-3

Covers models: CI-PM-3-00

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Printing Date: Dec 2002

Issue Date: **February 2002**

Issue: **4 Rev A**

Part No.: **IM55-CIPM3**

Previous Issue Date: Nov 99

Previous Issue: 3

Daniels Electronics Ltd.

Victoria, BC

PRINTED IN CANADA

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FEB 12, 2002

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7 REVISION HISTORY

Issue	Issued	Revised	Details
3	Nov 99	N/A	All prototype updates incorporated in this issue. All previous revision history in preliminary issue 3 (Pre3).
		Jan 02	New CI-PM-3 version to accommodate multiple footprints for U4 (AD9901) , and incorporate changes to the reference input circuit (MMIC removed).
4	Jan 02		New Issue, incorporates all changes since release of Issue 3.
4 A		Dec 02	Correct component layout (bottom CIPM3M4E) - TP14 & TP15 locations corrected - JU56 designation removed



MT-3 RADIO SYSTEMS

UHF TRANSMITTER INSTRUCTION MANUAL

UT-3 896 - 960 MHz

Covers models:

UT-3/900-SWB3, UT-3/935-SWB3, UT-3/950-SWB3,
UT-3/900-SNB3, UT-3/935-SNB3, UT-3/950-SNB3.

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Issue:	5	Previous Issue:	4	
Issue Date:	December 98	Previous Issue Date:	April 97	Daniels Electronics Ltd.
Printing Date:	Month Year			Victoria, BC
Part No.:	IM26-UT3900S PRINTED IN CANADA			

Reviewed By:

Quality Assurance:

Larry Freeman

Name

Signature

Date

NOTE:

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MODULE MANUALS

Transmitter Main Board Instruction Manual	IM20-MT3TXMN
UHF Amplifier Instruction Manual UT-3 806 - 960 MHz	IM25-UT38900AMP
Low Current Synthesizer Instruction Manual OS(R/T)-3 132-960 MHz	IM11-OS3
UHF Transmitter Channel Designation Table UT-3 896 - 960 MHz...	IM16-URT3900CT

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RF Exposure Warning

This transmitting equipment conforms to SAR (Specific Absorption Rate) limits regarding exposure of human beings to radio frequency electromagnetic energy, as defined in the following national and international standards and guidelines:

1. Industry Canada Radio Standards Specification 102 (RSS-102), *Evaluation Procedure for Mobile and Portable Radio Transmitters with respect to Health Canada's Safety Code 6 for Exposure of Humans to Radio Frequency Fields*;
2. Health Canada Safety Code 6, *Limits of Human Exposure to Radiofrequency Electromagnetic Fields in the Frequency Range from 3 kHz to 300 GHz*¹;
3. United States Federal Communications Commission, Code of Federal Regulations; 47 CFR Part 1, § 1.1310 *Radiofrequency radiation exposure limits*; and
4. American National Standards Institute (ANSI) criteria for localized SAR in Section 4.2 of "*IEEE Standard for Safety Levels with Respect to Human Exposure to Radio Frequency Electromagnetic Fields, 3 kHz to 300 GHz*"².

Notes:

- A. The SAR limit for uncontrolled exposure of persons not classed as RF and microwave exposed workers (including the general public) for transmitter equipment operating below 10 GHz, as defined in the references above, is **2 W/m²** (0.2 mW/cm²).
- B. This transmitting equipment is designed for use with an outdoor antenna with a characteristic antenna gain of **10 dBi**, typically mounted at a significant height above ground to provide for adequate signal coverage. To ensure that the general public is not exposed to a power density above the recommended limit of 2 W/m² (0.2 mW/cm²), the equipment must be installed such that the following minimum safe distances from the antenna are maintained:

10.0 m (32.8 ft)	when configured with	250 W PA
6.3 m (20.7 ft)	when configured with	100 W PA
1.1 m (3.6 ft)	standalone (i.e. no PA)	3 W TX

- C. The following power density formula has been utilized in determining minimum safe distances:

$$S = \frac{PG}{4\pi R^2}$$

where:

- S = Power density (in appropriate units, e.g. W/m²)
- P = Power input to the Antenna (in appropriate units, e.g., W)
- G = Power gain of the antenna in the direction of interest relative to an isotropic radiator
- R = Distance to the center of radiation of the antenna (appropriate units, e.g., m)

¹Minister of Public Works and Government Services, Canada 1999, Cat. H46- 2/ 99- 237E, ISBN 0- 662- 28032- 6

²ANSI/IEEE C95.1–1992, Copyright 1992 by the Institute of Electrical and Electronics Engineers, Inc., New York, New York 10017

1 GENERAL

1.1 Introduction

2 SYSTEM OVERVIEW

2.1 Transmitter Operation

3 ILLUSTRATIONS

3.1 MT-3 Transmitter Front Panel

4 PARTS LIST

5 REVISION HISTORY

ISSUE	DATE	DESCRIPTION AND (REASON)
5	May 98	• Manual formatted to modular style. All previous revision history in issue 4.

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MT-3 RADIO SYSTEMS

TRANSMITTER MAIN BOARD INSTRUCTION MANUAL

Covers: Version 1.7 of the Transmitter Main Board
Version 1.6 & 1.8 of the FM Audio Processor Board

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Issue: 3 Previous Issue: 2

Issue Date: November 98 Previous Issue Date: May 98

Printing Date: NA

Part No.: IM20-MT3TXMN

Daniels Electronics Ltd.
Victoria, B.C.

PRINTED IN CANADA

Reviewed By:

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4 TRANSMITTER INTERCONNECT PIN DEFINITIONS

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5 ILLUSTRATIONS AND SCHEMATIC DIAGRAMS

5.1 Transmitter Block Diagram



MT3TXMNM1D

6 PARTS LISTS

6.1 Transmitter Main Board Parts List

6.1.1 Transmitter Main Board Electrical Parts List

7 REVISION HISTORY

ISSUE	DATE	REVISION
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1	August 97	First Issue.
	Sept. 97	Included PCB version 1.4 Component Layout and Schematic diagrams.
2	Dec 97	Main PCB version now 1.7 (ECO 515). • BCD Switches changed from Surface Mount Part to Through Hole Part. • Audio Amplifier was removed because this option was never used. • Added Timer Out Timer circuitry to Main Tx Board. • TOT PCB no longer installed on Audio Processor. For A21-TX3-00 TX MAIN/FP, MT-3, STANDARD A21-TX3-30 TX MAIN/FP, MT-3, + REF. INPUT TUBING, TFE-260C,14AWG T/W,CLR 7610-260C14TW 18mm Long and Consummable Buss Wire 16 Awg 40mm Long NOW NOT INSTALLED
	Dec 97	For A21-TX3-01 TX MAIN/FP, MT-3, WITH FUSE A21-TX3-02 TX MAIN/FP, MT-3, + DC RELAY A21-TX3-03 TX MAIN/FP, MT-3, + FUSE,RELAY • Removed Jumpers J1, J5, J8, J10, J11. • Added Jumpers J22 - J29, J31 - J35. • Added Test Points TP28 - TP34
	Dec 97	Front Panel Board version now 1.2 (ECO 521). Modified MT-3 Tx Front Panel Board (FPB) to support all options on the New Transmitter Main Board . Also, the Front Panel Board is now easier to configure if new microphones (other than Daniels microphones) are used. The new FPB can be used on the old TX-3 main - all options will function. However, the old version of FPB will NOT work with the new version TX-3 Main PCB (unless you hard wire one of the microphone pins into the main PCB (13.8V line.) Added J2 SM Jumper. This jumper now selects Rx Audio or 13.8V to Pin 4 of the Microphone. This capability used to be selected by a jumper on the Main Tx Board. For Normal Opertion J2 'x' position must be installed Options - This is for future use (not used now). Added 2x4 header land pattern to Tx Front Panel Board. A 2x4 header can be installed to make other microphones compatible with Daniels Transmitters.
	Nov 98	MT-3 FM Audio Processor now version 1.8 The MT-3 FM Audio Processor was re-designed because the IC, XXXXX, XXXXX, SO-8 is no longer available from the supplier. Also, the new design improves the flat and 300Hz Pre-emphasis audio responses. Included PCB version 1.8 Component Layout, Schematic diagram, Parts List and Section 2.4, 3.9 and 3.10.

ISSUE	DATE	REVISION
3	Nov 98	Updated the DE logo and added the statutory trademark statement to the title page. Updated the Low Frequency Modulation section 3.11 to reflect the in house document A0361-06.



MT-3 RADIO SYSTEMS

ENHANCED AM/FM SYNTHESIZER INSTRUCTION MANUAL OS(R/T)-3(A/H) 29 - 935 MHz

Preliminary

Covers models:

OST-3H035, OST-3H045, OSR-3H061
OST-3A128, OSR-3A149
OST-3H141, OST-3H162, OSR-3H141, OSR-3H162
OST-3H440, OSR-3H440
OST-3H932

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Issue:	4 in revision	Previous Issue:	3	
Issue Date:	September 2000	Previous Issue Date:	March 2000	Daniels Electronics Ltd.
Printing Date:	September 2000			Victoria, BC.
Part No.:	IM10-OS3AH			PRINTED IN CANADA

Reviewed By:

Quality Assurance:

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Name

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Date

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1 GENERAL

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2 THEORY OF OPERATION

2.1 Internal Power and Control (Digital Board)

3 SYNTHESIZER ALIGNMENT

3.1 General

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5 PARTS LISTS

5.1 OS(R/T)-3H 29 - 71.4 MHz Analog Board Electrical Parts List

6 REVISION HISTORY

ISSUE	DATE	REVISION
1	May 97	• Issue 1
2	Mar 98	• Changes to the AM Analog board (OST-3A128) to improve performance. ECO #547. C37 was 220nF is now 100nF and C40 was 8.2pF is now not installed C45 was 33nF is now 22nF and C49 was 2.2nF is now 1.5nF R32 was 33kΩ is now 56kΩ and R36 was 3k3Ω is now 5k6Ω
3	Mar 00	• Changes to the AM Analog board to improve performance at -40°C. ECO #565. L4 was 1.5μH is now 3.9 μH • Changes to the FM Analog boards to improve manufacturing. ECO #572 C32 & C33 were 100μF through hole tantalums are now 100μF surface mount tantalums • Changes to the OS-3A/H Digital board for compatibility with the new AM wideband Synthesizers. ECO #579. Added C15 (10μF) and R41 (221kΩ). JU1 was added and is installed for AM modules only. PCB, DIGITAL, OS-3H/P SYNTH was version 2 now version 3. • Added the new component layouts, schematic diagram and parts lists for the new AM wideband synthesizer. Wideband referring to only having to be tune once and working over the whole AM band (118-138 MHz).
4	May 00	• Changes to the OS-3H 128-174 MHz Analog board. ECO #603. R29 was 18k2 is now 3k92, U10 was MC145191 is now MC145193. • Changes to the OSR-3H 128-174 MHz Analog board. ECO #609. R22 was 100R is now 0R0. • Changes to the OS-3A 118-159.4 Analog board. ECO #601. R42 & R53 were 137kΩ are now 100kΩ.
	Jul 00	• Corrected the SELECT table on the OS(R/T)-3H 128-174 MHz Schematic diagram (section 4.3.3).

ISSUE	DATE	REVISION
4	Aug 00	- Changes to the OS(R/T)-3(A/H) Digital board. ECO #599. R30, R31 & R32 were 332R are now 215R. - Changes to the OS-3H 406-470 MHz Analog board. ECO # 597. R48 was 27R4 is now 47R5, R49 was 33R2 is now 10R. R52 was 49R9 is now Not Installed.
	Oct 00	Added the TBA part numbers for U1- U4 & U18 on the OS-3A 118-159.4 MHz Analog Board.
	Dec 00	Changes to the OS-3H 29-71.4 MHz Analog Board. ECO #631 R22 eas 475R is now 1k00.
	Jan 01	- Change to the OS-3A 118-159.4 MHz Analog Board. ECO #589. R31 was 100R is now 49R9 - Changes to the OST-3A128 Analog Board. C35 was 5.6pF is now 3.3pF and R40 was 330R is now 220R.
	Feb 01	- Corrected the confusion with D6 & D7 on the OS-3A 118-159.4 MHz Analog Board parts list. - Changes to the OS-3A 118-159.4 MHz Analog Board. ECO #634. C26 was 1nF is now 3.3pF. - Changes to the OS-3 128 – 174 MHz Analog Board. ECO #635. C56 was 330pF is now R42 (Select).
	Apr 01	Changes to the OST-3H4xx Analog Board. ECO #619. C37 – C39 were 1.0µF are now 1.5µF, C45 was 220nF is now 68nF. C49 was 22nF now 15nF, C60 was 100nF now a zero ohm wire jumper. R19 was 10k0 is now zero ohm jumper (Both OS(R/T)-3H4xx). R32 was 5k6 is now 6k2 and R36 was 2k2 is now 1k2.
	Jan 03	- Updated all sections to include an extra band from 928 - 935 MHz - Added Schematics, CLD and Parts lists for the OST-3H932 module



MT-3 RADIO SYSTEMS

UHF TX CHANNEL DESIGNATION TABLES UT-3/935 928 - 935MHz

Covers models: UT-3/935-SWB3, UT-3/935-SNB3

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Issue:	Preliminary	Previous Issue:	-	
Issue Date:	New	Previous Issue Date:	-	Daniels Electronics Ltd.
Printing Date:	Month Year			Victoria, BC.
Part No.:	New			PRINTED IN CANADA

Reviewed By:

Quality Assurance:

Larry Freeman

Name

Signature

Date

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The design of this equipment is subject to change due to continuous development. This equipment may incorporate minor changes in detail from the information contained in this manual.

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1. CHANNEL DESIGNATION TABLES

1.1 UT-3/932 Channel Designation Table: 928-935 MHz,6.25 kHz Increments

2 REVISION HISTORY

ISSUE	DATE	DESCRIPTION AND (REASON)
1	Jan 2003	• Preliminary.

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