

REV	C	APPLICATION			REVISIONS			
		NEXT ASSEMBLY	FINAL ASSEMBLY	REV	DESCRIPTION	DATE	APPROVED	APPROVED
SH	1			A	Initial Release per DCN W1644	01-11-02	V Wallace	S Hovelsrud
				B	Revised per DCN W3784	12-2-04	V Wallace	S H - CE
				C	Revised per DCN W5241			
DWG. NO.		150-041118						

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APPROVALS		DATE	INSTALLATION MANUAL COMMUNICATIONS MANAGEMENT CONTROLLER C-5000 (Digital Capable)			
DRAWN						
C Gregory	01-11-02					
CHECKED			SIZE CAGE CODE DWG NO. REV			
C Estes	01-11-02					
ENGINEER						
S Hovelsrud	01-11-02					
ISSUED						
V Wallace	01-11-02					
			A	1B7G3	150-041118	C
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Wulfsberg Electronics Division
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INSTALLATION MANUAL

*Engineering and Production by
Wulfsberg Electronics, a Division of Chelton Avionics, Inc.*

WULFSBERG

C-5000

(P25 Capable)

COMMUNICATION MANAGEMENT CONTROLLER

*MANUAL NUMBER 150-041118
REVISION C, MAY 2006*



Wulfsberg Electronics Division
A Chelton Group Company
Prescott, AZ 86301 U.S.A.

C-5000 COMMUNICATION MANAGEMENT CONTROLLER INSTALLATION MANUAL

Wulfsberg Electronics Division, located in Prescott, Arizona, designs and manufactures the C-5000 Communication Management Controller

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SECTION 1 - INTRODUCTION

IMPORTANT

This manual contains information pertaining to the installation of the C-5000 Communication Management Controller with FLEXCOMM II and FLEXCOMM I. FLEXCOMM II consists of the RT-5000 Transceiver, appropriate antennas, and optional equipment as required. FLEXCOMM I consists of the RT-9600 Transceiver, RT-9600F Transceiver, RT-7200 Transceiver, and optional combinations of up to three of the following FLEXCOMM Transceivers: RT-30, RT-118, RT-138(F), RT-406F, RT-450, appropriate antennas, and optional equipment as required. The C-5000 can also interface with combined applications of FLEXCOMM II and FLEXCOMM I, i.e., a hybrid RT System configuration that consists of both RT-5000 and FLEXCOMM I Transceivers.

1. Components

The following components can be installed:

A. Communication Management Controller

C-5000 PN 31300-1X02-XXXX (See Figure 1-1)

B. FLEXCOMM II

(1) Transceivers

RT-5000 PN 400-015525-XXXX (See Table 1-1)

(2) Antennas Systems (Refer to Table 1-2)

AT-560 PN 121-040130-XX

AT-160 PN 121-040129-01

AT-5000 PN 121-040045-01

AT-550 PN 121-017850-01

AT-150 PN 153-017822-01

AT-50 PN 121-016587-01

AT-51 PN 121-016796-01

AT-140 PN 121-016584-01

AT-400 PN 121-16821-01

FC-50 Logic Converter PN 153-016586-01

FC-5000 Logic Converter PN 153-040047-01



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FC-550 Logic Converter PN 153-017851

(3) RT-5000 Mounting Trays

Vertical Mounting Tray PN 300-316605-01

Horizontal Mounting Tray PN 300-316835-01

C. FLEXCOMM I

(1) Transceivers

RT-30 PN 400-0098-XXX (See Table 1-3)

RT-118 PN 400-0119-XXX (See Table 1-4)

RT-138 PN 400-0102-XXX (See Table 1-5)

RT-138F PN 400-014525-XX/5X (See Table 1-6)

RT-406F PN 400-012785-XX/5X (See Table 1-7)

RT-450 PN 400-0103-XXX (See Table 1-8)

RT-7200 PN 400-0087-XXX (See Table 1-9)

RT-9600 PN 400-0052-XXX (See Table 1-10)

RT-9600F PN 400-0140-XXXX (See Table 1-11)

(2) Antennas

AT-35 System PN 121-014235-XX

AT-270 PN 121-0002-000

AT-461 PN 121-0011-000

AT-462 PN 121-014378-01

AT-695 PN 121-0019-000

AT-960 PN 121-0010-000

Note: Refer to the following for information on FLEXCOMM I antennas and installation:

a FLEXCOMM I Installation Manual, WED Manual No. 150-040011-000, for information on FLEXCOMM Antennas.

b WED Manual No. 150-0061-000 for information on RT-9600 and RT-7200 Antennas.



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D. Part Numbering

The C-5000's basic unit part number 31300-XXXX-XXXX is configured as follows:

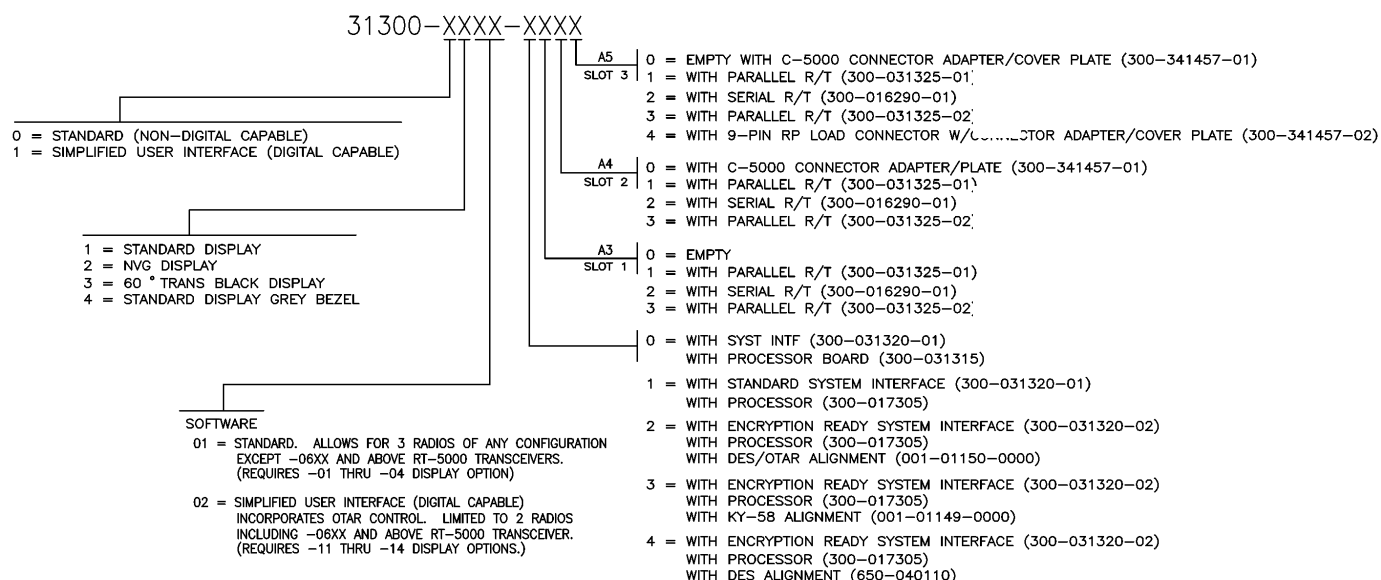


Figure 1-1. C-5000 Part Numbering
(Ref Dwg No. 400-031300, Rev AM)

Note: Processor board PN 300-031315 can only be used with Parallel R/T board PN 300-031325. Processor board PN 300-017305 can be used with Parallel R/T PN 300-031325 and Serial R/T board PN 300-016290.

The installation and operation of the Frequency Agile C-5000 Control Unit is limited to aircraft installations per FCC Rules and Regulations, Part 90, Section 90.423 and 90.203(h). A non-frequency agile C-5000 is available for other than aircraft installations and is in compliance with FCC Rules and Regulations 90.203(g).



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Table 1-1. RT-5000 Part Numbers

Part Number	Analog Description
400-015525-0101	Standard Transceiver w/o Guard
400-015525-0201	Transceiver, 30-50 MHz Guard
400-015525-0301	Transceiver, 138-174 MHz Guard
400-015525-0401	Transceiver, 406-512 MHz Guard
400-015525-0501	Transceiver w/Synthesized Guard
XTS-3000 Description	
400-015525-0611	Transceiver, D.E.S. Encrypted VHF 138-174 MHz MTM Guard Receiver
400-015525-0711	Transceiver, VHF 138 MHz MTM Guard Receiver
400-015525-0811	Transceiver, D.E.S. Encrypted UHF403 MHz MTM Guard Receiver
400-015525-0911	Transceiver, UHF403 MHz MTM Guard Receiver
400-015525-1011	Transceiver, D.E.S. Encrypted UHF450-520 MHz MTM Guard Receiver
400-015525-1111	Transceiver, UHF520 MHz MTM Guard Receiver
400-015525-1211	Transceiver, D.E.S. Encrypted UHF800 Trunk MHz MTM Guard Receiver
400-015525-1311	Transceiver, UHF800 MHz MTM Guard Receiver
400-015525-1411	Transceiver, D.E.S. Encrypted VHF138 MHz MTM Guard Receiver and UHF800 MHz MTM Guard Receiver
400-015525-1511	Transceiver, VHF138 MHz MTM Guard Receiver and UHF800 MHz MTM Guard Receiver
400-015525-1611	Transceiver, D.E.S. Encrypted VHF138 MHz MTM Guard Receiver and D.E.S. Encrypted UHF800 MHz MTM Guard Receiver
400-015525-1711	Transceiver, VHF138 MHz MTM Guard Receiver and D.E.S. Encrypted UHF800 MHz MTM Guard Receiver
400-015525-1811	Transceiver, D.E.S. Encrypted VHF138 MHz MTM Guard Receiver and UHF520 MHz MTM Guard Receiver
400-015525-1911	Transceiver, VHF138 MHz MTM Guard Receiver and UHF520 MHz MTM Guard Receiver
400-015525-2011	Transceiver, D.E.S. Encrypted VHF138 MHz MTM Guard Receiver and D.E.S. Encrypted UHF520 MHz MTM Guard Receiver
400-015525-2111	Transceiver, VHF138 MHz MTM Guard Receiver and D.E.S. Encrypted UHF520 MHz MTM Guard Receiver
400-015525-2211	Transceiver, D.E.S. Encrypted VHF138 MHz MTM Guard Receiver and UHF403 MHz MTM Guard Receiver
400-015525-2311	Transceiver, VHF138 MHz MTM Guard Receiver and UHF403 MHz MTM Guard Receiver



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Table 1-1. RT-5000 Part Numbers (cont'd)

Part Number	XTS-3000 Description
400-015525-2411	Transceiver, D.E.S. Encrypted VHF138 MHz MTM Guard Receiver and D.E.S. Encrypted UHF403 MHz MTM Guard Receiver
400-015525-2511	Transceiver, VHF138 MHz MTM Guard Receiver and D.E.S. Encrypted UHF403 MHz MTM Guard Receiver
400-015525-2611	Transceiver, DVI-XL UHF520 MHz MTM Guard Receiver
400-015525-2711	Transceiver, DVI-XL UHF800 MHz MTM Guard Receiver
400-015525-2811	Transceiver, 138 MHz w/D.E.S. MTM Guard Receiver
400-015525-2911	Transceiver, 138 MHz w/D.V.P. MTM Guard Receiver
400-015525-3011	Transceiver, 800 MHz w/D.E.S, MTM Guard Receiver
400-015525-3111	Transceiver, 800 MHz w/MTM Guard Receiver
400-015525-3211	Transceiver, 403 MHz w/D.E.S., MTM Guard Receiver
400-015525-3311	Transceiver, 138 MHz w/D.E.S., MTM Guard Receiver and A.E.S.
400-015525-3411	Transceiver, 138 MHz w/Smartnet/D.E.S., 520 MHz/ Smartzone/A.E.S/D.E.S., MTM Guard Receiver
400-015525-3511	Transceiver, 138 MHz, Smartnet w/A.E.S./D.E.S., 403 MHz Smartnes w/A.E.S./D.E.S., P-25 MTM Guard
Part Number	XTS-5000 Description
400-015525-5011	Transceiver, VHF (136-174 MHz), P-25 TRUNKING, ENCRYPTION AND UHF (764-870 MHz), P-25 TRUNKING, ENCRUPTION
400-015525-5111	Transceiver, VHF (136-174 MHz), P-25 TRUNKING, ENCRYPTION AND UHF (380-470 MHz), P-25 TRUNKING, ENCRYPTION
400-015525-5211	Transceiver, VHF (136-174 MHz), P-25 TRUNKING, ENCRYPTION AND UHF (450-520 MHz), P-25 TRUNKING, ENCRYPTION
400-015525-5311	Transceiver, UHF (764-870 MHz), P-25 TRUNKING, ENCRYPTION
400-015525-5411	Transceiver, UHF (380-470 MHz), P-25 TRUNKING, ENCRYPTION
400-015525-5511	Transceiver, UHF (450-520 MHz), P-25 TRUNKING, ENCRYPTION
400-015525-5611	Transceiver, VHF (136-174 MHz), P-25 TRUNKING, ENCRYPTION



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Table 1-2. FLEXCOMM II Antenna Part Numbers

Part Number	Antenna Description
121-040130-01	AT-560 -- 29.7 - 960 MHz 9.5" Tuned Multiband White
121-040130-02	AT-560 -- 29.7 - 960 MHz 9.5" Tuned Multiband Black
121-040129-01	AT-160 -- 29.7 – 960 MHz 9.5" Passive Multiband
121-040045-01	AT-5000 -- 29.7 – 960 MHz 5.5" (FC-5000 Req) White
121-040045-02	AT-5000 -- 29.7 – 960 MHz 5.5" (FC-5000 Req) Black
121-017850-01	AT-550 -- 29.7 – 960 MHz (FC-550 Req) White
153-017822-01	AT-150 -- 29.7 – 960 MHz (poor 30-88 MHz) White
121-016587-01	AT-50 -- 29.7 - 400MHz Autotuned Blade White
121-016796-01	AT-51 -- 29.7 - 400MHz Autotuned Blade White
121-016584-01	AT-140 -- 29.7MHz - 400MHz Blade White
121-016821-01	AT-400 -- 400MHz - 960MHZ Jet Blade White
153-016586-01	FC-50 Logic Converter -- Antenna Tuner for AT-50/51
153-040047-01	FC-5000 -- Antenna Tuner for AT-5000 and AT-560



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Table 1-2. FLEXCOMM II Antenna Part Numbers (cont'd)

Part Number	Antenna Description
153-017851	FC-550 Logic Converter
146-016958-01	Gasket, AT-400
146-014960-01	Gasket, AT-51
146-014959-01	Gasket, AT-50

Table 1-3. RT-30 Part Numbers

Part Number	RT-30 Description
400-0098-000	Transceiver, FLEXCOMM Lo Band VHF, 29.70-49.99 MHz.
400-0098-001	Transceiver, FLEXCOMM Lo Band VHF, 29.70 - 49.99 MHz, with Guard Receiver
400-0098-002	Transceiver, FLEXCOMM Lo Band VHF, 29.70 - 49.99 MHz, with Guard Receiver and Guard Receiver CTCSS Tones.

Table 1-4. RT-118 Part Numbers

Part Number	RT-118 Description
400-0119-000	Transceiver, FLEXCOMM VHF-AM Band 118.000 - 137.975 MHz, Standard Receiver IF Bandwidth
400-0119-001	Transceiver, FLEXCOMM VHF-AM Band 118.000 - 137.975 MHz, Wide Receiver IF Bandwidth

Table 1-5. RT-138 Part Numbers

Part Number	RT-138 Description
400-0102-000	Transceiver, FLEXCOMM Hi Band VHF, 138.0000 - 173.9975 MHz
400-0102-001	Transceiver, FLEXCOMM Hi Band VHF, 138.0000 - 173.9975 MHz, with Guard Receiver.
400-0102-002	Transceiver, FLEXCOMM Hi Band VHF, 138.0000 - 173.9975 MHz, with Guard Receiver and Guard Receiver CTCSS Tones
400-0102-003	Transceiver, FLEXCOMM Hi Band VHF, 138.0000 - 173.9975 MHz, with increased sensitivity (precludes Guard).



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Table 1-6. RT-138F Part Numbers

Part Number	RT-138F Description
400-014525-00	Transceiver, FLEXCOMM Hi Band VHF, 138.0000-173.9975 MHz.
400-014525-01	Transceiver, FLEXCOMM Hi Band VHF, 138.0000 - 173.9975 MHz, with Guard Receiver.
400-014525-02	Transceiver, FLEXCOMM Hi Band VHF, 138.0000 - 173.9975MHz, with Guard Receiver and Guard Receiver CTCSS Tones.
400-014525-03	Transceiver, FLEXCOMM Hi Band VHF, 138.0000 - 173.9975 MHz, with increased sensitivity (precludes Guard).
400-014525-50	Transceiver, FLEXCOMM Hi Band VHF, 138.0000 - 173.9975 MHz, Voice Encryption interface compatible.
400-014525-51	Transceiver, FLEXCOMM Hi Band VHF, 138.0000 - 173.9975 MHz, with Guard Receiver, Voice Encryption interface compatible.
400-014525-52	Transceiver, FLEXCOMM Hi Band VHF, 138.0000 - 173.9975 MHz, with Guard Receiver, Guard Receiver CTCSS Tones and Voice Encryption interface compatible.
400-014525-53	Transceiver, FLEXCOMM Hi Band VHF, 138.0000 - 173.9975 MHz, with increased sensitivity and Voice Encryption interface compatible (precludes Guard).

Note: All RT-138F units are compatible with Voice Encryption systems utilizing Non Return to Zero (NRZ) modulation at a data rate of 12 Kbit/sec or less. The -5X units are specifically wired to readily interface with Motorola and General Electric encryption modules. Additionally, all RT-138F units are compatible with Digital Coded Squelch Systems (Motorola Digital Private Line and GE Digital Channel Guard).



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Table 1-7. RT-406F Part Numbers

Part Number	RT-406F Description
400-012785-00	Transceiver, FLEXCOMM UHF Band, 406.0000 511.9875 MHz.
400-012785-01	Transceiver, FLEXCOMM UHF Band, 406-0000 511.9875 MHz, with Guard Receiver.
400-012785-02	Transceiver, FLEXCOMM UHF Band, 406.0000 511.9875 MHz, with Guard Receiver and Guard Receiver CTCSS Tones.
400-012785-03	Transceiver, FLEXCOMM UHF Band, 406.0000 511.9875 MHz, with increased sensitivity (precludes Guard).
400-012785-50	Transceiver, FLEXCOMM UHF Band, 406.0000 511.9875 MHz, Voice Encryption interface compatible
400-012785-51	Transceiver, FLEXCOMM UHF Band, 406.0000 511.9875 MHz, with Guard Receiver, Voice Encryption interface compatible
400-012785-52	Transceiver, FLEXCOMM UHF Band, 406.0000 511.9875 MHz, with Guard Receiver, Guard Receiver CTCSS Tones and Voice Encryption interface compatible
400-012785-53	Transceiver, FLEXCOMM UHF Band, 406.0000 511.9875 MHz, with increased sensitivity and Voice Encryption interface compatible (precludes Guard).

Note: All RT-406F units are compatible with Voice Encryption systems utilizing Non Return to Zero (NRZ) modulation at a data rate of 12 Kbit/sec or less. The -5X units are specifically wired to readily interface with Motorola and General Electric encryption modules. Additionally, all RT-406F units are compatible with Digital Coded Squelch Systems (Motorola Digital Private Line and GE Digital Channel Guard).

Table 1-8. RT-450 Part Numbers

Part Number	RT-450 Description
400-0103-000	Transceiver, FLEXCOMM UHF Band, 450.0000 - 469.9875 MHz.
400-0103-001	Transceiver, FLEXCOMM UHF Band, 450.0000 - 469.9875 MHz, with Guard Receiver.
400-0103-002	Transceiver, FLEXCOMM UHF Band, 450.0000 - 469.9875 MHz, with Guard Receiver and Guard Receiver CTCSS Tones.
400-0103-003	Transceiver, FLEXCOMM UHF Band, 450.0000 - 469.9875 MHz, with increased sensitivity (precludes Guard).



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Table 1-9. RT-7200 Part Numbers

Part Number	RT-7200 Description
400-0087-000	Transceiver, RT-7200 VHF HI-Band, 138.0000 - 173.995 MHz, 14/28 VDC, 100mW Audio, Recessed Connector.
400-0087-001	Transceiver, RT-7200 VHF HI-Band, 138.00 - 173.995 MHz, 14/28 VDC, 100mW Audio, Recessed Connector, with Guard Receiver.
400-0087-002	Transceiver, RT-7200 VHF HI-Band, 138.0000 - 173.995 MHz, 14/28 VDC, 100mW Audio, Recessed Connector, with CTCSS Tones.
400-0087-003	Transceiver, RT-7200 VHF HI-Band, 138.0000 - 173.995 MHz, 14/28 VDC, 100mW Audio, Recessed Connector, with Guard Receiver and CTCSS Tones.

Table 1-10. RT-9600 Part Numbers

Part Number	RT-9600 Description
400-0052-002	Transceiver, RT-9600 VHF HI-Band, 150.0000 - 173.995 MHz, 14/28 VDC, 100 mW Audio, Protruding Connector
400-0052-005	Transceiver, RT-9600 VHF HI-Band, 150.0000 - 173.995 MHz, 14/28 VDC, 100 mW Audio, Protruding Connector, with Guard Receiver
400-0052-008	Transceiver, RT-9600 VHF HI-Band, 150.0000 - 173.995 MHz, 4/28 VDC, 100 mW Audio, Protruding Connector with CTCSS Tones
400-0052-011	Transceiver, RT-9600 VHF HI-Band, 150.0000 - 173.995 MHz, 14/28 VDC, 100 mW Audio, Protruding Connector, with Guard Receiver and CTCSS Tones
400-0052-024	Transceiver, RT-9600 VHF HI-Band, 150.0000 - 173.995 MHz, 14/28VDC, 100 mW Audio, Recessed Connector
400-0052-025	Transceiver, RT-9600 VHF HI-Band, 150.0000 - 173.995 MHz, 14/28 VDC, 100 mW Audio, Recessed Connector, with Guard Receiver
400-0052-026	Transceiver, RT-9600 VHF HI-Band, 150.0000 - 173.995 MHz, 14/28 VDC, 100 mW Audio, Recessed Connector, with CTCSS Tones
400-0052-027	Transceiver, RT-9600 VHF HI-Band, 150.0000 - 173.995 MHz, 14/28 VDC, 100 mW Audio, Recessed Connector, with Guard Receiver and CTCSS Tones



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Table 1-11. RT-9600F Part Numbers

Part Number	RT-9600F Description
400-0140-002	Transceiver, RT-9600F VHF HI-Band, 150.0000 - 173.995 MHz, 14/28 VDC, 100 mW Audio, Protruding Connector
400-0140-005	Transceiver, RT-9600F VHF HI-Band, 150.0000 - 173.995 MHz, 14/28 VDC, 100 mW Audio, Protruding Connector, with Guard Receiver
400-0140-008	Transceiver, RT-9600F VHF HI-Band, 150.0000 - 173.995 MHz, 14/28 VDC, 100 mW Audio, Protruding Connector with CTCSS Tones
400-0140-011	Transceiver, RT-9600F VHF HI-Band, 14/28 VDC, 100 mW Audio, Protruding Connector, with Guard Receiver and CTCSS Tones
400-0140-024	Transceiver, RT-9600F VHF HI-Band, 150.0000 - 173.995 MHz, 14/28VDC, 100 mW Audio, Recessed Connector
400-0140-025	Transceiver, RT-9600F VHF HI-Band, 150.0000 - 173.995 MHz, 14/28 VDC, 100 mW Audio, Recessed Connector, with Guard Receiver
400-0140-026	Transceiver, RT-9600F VHF HI-Band, 150.0000 - 173.995 MHz, 14/28 VDC, 100 mW Audio, Recessed Connector, with CTCSS Tones
400-0140-027	Transceiver, RT-9600F VHF HI-Band, 150.0000 - 173.995 MHz, 14/28 VDC, 100 mW Audio, Recessed Connector, with Guard Receiver and CTCSS Tones
400-0140-052, 400-0140-152	Transceiver, RT-9600F VHF HI-Band, 150.0000 -173.995 MHz, 14/28 VDC, 100 mW Audio, Protruding Connector and Voice Encryption interface compatible
400-0140-055, 400-0140-155	Transceiver, RT-9600F VHF HI-Band, 150.0000 - 173.995 MHz, 14/28 VDC, 100 mW Audio, Protruding Connector, and Voice Encryption interface compatible
400-0140-058, 400-0140-158	Transceiver, RT-9600F VHF HI-Band, 150.0000 - 173.995 MHz, 14/28 VDC, 100 mW Audio, Protruding Connector with CTCSS Tones, and Voice Encryption interface compatible
400-0140-061, 400-0140-1611	Transceiver, RT-9600F VHF HI-Band, 150.0000 - 173.995 MHz, 14/28 VDC, 100 mW Audio, Protruding Connector, with Guard Receiver and CTCSS Tones, and Voice Encryption interface compatible
400-0140-074, 400-0140-174	Transceiver, RT-9600F VHF HI-Band, 150.0000 - 173.995 MHz, 14/28 VDC, 100 mW Audio, Recessed Connector, and Voice Encryption interface compatible
400-0140-075, 400-0140-175	Transceiver, RT-9600F VHF HI-Band, 150.0000 - 173.995 MHz, 14/28 VDC, 100 mW Audio, Recessed Connector, with Guard Receiver, and Voice Encryption interface compatible

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Table 1-11. RT-9600F Part Numbers (Cont'd)

Part Number	RT-9600F Description
400-0140-076, 400-0140-176	Transceiver, RT-9600F VHF HI-Band, 150.0000 - 173.995 MHz, 14/28 VDC, 100 mW Audio, Recessed Connector, with CTCSS Tones, and Voice Encryption interface compatible
400-0140-077, 400-0140-177	Transceiver, RT-9600F VHF HI-Band, 150.0000 - 173.995 MHz, 14/28 VDC, 100 mW Audio, Recessed Connector, with Guard Receiver and CTCSS Tones, and Voice Encryption interface compatible

Note: All RT-9600F units are compatible with Voice Encryption systems utilizing Non Return to Zero (NRZ) modulation at a data rate of 12 Kbit/sec or less. The -05X, -06X, and -07X units are specifically wired to readily interface with Motorola encryption modules. Additionally, all RT-9600F units are compatible with Digital Coded Squelch Systems (Motorola Digital Private Line and GE Digital Channel Guard).

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SECTION 2 - SYSTEM INSTALLATION

1. General

This section contains system specifications, interface information, and examples of typical system configurations for the C-5000 Communication Management Controller installed with FLEXCOMM II, FLEXCOMM I, or a configuration consisting of both FLEXCOMM II and FLEXCOMM I transceivers. System power requirements are included in Table 2-1. Figures 2-1 through 2-6 show generalized system interface diagrams.

2. Sample Systems

The following are examples of ways to configure your aircraft installation:

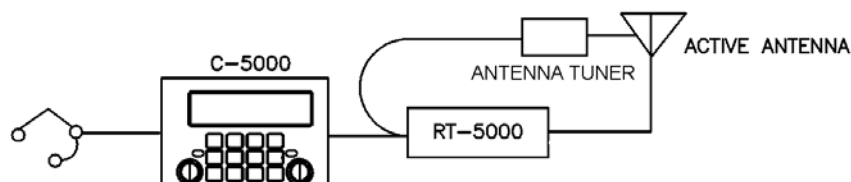


Figure 2-1. Single RT-5000 with Active Antenna

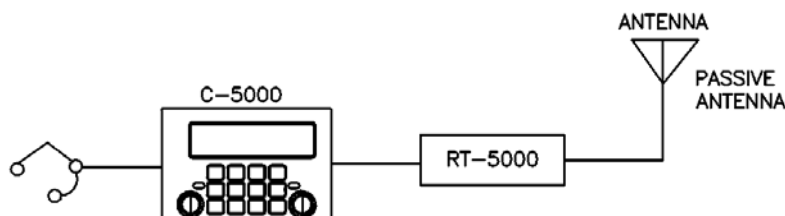


Figure 2-2. Single RT-5000 with Passive Antenna

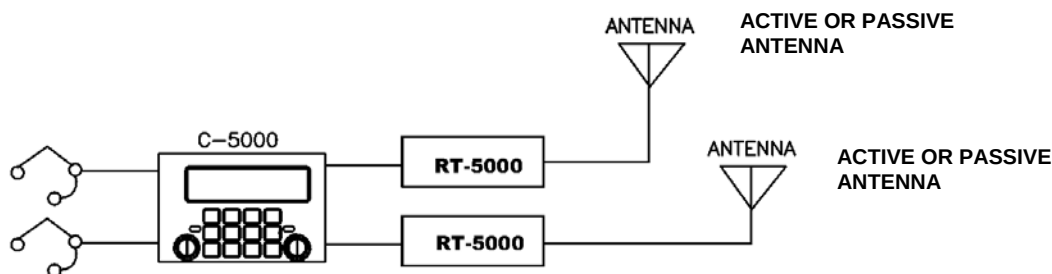


Figure 2-3. Dual RT-5000 with Dual Mic/Headset



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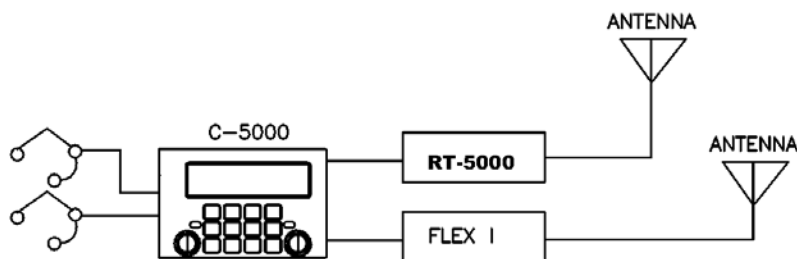


Figure 2-4. Dual Transceiver, RT-5000 and Flexcomm I

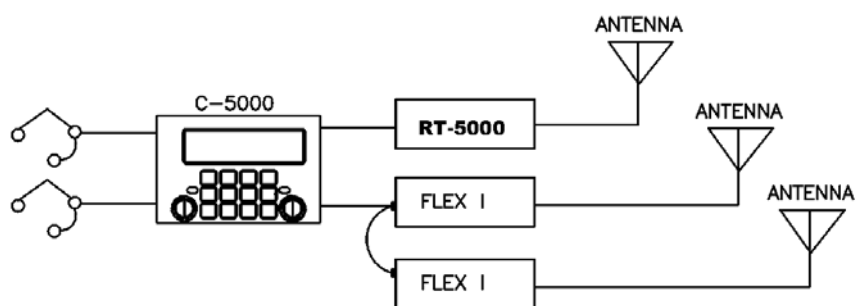


Figure 2-5. Dual Transceiver, RT-5000 and Parallel Flexcomm I Transceivers

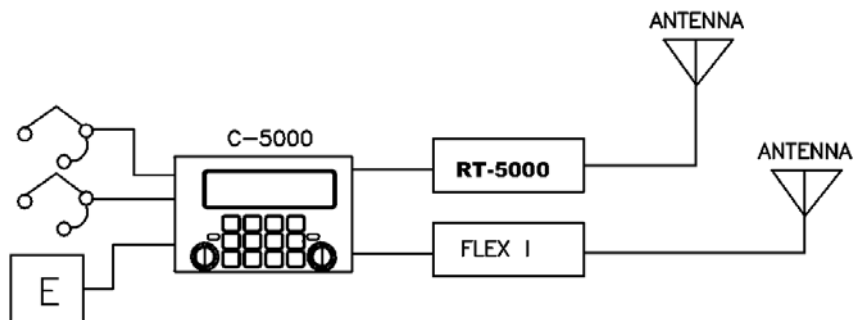


Figure 2-6. Dual Transceiver with External Encryption



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3. Component Specifications

COMPONENT	POWER REQUIREMENTS	
C-5000	VOLTAGE:	27.5 Vdc $\pm$ 20% Aircraft
	CURRENT:	0.4 amps (typical) 1.3 amps (maximum external loading)
FLEXCOMM II RT-5000	VOLTAGE:	27.5 VDC Aircraft
	STANDBY:	1.7 amps
	RECEIVE:	1.7 amps
	TRANSMIT:	10.0 amps
FLEXCOMM I	RT-30	Refer to <i>FLEXCOMM I Transceiver System Installation Manual</i> , Manual Number 150-040011, for power requirements.
	RT-118	
	RT-138	
	RT-138F	
	RT-406F	
	RT-450	Refer to <i>VHF/FM Transceivers RT-7200, RT-9600, AN/ARC-513(V) Installation /Operators Manual</i> , Manual Number 150-0061-000, for power requirements.
	RT-9600	
	RT-9600F	
	RT-7200	

Table 2-1. System Power Requirements

A. C-5000 Communication Management Controller

Note: The installation and operation of the Frequency Agile C-5000 Control Unit is limited to aircraft installations per FCC Rules and Regulations, Part 90, Section 90.423 and 90.203(h). A non-frequency agile C-5000 is available for other than aircraft installations and is in compliance with FCC Rules and Regulations 90.203(g).

- | | |
|-------------------------|---|
| (1) Number of Channels: | 350 programmable channels |
| (2) Temperature: | -30° to + 60° C |
| (3) Panel Lighting: | 5 Vdc, 5 Vac, or 28 Vdc |
| (4) Keypad Lighting: | Type: Electro Luminescent (E.L.) Lighting
Color: Blue/white (standard)
Green NVG (optional) |



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- (5) Audio Output: Standard: 100 mV into 600 ohm load, shop adjustable
0.1 to 250 mW, 600 ohms
Unsquelled Audio: 0.5 VRMS/2k ohms, adjustable 0.1
to 1.5 V
- (6) Audio Input Level: Std. Voice: 0.25 Vrms 150 ohm balanced pair, shop
adjustable 30 mV to 1.5 Vrms Narrowband: same as
voice, 2K single ended
- (7) Microphone Interface: Carbon or equivalent

B. FLEXCOMM II (RT-5000)

- (1) RT-5000 Transceiver
- a) Tunability: 1.25 kHz Incremental Tuning Simplex/Semi-duplex.
- b) Mode: FM/AM/P25/Trunking
- c) Frequency Bands: 29.7-88 MHz (FM Band)
108-118 MHz (receive only)
118-156 MHz (AM Band)
138-174 MHz (FM Band)
220-225 MHz (AM/FM)
225-400 MHz (AM/FM)
- FM:
400-512 MHz
512-806 MHz
806-960 MHz
- P25 Options
136-174 MHz
380-470 MHz
403-470 MHz
450-520 MHz
764-870 MHz
806-870 MHz
- d) Channeling: 12.5/20/25/30/50 kHz
- e) Temperature: -30° C to + 60° C
- f) Altitude: 51,000 feet above MSL
- g) Control: C-5000 Serial Tuning Bus



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- h) Tx Power: 10 Watts FM
 15 Watts AM
 10 Watts (VHF P25 Module)
 3 Watts (UHF P25 Module)

C. RT-5000 Antennas

1) AT-560 Antenna

- 1) Frequency: 29.7 - 960 MHz
- 2) VSWR: 2.5:1 maximum
- 3) Radiation Pattern: Omnidirectional in azimuth
- 4) Polarization: Vertical
- 5) Impedance: 50 ohms
- 6) Power: 20 Watts
- 7) Gain: 30 MHz, -14 dBi
88 MHz, -6 dBi
108-174 MHz, 0 dBi
220-960 MHz, 0 dBi
- 8) Temperature: -55°C to + 70°C
- 9) Altitude: 50,000 feet

2) AT-160 Antenna

- 1) Frequency: 29.7 - 960 MHz
- 2) VSWR: 2.5:1 maximum
- 3) Radiation Pattern: Omnidirectional in azimuth
- 4) Polarization: Vertical
- 5) Impedance: 50 ohms
- 6) Power: 20 Watts
- 7) Gain: 30 MHz, -21 dBi
60 MHz, -21 dBi
88 MHz, -12 dBi
108-174 MHz, -3 dBi
225-960 MHz, 0 dBi



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- 8) Temperature: -55°C to + 70°C
- 9) Altitude: 50,000 feet
- 3) AT-5000 Antenna
 - 1) Frequency: 29.7 - 960 MHz
 - 2) VSWR: 2.5:1 maximum
 - 3) Radiation Pattern: Omnidirectional in azimuth
 - 4) Polarization: Vertical
 - 5) Impedance: 50 ohms
 - 6) Power: 20 Watts
 - 7) Gain:
 - 30 MHz, -15 dBi
 - 88 MHz, -7.5 dBi
 - 118-174 MHz, -3 dBi
 - 225-960 MHz, 0 dBi
 - 8) Temperature: -55°C to + 70°C
 - 9) Altitude: 55,000 feet
- 4) AT-550 Antenna
 - 1) Frequency: 29.7 - 960 MHz
 - 2) VSWR: 2.5:1 maximum
 - 3) Radiation Pattern: Omnidirectional in azimuth
 - 4) Polarization: Vertical
 - 5) Impedance: 50 ohms
 - 6) Power: 20 Watts
 - 7) Gain:
 - 30 MHz, -14 dBi
 - 88 MHz, -6 dBi
 - 108-174 MHz, 0 dBi
 - 225-960 MHz, 0 dBi
 - 8) Temperature: -55°C to + 70°C
 - 9) Altitude: 40,000 feet



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- 5) AT-50 Antenna
 - 1) Frequency: 29.7 - 400 MHz
 - 2) VSWR: 2: 1 maximum
 - 3) Radiation Pattern: Omnidirectional in azimuth
 - 4) Polarization: Vertical
 - 5) Impedance: 50 ohms
 - 6) Power: 20 Watts
 - 7) Gain:
 - 30 MHz, -11 dBi
 - 88 MHz, -6 dBi
 - 108-174 MHz, 0 dBi
 - 225-400 MHz, + 2 dBi
 - 8) Temperature: -54°C to + 71°C
 - 9) Altitude: 50,000 feet
- 6) AT-51 Antenna
 - 1) Frequency: 29.7 - 400 MHz
 - 2) VSWR: 2.5: 1 maximum
 - 3) Radiation Pattern: Omnidirectional in azimuth
 - 4) Polarization: Vertical
 - 5) Impedance: 50 Ohms
 - 6) Power: 15 Watts
 - 7) Gain:
 - 30 MHz, -14 dBi
 - 88 MHz, -7 dBi
 - 108-174 MHz, -3 dBi
 - 225-400 MHz, 0 dB
 - 8) Temperature: -54°C to + 71°C
 - 9) Altitude: 50,000 feet



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- 7) AT-140 Antenna
 - 1) Frequency: 29.7 - 400 MHz
 - 2) VSWR:
 - 2.5: 1 at 30-88 MHz
 - 5.0: 1 at 108-117 MHz
 - 2.5: 1 at 118-174 MHz
 - 2.0: 1 at 225-400 MHz
 - 3) Radiation Pattern: Omnidirectional in azimuth
 - 4) Polarization: Vertical
 - 5) Impedance: 50 ohms
 - 6) Power: 50 Watts
 - 7) Gain:

30 MHz	-22.5 dBi
88 MHz	-10 dBi
108 - 174 MHz	-2 dBi
225 - 400 MHz	+2 dBi
 - 8) Temperature: -54°C to + 71°C operating
-62°C to + 85°C non-operating
 - 9) Altitude: 50,000 ft
- 8) AT-400 Antenna.
 - 1) Frequency: 400 - 960 MHz
 - 2) VSWR: 2.0: 1 maximum
 - 3) Radiation Pattern: Typical of $\lambda/4$ stub
 - 4) Polarization: Vertical
 - 5) Impedance: 50 ohms
 - 6) RF Power: 100 Watts
 - 7) Efficiency: 90% min. 400 - 960 MHz
 - 8) Temperature: -55°C to +70°C
 - 9) Altitude: 50,000 ft



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D. FLEXCOMM I

Note: Refer to FLEXCOMM I Transceiver System Installation Manual, Manual Number 150-040011, for specification data on FLEXCOMM Transceivers and Antennas. Refer to VHF/FM Transceivers RT-7200, RT-9600, AN/ARC-513(V) Installation/Operators Manual, Manual Number 150-0061-000, for specification data on RT-9600 and RT-7200 transceivers.

E. Miscellaneous Data Loading Cables and Software

- (1) 149-041389-0101 C-5000 PC cloning cable and software.

This software and cable allows the operator to program channel information into the C-5000 via the front panel programming port.

- (2) 404-041382-0101 C-5000 PC remote programmer software.

- (3) 124-015911-01 5-Pin cloning cable.

- (4) 124-015911-02 9-Pin cloning cable.

- (5) 152-241520-01 RT-5000 KVL keyload cable.

This cable allows the operator to load encryption keys using a Motorola KVL type keyloader into the RT-5000 (P/N 400-015525-0611 and above) via P1 connector on the RT-5000.



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SECTION 3 - MECHANICAL INSTALLATION

1. General

This section contains instructions and considerations for the proper mechanical installation of the C-5000 Communication Management Controller with FLEXCOMM II and FLEXCOMM I Systems.

The information presented here is necessary for the proper operation and satisfactory performance of the equipment.

The FLEXCOMM II System consists of the RT-5000 Transceiver, appropriate antennas, and optional equipment as required.

The FLEXCOMM I System consists of an RT-9600F, or an RT-9600, or an RT-7200, or a combination of up to 3 of the following transceivers: RT-30, RT-118, RT-138, RT-138F, RT-406F, RT-450, appropriate antenna(s), and optional equipment as required.

Note: An RT-138 transceiver or an RT-138F transceiver (not both) may be installed in the same RT-System. An RT-406F transceiver or an RT-450 transceiver (not both) may be installed in the same RT System.

Refer to FLEXCOMM I Transceiver System Installation Manual, Manual Number 150-040011, for mechanical installation information on FLEXCOMM transceivers. Refer to VHF/FM Transceivers RT-7200, RT-9600, AN/ARC-513(V) Installation /Operators Manual, Manual Number 150-0061-000, for mechanical installation information on the RT-9600, and RT-7200 transceivers.

For instructions and considerations on the mechanical installation of a configuration that consists of both FLEXCOMM II and FLEXCOMM I transceivers, refer to applicable information in this section for the installation of FLEXCOMM II transceivers, and to the documents noted in the previous paragraph for installation of FLEXCOMM I transceivers.

2. Unpacking and Inspecting Equipment

Physically compare the presence of each item in the shipment with that shown on the packing list. Exercise care when unpacking each unit. Make a visual inspection of each unit for evidence of damage incurred during shipment. If a claim for damage is to be made, save the shipping container to substantiate the claim. When all equipment is unpacked, it is suggested the carton and packing materials be saved for possible reshipment.



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3. General Installation Requirements

A. Component Weights

Component	Weight
C-5000	3.1 to 3.9 lbs (1.4 to 1.8 kg) depending on configuration
RT-5000	16.2 to 19.7 lbs (7.3 to 8.9 kg) depending on configuration
AT-560	2.7 lbs (1.2 kg)
AT-160	2.7 lbs (1.2 kg)
AT-5000	3.5 lbs (1.6 kg)
AT-550	2.7 lbs (1.2 kg)
AT-150	2.7 lbs (1.2 kg)
AT-50	4.8 lbs max (2.18 kg)
AT-51	3.1 lbs max (1.41 kg)
AT-140	4.0 lbs max (1.8 kg)
AT-400	.75 lbs max (.34 kg)
FC-50	1.65 lbs max (0.75 kg)
FC-5000	1.65 lbs (0.75 kg)
FC-550	1.75 lbs (0.79 kg)
HA-4	1.13 lbs (0.51 kg)
FLEXCOMM I Components	Refer to appropriate Installation Manual

Table 3-1. Component Weights



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4. Installation of Multipin Crimp Connectors

A. Contacts and Crimp Tool Information

Contacts, D-Sub, Min. Crimp or Solder	WED PN 129-115451-01 Positronic PN FC8122D, crimp (or equivalent) or Positronic FS8122D, solder (or equivalent)
--	---

Crimp Tools (Suggested supplier: Daniels Manufacturing Corporation 526 Thorpe Road Orlando, FL 32824)	C-5000 Serial RT Card interface Connector Handle - M22520/2-01 Positioner - M22520/2-08 C-5000 Parallel RT Card Interface Connector Handle - M22520/2-01 Positioner - M22520/2-06 RT-5000 Interface Connector Tool Frame - M22520/1-01 Turret - M22520/1-02 Positioner - M22520/2-08
--	---

Insertion/Removal Tool	Positronic M81969/1-04 or equivalent
------------------------	--------------------------------------

B. Contacts and Insertion/Removal Tool Manufacturer Name and Address:

Positronic Industries, Inc.
423 N. Campbell Ave.
PO Box 8247
Springfield, Missouri 65801

5. Installation of C-5000

Mount C-5000 on Dzus/rails per MIL MS-25213.

See Figure 3-1 for mounting dimensions.

6. Installation of RT-5000

The RT-5000 is designed for horizontal or vertical fixed tray mounting. However, vertical mounting results in better cooling. **A minimum of 1 inch clearance is required on all sides.**

1. **Firmly** hand-tighten the rack knobs to secure the RT-5000 in the mounting tray. See Figures 3-2 through 3-4 for mounting dimensions.
2. Attach antenna cabling [Connector J103 (N Type, less-than-or equal-to 400 MHz), and J102 (TNC Type, greater-than-or-equal-to 400 MHz)]. Insure proper connector mating.
3. Attach RT-5000 mating Connector J101 (55 pin).
4. Vibration isolators are recommended but not required. Use of isolators (WED P/N 246-017812, quantity 4) is recommended whenever clearance of the RT-5000 is available.



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7. Installation of Antennas

The antenna should be mounted on the bottom of the aircraft if possible.

Unpainted aluminum base must make good electrical contact with airframe. Antenna should be installed on flat surface, using RF Gasket supplied with the antenna.

A bead of sealant such as Dow Corning RTV-738 should be applied to the outside perimeter of the mounting surface.

See Figures 3-5 through 3-14 for appropriate antenna mounting dimensions.

A. AT-560 and AT-5000

See the AT-560 and AT-5000 envelope drawings, Figures 3-6 and 3-8 respectively, for dimensions.

Mount antenna with No. 10 screws.

B. FC-5000

Note: The FC-5000 Logic Converter is required for the AT-560 and AT-5000 antennas.

See the FC-5000 envelope drawing, Figure 3-16, for dimensions.

C. AT-160 and AT-150

See the AT-160 and AT-150 envelope drawings, Figures 3-7 and 3-10 respectively, for dimensions.

Mount antenna with No. 10 screws.

D. AT-550

See the AT-550 envelope drawing, Figure 3-9, for dimensions.

Mount antenna with No. 10 screws.

E. FC-550

Note: The FC-550 Logic Converter is required for the AT-550 antenna.

See the FC-550 envelope drawing, Figure 3-17, for dimensions.



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F. AT-50 and AT-51

If antenna is installed on top of aircraft, drainage holes at smaller end of antenna should be plugged with blanking plugs and RTV. Drainage holes in antenna base flange at mounting face should not be obstructed.

If antenna is installed on underside of aircraft, drainage holes at smaller end of antenna base flange at mounting face should be sealed with a small fillet of RTV.

Note: For full 29.7-900 MHz frequency coverage, the user must also install the AT-400 antenna for 400-960 frequencies.

See the AT-50 and AT-51 envelope drawings, Figures 3-11 and 3-12 respectively, for dimensions.

Mount antenna with No. 10 screws.

G. FC-50

Note: The FC-50 Logic Converter is required for the AT-50 and AT-51 antennas.

See the FC-50 envelope drawing, Figure 3-15, for dimensions.

H. AT-400

See the AT-400 envelope drawing, Figure 3-14, for dimensions.

Mount antenna with No. 8 screws.

I. AT-140

Note: For full 29.7-400 MHz frequency coverage, the user must also install the AT-140 antenna for 400-960 frequencies.

See the AT-140 envelope drawing, Figure 3-13, for dimensions.

Mount antenna with No. 10 screws.



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Remove this page and insert:

154-031300, Sheet 1 of 1 (Figure 3-1)
154-015526, Sheet 1 of 1 (Figure 3-2)
300-316835, Sheet 1 of 1 (Figure 3-3)
300-316605, Sheet 1 of 1 (Figure 3-4)
246-017812, Sheet 1 of 1 (Figure 3-5)
121-040130, Sheet 1 of 1 (Figure 3-6)
121-040129, Sheet 1 of 1 (Figure 3-7)
121-040045, Sheet 1 of 1 (Figure 3-8)
121-017850, Sheet 1 of 1 (Figure 3-9)
153-017822, Sheet 1 of 1 (Figure 3-10)
121-016587, Sheet 1 of 1 (Figure 3-11)
121-016796, Sheet 1 of 1 (Figure 3-12)
121-016584, Sheet 1 of 1 (Figure 3-13)
121-016821, Sheet 1 of 1 (Figure 3-14)
153-016586, Sheet 1 of 1 (Figure 3-15)
153-040047, Sheet 1 of 1 (Figure 3-16)
153-017851, Sheet 1 of 1 (Figure 3-17)



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SECTION 4 - ELECTRICAL INSTALLATION

1. General

The following section describes the wiring requirements and options for the installation of the system. Because the system has so many features and options, it is recommended that the installer take the time to read pin descriptions and all notes on wiring diagrams before designing an installation.

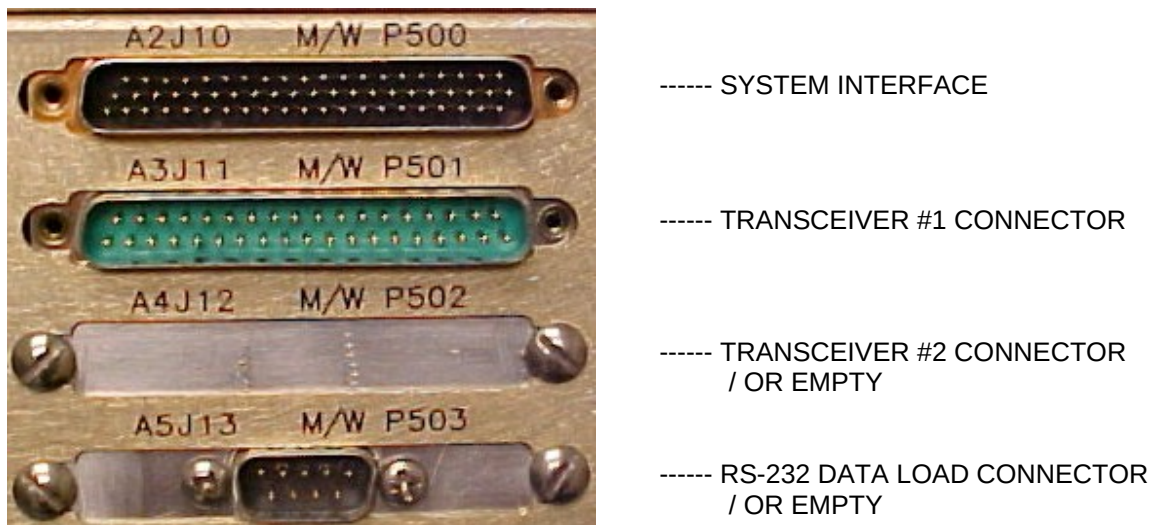


Figure 4-1 Rear View of C-5000

2. Wiring Considerations

To simplify the systems design, follow the steps below:

Step 1: Determine the type and number of radios. The C-5000 can control one or two transceiver systems. The word system is used because a Flexcomm I installation can be made of multiple transceivers electrically daisy chained to make one system. Based on the type of radio, chose the part number of C-5000 that applies to your application.

Step 2: Determine the type of antenna. For each transceiver, determine the appropriate antenna. For Flexcomm I Transceivers, see the proper installation manuals for options. For the RT-5000, the process begins by determining if the user needs optimum 30-88MHz performance. If so, the recommended antenna system will be an "active" antenna (i.e. one that is electrically tuned for maximum performance). If the user rarely uses 30-88 MHz, then passive antenna is suggested. Passive antennas are less expensive and less complex to install. Remember that performance in the 30-88 MHz frequency range is very degraded vs. an active antenna.

Step 3: Microphone/Headset. If only one radio is installed, use the primary mic/headset port. If two radios are installed, use primary mic/headset for transceiver system #1 and secondary mic/headset for transceiver system #2. If only one mic/headset port is available on the audio panel, use the primary mic/headset port and configure the C-5000 to operate in "single mic mode".



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Step 4: Panel Lighting. Select the input pin on P500 for the desired backlighting. Options are 28 Vdc (pin 30) or 5 Vdc/5vrms (pin 8).

Step 5: System Wiring. Based on steps 1-5, choose the wiring diagrams from this section that apply to your configuration. Note that if you have two RT-5000's in your system, copy the wiring illustrated for P501 to P502. In other words, choose the wiring for each radio and apply it to the appropriate connector.

A. C-5000 System Interface Connector, P500 Wiring Considerations

- (1) P500 Connector

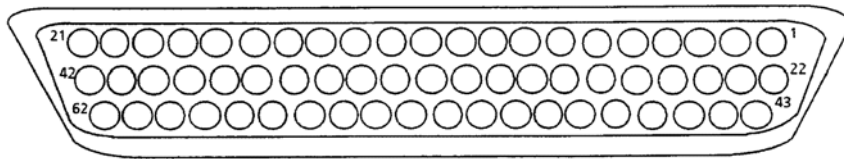


Figure 4-2 P500 Connector



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(2) System Interface Connector P500 Pin Names.

PIN	SIGNAL NAME	PIN	SIGNAL NAME
1	RT-X REXMT AUDIO OUT	32	RESERVED SPARE D
2	RS-422 TX LO	33	RT-X SELECT B
3	XMT AUDIO IN HI	34	RT-X REXMT CONTROL KEY OUT
4	XMT AUDIO COMMON	35	PLAIN/CIPHER SEL
5	INTERNAL CIPHER SEL A	36	EXT. CIPHER ACTIVE
6	INTERNAL CIPHER SEL B	37	RT-X WB MN RCV AUDIO OUT
7	REXMT AUDIO IN	38	RCV'NG EXT ENCRYP TEXT
8	5V LITES	39	HEADSET AUDIO COMMON
9	PRIMARY CARBON MIC HI	40	PRIMARY HEADSET AUDIO HI
10	SECONDARY CARBON MIC LO	41	SECONDARY MIC PTT
11	SHIELD	42	EXT RT-X DECODED RCV AUDIO
12	CIPHER/PLAIN SEL	43	A/C POWER GND
13	RT-X GUARD AUDIO OUT	44	27.5 VDC A/C POWER
14	INTERNAL CIPHER DISABLE	45	RS-422 TX HI
15	PTT FROM EXT CIPHER	46	RS-422 RX1 HI
16	RT-X SELECT A	47	RS-422 RX1 LO
17	SECONDARY CARBON MIC HI	48	MIC OUT LO
18	PRIMARY MIC PTT	49	MIC OUT HI
19	XMT'NG EXT ENCRYP TEXT	50	28V LITES
20	SECONDARY HEADSET AUDIO HI	51	RESERVED SPARE E
21	RESERVED SPARE C	52	RESERVED SPARE G
22	GUARD PRECEDENCE IN	53	RESERVED SPARE A
23	BW CONTROL IN	54	RESERVED SPARE F
24	RS-422 RX2 HI	55	INTERNAL CIPHER SEL C
25	RS-422 RX2 LO	56	PTT TO CIPHER
26	ZEROIZE	57	SPARE B
27	AUX AUDIO IN HI	58	AUX -15VDC
28	AUX +5 VDC	59	SPARE A
29	PRIMARY CARBON MIC LO	60	AUX +15 VDC
30	LITES COMMON	61	EXT RT-X WB XMT AUDIO
31	RESERVED SPARE B	62	AUX GND

Table 4-1. System Interface Connector P500 Pin Names



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Pin(s) - Signal Name

9, 29 - PRIMARY CARBON MIC HI/LO

These pins provide a 150 Ohm input impedance for the crew microphone input. Standard Carbon Mic bias of 15V through 300 Ohms is provided. Standard modulation of 1 kHz tone at 0.25 Vrms is factory set for ± 3 kHz deviation although an adjust range of 30 mV to 1.5 Vrms is provided by A2R174 on the system interface board.

18 - PRIMARY MIC PTT

This pin, when grounded, activates the transceiver system(s) selected for the primary mic/headset interface.

Note: The primary mic LO and PTT should be connected together at the mic interface (audio panel or mic jack). Alternately, the mic LO should be grounded at the mic interface as mic bias is not provided unless mic LO is DC grounded.

39, 40 - PRIMARY HEADSET AUDIO HI/COMMON

The pins provide receive and sidetone audio output for the transceiver system(s) selected for the primary mic/headset interface. Standard audio levels of 100 mW into 600 Ohm load is provided for standard modulation although an adjustment range of 0.5 to 200 mW is provided by A2R86 of the system interface board.

10, 17, 20, 41 - SECONDARY CARBON MIC HI/LO, SECONDARY HEADSET AUDIO HI AND SECONDARY MIC PTT

These pins provide a similar interface as the primary counterparts with some functional exceptions. Although levels and impedances provided are the same, the secondary interface provides the limited function of talk and listen in clear, non-encrypted audio. Features provided by the primary interface i.e. Selectable audio routing through internal or external encryption systems integrated with the C-5000 are not supported at the secondary interface.

11 – SHIELD

All shields of signals originating at the C-5000 and terminating at other equipment should be connected to this pin and left unterminated at the other equipment. Similarly, the shields of signals originating at other equipment and terminating at the C-5000 should be grounded at the other equipment and left unterminated at the C-5000.

43, 44 - A/C POWER GROUND AND 27.5 VDC A/C POWER

These pins provide aircraft 27.5 Vdc power to the C-5000 system. Typical loading is approximately 350 mA, however with external loading by auxiliary equipment connected to ± 15 V and +5 V pins provided, the current requirement can be 1.3 Amp at 27.5 Vdc and approach 2 Amps at low voltage. Appropriate circuit breaker should be provided with consideration given to separately powered radio equipment as part of the basic communications equipment being controlled by the C-5000.



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Pin(s) - Signal Name

8, 30, 50 - 28V, 5V, COMMON LITES

These pins provide for aircraft lite dimmer bus control of the keyboard lighting. Either 28 Vdc, 5 Vrms or 5 Vdc lighting may be used. The C-5000 does not draw power from the buss but simply monitors the voltage for proper lite tracking. Only 5 V or 28 V may be connected at once.

2, 24, 25, 45, 46, 47 - RS-422 TX HI/LO, RS-422 RX1 HI/LO, RS-422 RX2 HI/LO

These pins provide for a bi-directional digital data buss to other equipment on board the aircraft. Two separate receive inputs are provided and the transmit pair may be connected to multiple RS-422 devices. The receive shields should be connected only at the originating equipment and the transmit shield should only be connected to the C-5000 shield pin.

5, 6, 55 - INTERNAL CIPHER SEL A, B, C

Unavailable function.

14 - INTERNAL CIPHER DISABLE

This pin, when left unterminated, causes audio routing within the C-5000 to include the Internal Cipher Interface. By grounding this pin, audio routing of the following signals is to/from the external system interface for utilization with External Encryption Equipment, auxiliary systems and functions generally used in conjunction with military equipment. Associated signals routed to the External Interface are:

Mic output, voice band transmit audio input, wideband transmit audio input, wideband receive audio output, voice band receiver audio output, decoded/de-encrypted voice band received audio input, guard receiver voice band audio output.

This pin should normally be grounded unless an Internal Cipher module (or other special module) is installed in the C-5000 and then it should be switched for Internal or External routing of the "RT-X" signals.

36 - EXT CIPHER ACTIVE

This pin, when grounded, will automatically enable external encryption.



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Pin(s) - Signal Name

3, 4 - XMT AUDIO IN HI/COMMON

This pair provides a voice band input to the transmitter(s) as selected by the crew. Typical use is with external encryption equipment in which the mic input to the C-5000 is routed out to the encryption unit and when the encryption unit is not active, the mic input (voice band) is returned to this port for normal voice transmit. Standard levels are 0.9 Vrms into 600 Ω , although A2R160 and A2JP3 provide adjustment range of approximately 40 mV (150 Ω) to 5.4 V (600 Ω).

27 - AUX AUDIO IN HI

This port provides an auxiliary input to the headset audio amplifiers (primary and secondary). It is not switched and all inputs to this port will appear at the headset(s). Typical use is alert tones, progress tones, medical telemetry equipment like Doppler Monitors, etc. Typical input level of 0.5 Vrms (5k Ohm) will yield standard audio although A2R102 on the system interface board provides an adjustment range of 0.33 to 7.75 Vrms.

35 - PLAIN/CIPHER SEL

This output provides control signals to external equipment for activating encryption equipment. For normal operation, this output is an open circuit. An active pull to ground is provided for encryption active.

12 - CIPHER/PLAIN SEL

This output is similar to Plain/Cipher, but is opposite polarity and provides a ground for normal operation.

38 – RCV'NG EXT ENCRYP TEXT

This input, when grounded, indicates to the C-5000 computer that the external encryption equipment at the system interface is receiving properly decoded and encrypted text.

19 – XMT'NG EXT ENCRYP TEXT

When grounded, this input indicates to the C-5000 computer that the external encryption equipment is active and is providing cipher text for wideband modulation to the crew selected transmitter.

56 - PTT TO CIPHER

This pin provides a ground to repeat the mic input (primary only).



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Pin(s) - Signal Name

15 - PTT FROM EXT CIPHER

When grounded, this pin will cause the C-5000 to remain in transmit mode. Transmitter end of text messages can be transmitted after mic PTT has been released by utilizing this input as a stretched or delayed PTT input.

26 - ZEROIZE

Not to be used on new designs.

48, 49 - MIC OUT HI/LO

This pair provides a buffered primary mic output. As standard configuration, the balanced mic output is a combination of Primary Mic Input, REXMT Audio In, XMT Audio In and Internal Cipher Voice XMT Audio. The level is set for 0.25 Vrms for standard modulation. When external (or internal) encryption equipment is connected to the system interface board, A2JP2 on the system interface board is typically moved from "1 to 2" to "2 to 3" and zero Ohm resistor A2R140 (system interface board) is removed. With A2JP2 changed and A2R140 removed, the mic out is only the buffered primary mic input. In addition, the primary mic input is isolated from the rest of the C-5000 such that normal clear text voice modulation must be routed from mic out Hi/Lo. In this configuration, the external encryption equipment must be installed to complete the audio path from the primary mic input to the selected transmitter(s). Jumpers from mic out Hi/Lo to XMT Audio In Hi/Lo may be used temporarily when the external encryption equipment is disconnected. Audio levels are typically 0.9 Vrms (600 Ω) although A2R170 on the system interface board provides considerable adjustment range.

22 - GUARD PRECEDENCE IN

This pin, when grounded, disables nearly all of the C-5000 functions and channels the system to a pre-stored precedence channel. The volume control is functional. This mode is useful for an emergency mode in which all functions are disabled except basic talk/listen on the pre-stored system precedence channel. Normal operation is with this pin open circuited.

23 – BW CONTROL IN

Not to be used on new designs.



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Pin(s) - Signal Name

16, 33 - RT-X SELECT A & B

Unavailable function.

13 - RT-X GUARD AUDIO OUT

This pin provides the selected RT System Guard RCV Audio (voice band) signal for use with external equipment. Typically the plain text guard audio is summed with decoded main RCV audio and routed to the C-5000 for combined main (recovered cipher) and guard (clear) to the headset. Standard levels are 2 Vrms at low impedance, although A2R114 on the system interface board provides adjustment range of 0.5 to 4 Vrms.

7 - REXMT AUDIO IN

This input provides an auxiliary voice band transmit audio input and is summed with the primary mic audio. The receive audio from other equipment can be routed to this port and in conjunction with the "PTT from Ext. Cipher" (an auxiliary PTT input), a multi-system relay can be established. A level of 2 Vrms for standard modulation is standard, although A2R167 on the system interface board provides an adjustment range of 0.1 to 7.75 Vrms.

1 - RT-X REXMT AUDIO OUT

This pin provides a voice band receive audio output from the selected RT system (1, 2 or 3). The audio is normal audio from the selected radio system and includes both main and guard audio as well as sidetone during XMT. In conjunction with REXMT control key out, (squench activity from this system and PTT input to other aircraft equipment) this signal may be used in a multi system relay to provide receive audio from this system to transmit audio to other equipment on board the aircraft.

Typical application with external encryption equipment connected to the system interface utilizes this signal as clear text receive audio to be routed to, and returned from, the external equipment in time of nonencrypted reception to the RT-X Decoded Audio Input. The signal level is 2 Vrms for standard voice, although A2R108 on the system board provides an adjustment range of 0.2 to 7.75 Vrms.

Pin(s) - Signal Name

34 - RT-X REXMT CONTROL KEY OUT

This signal provides a ground output when the selected radio system (1, 2 or 3) main receiver is active (squench activity). This signal provides a PTT input to other aircraft equipment in a multi-system relay mode.



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37 - RT-X WB MN RCV AUDIO OUT

This signal is a wideband received audio signal from the selected RT system (1, 2 or 3) main receiver. It is not squelch gated and typically is used with external encryption equipment connected to the system interface. The standard level is 6 Vpp although A2R135 provides an adjustment range of 1.2 to 12 Vpp. The Motorola encryption equipment requires 4 Vpp.

42 - EXT RT-X DECODED RCV AUDIO

This input is typically used with external encryption equipment connected to the system interface. The signal is the decoded or de-encrypted voice band clear text from the encryption system. By proper C-5000 system programming, this signal can be routed directly as the selected RT system (1, 2 or 3) recovered audio or it can be internally summed with the selected RT system guard audio, sidetone, or both. In addition, the recovered audio can also be programmed to provide de-emphasis if required. A level of 2 Vrms is standard, although A2R131 provides an adjustment range of 0.25 to 7.75 Vrms.

61 - EXT RT-X WB XMT AUDIO

This input provides for wideband digital audio (encrypted or cipher text) modulation input to the selected RT system (1, 2 or 3). Modulation level of 6Vpp is standard, although A2R141 on the system interface board provides an adjustment range of 1.2 to 12 Vpp.

60 - AUX +15 VDC

This output can be used to power external auxiliary equipment. Total load cannot exceed 600 mA. In addition, the combined external load of + 15V, -15V and +5V outputs cannot exceed 11.5 Watts.

58 - AUX -15 VDC (OPTIONAL)

This optional output can be used to power external auxiliary equipment. A jumper must be installed on the system interface board to activate this output. Total load for this output cannot exceed 100 mA. In addition, the combined external load of +15V, -15V and +5V outputs cannot exceed 11.5 Watts.

28 - AUX +5 VDC (OPTIONAL)

This optional output can be used to power external auxiliary equipment. A jumper must be installed on the system interface board to activate this output. Total load for this output cannot exceed 200 mA. In addition, the combined external load of +15V, -15V and +5V outputs cannot exceed 11.5 Watts.

62 - AUX GND

This is a C-5000 power ground connection suitable for electrical reference ground to other auxiliary equipment.



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Remove this page and insert 147-014995 Sheet 1 of 3 (Figure 4-3a)



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B. C-5000 Transceiver Interface to RT-5000 Transceiver Wiring Considerations

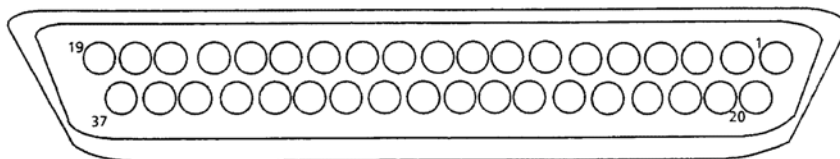


Figure 4-4. P501/P502 Connectors

PIN	SIGNAL NAME	PIN	SIGNAL NAME
1	DIGITAL SHIELD	23	SPARE
2	RS-422 CTRL TX LO	24	SPARE
3	ON/OFF	25	RESERVED OUT SPARE B
4	RS-422 CTRL TX HI	26	VOICE AUDIO LO IN
5	RS-422 CTRL RX LO	27	RESERVED OUPUT SPARE A
6	SPARE	28	SPARE
7	IN SPARE #1	29	AUDIO GND
8	RS-422 CTRL RX HI	30	MIC HI OUT
9	SPARE	31	UNSQL MN RX AUDIO IN
10	SPARE	32	SPARE
11	MIC LO/PTT OUT	33	$\overline{\text{TX}}$
12	SPARE	34	IN SPARE #3
13	VOICE AUDIO HI IN	35	SPARE
14	CIPHER / $\overline{\text{PLAIN}}$	36	IN SPARE #2
15	SPARE	37	GROUND
16	$\overline{\text{PLAIN}}$ / CIPHER		
17	TAKE CONTROL		
18	EXT XMT AUDIO OUT		
19	GROUND		
20	CONTROL GROUND		
21	UNSQL GD RCV AUDIO		
22	SPARE		

Table 4-2. C-5000 Transceiver (RT-5000) Connector P501, P502 Pin Names



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Note: Verify that the C-5000 Serial RT Card is installed for this interface.

Pin(s) - Signal Name

1 - DIGITAL SHIELD

Shield ground connection for RS-422 CONTROL TX H and CONTROL TX L lines. Normally not used.

2 – RS-422 CTRL TX LO

This pin is the active low sense serial data output and meets EIA RS-485 voltage levels. The data from this output must be connected to the RT-5000 input pin RS-422 CTRL RX LO (pin L).

3 - ON/OFF

When this output is pulled to ground, the power supply in the RT-5000 is enabled and the transceiver will turn on. This must be connected to pin W of the RT-5000.

4 – RS-422 CTRL TX HI

This pin is the active high sense serial data output and meets EIA RS-485 voltage levels. The data from this output must be connected to the RT-5000 input pin RS-422 CTRL RX HI (pin M).

5 – RS-422 CTRL RX LO

This pin is the active low sense serial data input and meets EIA RS-485 voltage levels. This input must be connected to the RT-5000 output pin RS-422 CTRL TX LO (pin K).

6 – SPARE

Spare pin.

7 - IN SPARE #1

Spare input pin.

8 – RS-422 CTRL RX HI

This pin is the active high sense serial data input and meets EIA RS-485 voltage levels. This input must be connected to the RT-5000 RS-422 output pin CTRL TX HI (pin K).

9 – SPARE

Spare pin.



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Pin(s) - Signal Name

10 – SPARE

Spare pin.

11 - MIC LO/PTT OUT

Low side of the microphone audio that connects to the RT-5000 input pin MIC LO/PTT IN (pin Z). This pin floats during receive mode and goes to ground when a transmit condition occurs. Audio on this pin along with MIC HI is the voice audio used to modulate the RT-5000.

12 - SPARE

Spare output pin.

13 - VOICE AUDIO HI IN

Input pin that gets voice bandwidth receive audio from the RT-5000. This pin must be connected to the RT-5000 AUDIO HI output (pin j).

14 – CIPHER / PLAIN

Normally internally pulled high output pin able to sink 30mA to ground. Used to set the mode of an external encryption device. Pins 14 and 16 provide for control of devices that have different polarities for the mode set function. This pin is not used in RT-5000 systems.

15 – SPARE

Spare Pin.

16 – PLAIN / CIPHER

Normally internally pulled high output pin able to sink 30mA to ground. Used to set the mode of an external encryption device. Pins 16 and 14 provide for control of devices that have different polarities for the mode set function. This pin is not used in RT-5000 systems.

17 - TAKE CONTROL

If this input pin is grounded, the Serial control lines will be tri-stated. This allows for control of the RT-5000 by another C-5000.



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Pin(s) - Signal Name

18 - EXT XMT AUDIO OUT

This output is a single ended audio output to the RT-5000 that carries wide band audio to the RT-5000. Normally the audio on the pin comes from an external encryption device connected to P500 of the C-5000 and is the encrypted transmit audio from that device. Connect this pin in all installations even though an external encryption box is not used. Use shielded wire.

19 - GROUND

General purpose ground. Not a required pin for installation.

20 - CONTROL GROUND

Provides for ground connection between the control head and the RT-5000.
This pin is very important to establish a common signal ground between the units. It should be connected to RT-5000 pin D.

21 - UNSQL GD RCV AUDIO IN

Single ended audio line that routes unsquelched receiver audio from the RT-5000 Guard Receiver to the C-5000. When the RT-5000 is using the external encryption device at the C-5000, the guard receiver audio from this input is added inside the C-5000 to the decoded audio from the MAIN receiver so that both MAIN and GUARD messages can be received simultaneously. It should be connected inside a shielded cable to RT-5000 WIDE BAND GD RX AUDIO OUT (pin w).

22, 23, 24 28, 32, 35 – SPARE

Spare pins.

25 - RESERVED OUT SPARE B

Reserved spare output.

26 - VOICE AUDIO LO IN

Low side of the voice band receive audio that comes from the RT-5000. Use shielded wire.

27 - RESERVED OUT SPARE A

Reserved spare output.



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Pin(s) - Signal Name

29 – AUDIO GND

Used for grounding shields. There is not separate digital and analog grounds within the C-5000 so all shields can be connected to this pin. All shields should also be connected to the Backshell of the connector and then grounded to the aircraft frame.

30 - MIC HI OUT

High side of the transmit voice audio that connects to the RT-5000 input pin MIC HI IN (pin Y). The pin along with MIC LO/PTT OUT should be connected using shielded wire.

31 - UNSQL MN RCV AUDIO IN

Single ended audio line that inputs unsquelched receiver audio from the RT-5000 Main Receiver into the C-5000. When the RT-5000 is using the external encryption device at the C-5000, the main receiver audio from this input is routed to the encryption device for decoding encrypted signals. It should be connected inside a shielded cable to RT-5000 WIDE BAND MN RX AUDIO OUT (pin q).

33 - $\overline{\text{TX}}$

This active low input pin holds the MIC LO/PTT OUT line low in order for external devices to send a turn off message. No application for this pin is currently available.

34 - IN SPARE #3

Spare input pin.

36 - IN SPARE #2

Spare input pin.

37 - GROUND

This ground performs the same function as CONTROL GROUND pin 20. Either or both of these two pins can be used for providing a signal ground between the C-5000 and RT-5000.



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C. C-5000 RS-232 Data Load Connector P503

This connector is used to program the C-5000 from a PC using a standard serial cable. It parallels the circular connector on the front of the C-5000.

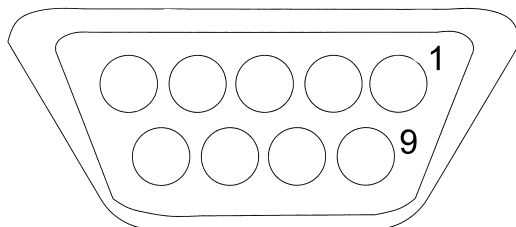


Figure 4-5. P503 Connector

PIN	SIGNAL NAME
1	DIGITAL SHIELD / GROUND
2	RS-422 CTRL TX LO RX DMA
3	ON/OFF TX DATA
4	RS-422 CTRL TX HI DTR
5	RS-422 CTRL RX LO GND
6	SPARE DSR
7	IN SPARE #1 RTS
8	RS-422 CTRL RX HI CTS
9	SPARE RI

Table 4-3. C-5000 RS-232 Data Load Connector P503

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D. RT-5000 Transceiver Installation Wiring Considerations (Digital Capable P/N's 400-015525-0611 and above)

- (1) J101 Connector

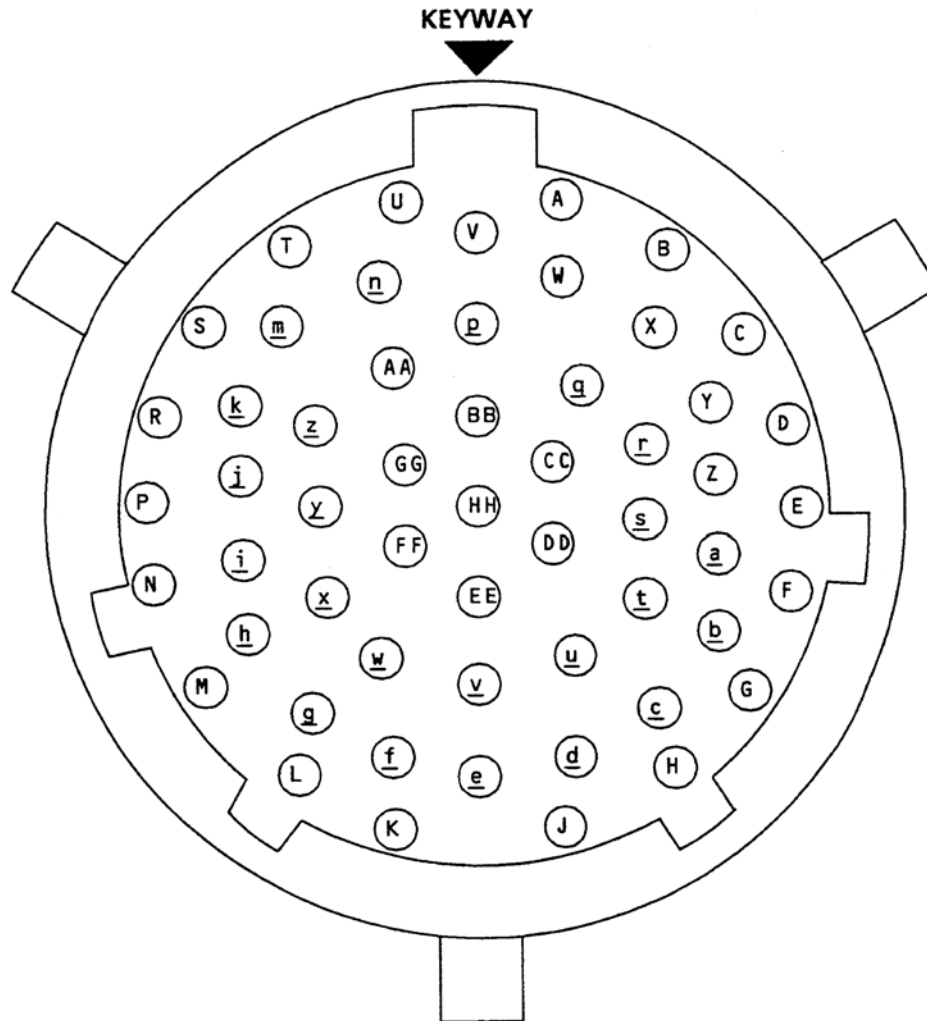


Figure 4-6 Connector J101



C-5000 COMMUNICATION MANAGEMENT CONTROLLER INSTALLATION MANUAL

- (2) RT-5000 Transceiver (P/N's 400-015525-0611 and above)
Connector J101 Pin Names.

PIN	SIGNAL NAME	PIN	SIGNAL NAME
A	AUX AUDIO IN	i	GUARD AUDIO INHIBIT
B	AUX SIDETONE	j	AUDIO HI OUT
C	KEY	k	AUDIO LO OUT
D	CONTROL GND	m	AUDIO GND
E	RS-422 ANT TX H	n	EXTRA WB MAIN RX AUDIO
F	RS-422 ANT TX L	p	MAIN SQUELCH DISABLE
G	RS-422 ANT RX L	q	WIDE BAND MN RX AUDIO OUT
H	RS-422 ANT RX H	r	DF ENABLE
J	RS-422 CTRL TX HI	s	DF AUDIO
K	RS-422 CTRL TX LO	t	RS-232-RTS
L	RS-422 CTRL RX LO	u	HOMING SIGNAL STRENGTH
M	RS-422 CTRL RX HI	v	MN RX 180 ENABLE
N	DATA SHIELD GND	w	WIDE BAND GD RX AUDIO OUT
P	MAIN SQUELCH ANNUN	x	GD RX 180 ENABLE
R	GUARD SQUELCH ANNUN	y	GUARD RX AUDIO
S	RS232-RXD	z	TX 180 ENABLE
T	RS232-TXD	AA	28 VDC PWR
U	RS232-CTS	BB	28 VDC PWR
V	ATTENUATOR CONTROL	CC	28 VDC PWR
W	ON/OFF	DD	28 VDC PWR
X	GUARD SQUELCH DISABLE	EE	PWR GND
Y	MIC HI IN	FF	PWR GND
Z	MIC LO/PTT IN	GG	PWR GND
a	EXTERNAL PTT	HH	PWR GND
b	PTT OUTPUT		
c	SWITCHED +15V		
d	TX SWITCHED +15V		
e	SWITCHED +27.5V		
f	MAIN AUDIO INHIBIT		
g	EXTRA WIDE BAND AUDIO IN		
h	WIDE BAND AUDIO IN		

**Table 4-4. RT-5000 Transceiver (P/N's 400-015525-0611 and above)
Connector J101 Pin Names**



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Pin - Signal Name

A - AUX AUDIO IN

This input will take audio from an external source unit and add to the normal transceiver audio. Not used in normal installations.

B - AUX SIDETONE

This input will take alert tone audio from an external source and produce headset sidetone. Not used in normal installations.

C - KEY

Bi-directional pin between the key loader and RT-5000.

D - CONTROL GND

This ground goes to the control head. Loss of this ground may disable the RT-5000 or cause intermittent function.

E – RS-422 ANT TX H

This output is the active high sense serial data output and meets EIA RS-485 voltage levels. The data from this output controls the RT-5000 antenna.

F – RS-422 ANT TX L

This output is the active low sense serial data output and meets EIA RS-485 voltage levels. The data from this output controls the RT-5000 antenna.

G – RS-422 ANT RX L

This input is the active low sense serial data output and meets EIA RS-485 voltage levels. The data from this input comes from the RT-5000 antenna.

H – RS-422 ANT RX H

This input is the active high sense serial data output and meets EIA RS-485 voltage levels. The data from this input comes from the RT-5000 antenna.

J – RS-422 CTRL TX HI

This output is the active high sense serial data output, meets EIA RS-485 voltage levels.

K – RS-422 CTRL TX LO

This output is the active low sense serial data output, meets EIA RS-485 voltage levels.



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Pin - Signal Name

L – RS-422 CTRL RX LO

This input is the active low sense serial data input and meets EIA RS-485 voltage levels. The data from this input comes from the C-5000.

M – RS-422 CTRL RX HI

This input is the active high sense serial data input and meets EIA RS-485 voltage levels. The data from this input comes from the C-5000.

N - DATA SHIELD GND

Spare ground.

P - MAIN SQUELCH ANNUN

This output sinks 30 mA to ground when the main receiver signal-to-noise squelch conditions are met.

R - GUARD SQUELCH ANNUN

This output sinks 30 mA to ground when the guard receiver signal-to-noise squelch conditions are met.

S - RS232-RXD

This pin is used to transfer information to the MTM guard.

T - RS232-TXD

This pin is used to transfer information to the MTM guard.

U - RS232-CTS

This pin is used to transfer information to the MTM guard.

V - ATTENUATOR CONTROL

When this input is pulled to ground, the RT-5000 will engage a 10 dB receive attenuator in both main and crystal synthesized guard receivers.

W - ON/OFF

When this input is pulled to ground by the C-5000, power is applied to the RT-5000.

X - GUARD SQUELCH DISABLE

When this input is pulled to ground, the guard squelch conditions are overridden.



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Pin - Signal Name

Y - MIC HI IN

This input is the standard 150 Ohm carbon microphone high input. The nominal input is .25 Vrms and is adjustable over a range of .125 Vrms to 1.5 Vrms. The 3 dB bandwidth is 100 Hz to 8.7 kHz for raw audio and 300 Hz to 3 kHz for processed audio per EIA specifications.

Z - MIC LO/PTT IN

This input when pulled to ground, places the radio in transmit mode if the transmit bit is set in the serial data stream. This input also forms the low side of the standard 150 Ohm carbon microphone.

a - EXTERNAL PTT

If the radio is controlled by a controller other than a C-5000, the RT-5000 will transmit if this pin is grounded.

b - PTT OUTPUT

This output sinks 30ma to ground when the RT-5000 is transmitting.

c - SWITCHED +15 V

This output is capable of supplying +15 V $\pm$ 1.5 V at 500 mA.

d - TX SWITCHED +15V

When the RT-5000 is placed in transmit mode, this output supplies +15V $\pm$ 2.5V at a maximum of 100 mA.

e - SWITCHED +27.5V

This output is capable of supplying unregulated +27.5V at 500 mA.

f - MAIN AUDIO INHIBIT

When this input is pulled to ground, the main receiver audio is disabled.

g - EXTRA WIDE BAND AUDIO IN

This input is the single ended extra wide band audio input. It has a nominal impedance between 2k Ohms and 5k Ohms and a 3 dB bandwidth of 1 Hz to 40 kHz. The input is adjustable from 0.1 Vrms to 1.5 Vrms and set to .6 Vrms.



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Pin - Signal Name

h - WIDE BAND AUDIO IN

This input is the single ended wide band audio input. It has a nominal impedance between 2k Ohms and 5k Ohms and a 3 dB bandwidth of 1 Hz to 27.5 kHz. The input is adjustable from .1 Vrms to 1.5 Vrms and set to .6 Vrms.

i - GUARD AUDIO INHIBIT

When this input is pulled to ground, the guard receiver audio is disabled.

j - AUDIO HI OUT

This is the high side differential audio output. It can drive a 150 Ohm load to 100 mW and a 600 Ohm load to 25 mW. 3 dB bandwidth is 300 Hz to 3 kHz.

k - AUDIO LO OUT

This is the low side differential audio output. It can drive a 150 Ohm load to 100 mW and a 600 Ohm load to 25 mW. 3 dB bandwidth is 300 Hz to 3 kHz.

m - AUDIO GND

This ground is for shielding the audio outputs.

n - EXTRA WB MAIN RX AUDIO

This output is the single ended extra wide band audio output. It is capable of driving a 2k Ohm impedance and has a 3 dB bandwidth of 1 Hz to 40 kHz. The output is adjustable from .1 Vrms to 1.5 Vrms and set to .6 Vrms.

p - MAIN SQUELCH DISABLE

When this input is pulled to ground, the main squelch conditions are overridden.

q - WIDE BAND MN RX AUDIO OUT

This output is the single ended audio output. It is capable of driving a 2k Ohm impedance and has a bandwidth of 1 Hz to 27.5 kHz.

r - DF ENABLE

Grounding this input enables the DF audio output. DF function only available when using the main receiver. Digital channels do not have DF capability.

s - DF AUDIO

This output produces an output proportional to the AM signal. The output has a 3 dB bandwidth of 1Hz to 10 kHz. The output will drive a 2k Ohm impedance. The output is adjustable from. 1 Vrms to 1.5 Vrms and set to .1.4 Vrms (4Vp-p).



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Pin - Signal Name

t – RS-232-RTS

This pin is used to transfer information to the MTM guard.

u - HOMING SIGNAL STRENGTH

This output produces an output based on the signal strength that varies between 0 and 8 VDC, and is capable of driving a 2k Ohm load. This signal has a 3 dB bandwidth between DC and 50 Hz.

v - MN RX 180 ENABLE

Grounding this input causes 180 degrees of phase shift in the main received audio.

w - WIDE BAND GUARD RX AUDIO OUT

This output is the single ended wide band guard audio output. It is capable of driving a 2k Ohm impedance and has a 3 dB bandwidth of 1 Hz to 27.5 kHz. The output is adjustable from .1 Vrms to 1.5 Vrms and set to .6 Vrms.

x - GD RX 180 ENABLE

Grounding this input causes 180 degrees of phase shift in the guard received audio.

y - GUARD RX AUDIO

This output is the single ended guard audio output. It is capable of driving a 2k Ohm impedance and has a 3 dB bandwidth of 1 Hz to 3kHz. The output is adjustable from .1 Vrms to 1.5 Vrms and set to .6 Vrms.

z - TX 180 ENABLE

Grounding this input causes 180 degrees of phase shift in the transmitted audio. This phase shift may be required when using an external encryption device.

AA, BB, CC, DD – 28 VDC PWR

Input Aircraft power pins.

EE, FF, GG, HH – PWR GND

Input Aircraft power ground pins.



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E. RT-5000 Transceiver Installation Wiring Considerations (P/N's 400-015525-0101 to 0501)

- (1) J101 Connector

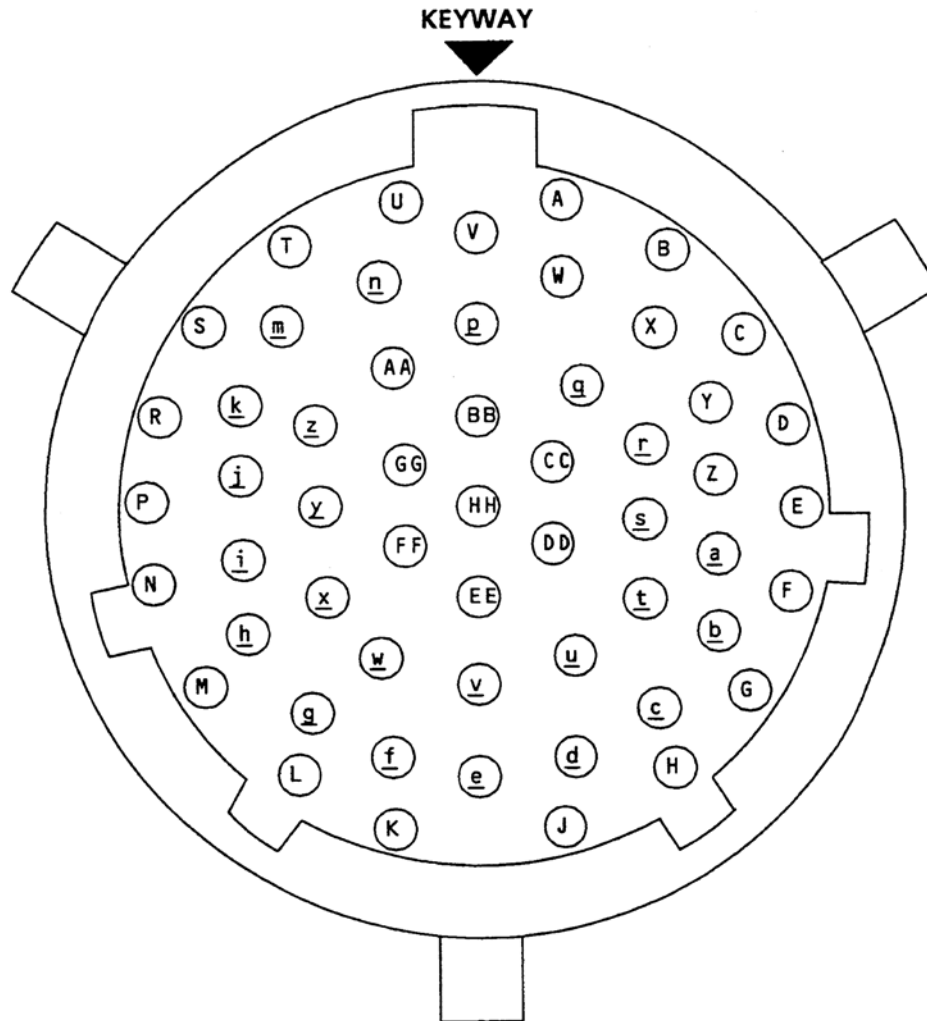


Figure 4-7 Connector J101



C-5000 COMMUNICATION MANAGEMENT CONTROLLER INSTALLATION MANUAL

- (2) RT-5000 Transceiver (P/N's 400-015525-0101 to 0501)
Connector J101 Pin Names.

PIN	SIGNAL NAME	PIN	SIGNAL NAME
A	AUX AUDIO IN	i	GUARD AUDIO INHIBIT
B	AUX SIDETONE	j	AUDIO HI OUT
C	RES SPARE A	k	AUDIO LO OUT
D	CONTROL GND	m	AUDIO GND
E	RS-422 ANT TX H	n	EXTRA WB MAIN RX AUDIO
F	RS-422 ANT TX L	p	MAIN SQUELCH DISABLE
G	RS-422 ANT RX L	q	WIDE BAND MN RX AUDIO OUT
H	RS-422 ANT RX H	r	DF ENABLE
J	RS-422 CTRL TX HI	s	DF AUDIO
K	RS-422 CTRL TX LO	t	RES SPARE B
L	RS-422 CTRL RX LO	u	HOMING SIGNAL STRENGTH
M	RS-422 CTRL RX HI	v	MN RX 180 ENABLE
N	DATA SHIELD GND	w	WIDE BAND GD RX AUDIO OUT
P	MAIN SQUELCH ANNUN	x	GD RX 180 ENABLE
R	GUARD SQUELCH ANNUN	y	GUARD RX AUDIO
S	AM/FM MODE INDICATOR	z	TX 180 ENABLE
T	VHF/UHF MODE INDICATOR	AA	28 VDC PWR
U	VHF_LO MODE INDICATOR	BB	28 VDC PWR
V	ATTENUATOR CONTROL	CC	28 VDC PWR
W	ON/OFF	DD	28 VDC PWR
X	GUARD SQUELCH DISABLE	EE	PWR GND
Y	MIC HI IN	FF	PWR GND
Z	MIC LO/PTT IN	GG	PWR GND
a	EXTERNAL PTT	HH	PWR GND
b	PTT OUTPUT		
c	SWITCHED +15V		
d	TX SWITCHED +15V		
e	SWITCHED +27.5V		
f	MAIN AUDIO INHIBIT		
g	EXTRA WIDE BAND AUDIO IN		
h	WIDE BAND AUDIO IN		

**Table 4-5. RT-5000 Transceiver (P/N's 400-015525-0101 to 0501)
Connector J101 Pin Names**



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Pin - Signal Name

A - AUX AUDIO IN

This input will take audio from an external source unit and add to the normal transceiver audio. Not used in normal installations.

B - AUX SIDETONE

This input will take alert tone audio from an external source and produce headset sidetone. Not used in normal installations.

C – RESERVED SPARE A

D - CONTROL GND

This ground goes to the control head. Loss of this ground may disable the RT-5000 or cause intermittent function.

E – RS-422 ANT TX H

This output is the active high sense serial data output and meets EIA RS-485 voltage levels. The data from this output controls the RT-5000 antenna.

F – RS-422 ANT TX L

This output is the active low sense serial data output and meets EIA RS-485 voltage levels. The data from this output controls the RT-5000 antenna.

G – RS-422 ANT RX L

This input is the active low sense serial data output and meets EIA RS-485 voltage levels. The data from this input comes from the RT-5000 antenna.

H – RS-422 ANT RX H

This input is the active high sense serial data output and meets EIA RS-485 voltage levels. The data from this input comes from the RT-5000 antenna.

J – RS-422 CTRL TX HI

This output is the active high sense serial data output, meets EIA RS-485 voltage levels.

K – RS-422 CTRL TX LO

This output is the active low sense serial data output, meets EIA RS-485 voltage levels.



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Pin - Signal Name

L – RS-422 CTRL RX LO

This input is the active low sense serial data input and meets EIA RS-485 voltage levels. The data from this input comes from the C-5000.

M – RS-422 CTRL RX HI

This input is the active high sense serial data input and meets EIA RS-485 voltage levels. The data from this input comes from the C-5000.

N - DATA SHIELD GND

Spare ground.

P - MAIN SQUELCH ANNUN

This output sinks 30 mA to ground when the main receiver signal-to-noise squelch conditions are met.

R - GUARD SQUELCH ANNUN

This output sinks 30 mA to ground when the guard receiver signal-to-noise squelch conditions are met.

S – AM/FM MODE INDICATOR

This output sinks 30mA to ground when the RT-5000 is in AM mode.

T – VHF/UHF MODE INDICATOR

This output sinks 30mA to ground when the RT-5000 is tuned to a frequency that is less than 400 MHz.

U – VHF_LO MODE INDICATOR

This output sinks 30mA to ground when the active frequency is less than 88 MHz.

V - ATTENUATOR CONTROL

When this input is pulled to ground, the RT-5000 will engage a 10 dB receive attenuator in both main and crystal synthesized guard receivers.

W - ON/OFF

When this input is pulled to ground by the C-5000, power is applied to the RT-5000.



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Pin - Signal Name

X - GUARD SQUELCH DISABLE

When this input is pulled to ground, the guard squelch conditions are overridden.

Y - MIC HI IN

This input is the standard 150 Ohm carbon microphone high input. The nominal input is .25 Vrms and is adjustable over a range of .125 Vrms to 1.5 Vrms. The 3 dB bandwidth is 100 Hz to 8.7 kHz for raw audio and 300 Hz to 3 kHz for processed audio per EIA specifications.

Z - MIC LO/PTT IN

This input when pulled to ground, places the radio in transmit mode if the transmit bit is set in the serial data stream. This input also forms the low side of the standard 150 Ohm carbon microphone.

a - EXTERNAL PTT

If the radio is controlled by a controller other than a C-5000, the RT-5000 will transmit if this pin is grounded.

b - PTT OUTPUT

This output sinks 30ma to ground when the RT-5000 is transmitting.

c - SWITCHED +15 V

This output is capable of supplying +15 V $\pm$ 1.5 V at 500 mA.

d - TX SWITCHED +15V

When the RT-5000 is placed in transmit mode, this output supplies +15V $\pm$ 2.5V at a maximum of 100 mA.

e - SWITCHED +27.5V

This output is capable of supplying unregulated +27.5V at 500 mA.

f - MAIN AUDIO INHIBIT

When this input is pulled to ground, the main receiver audio is disabled.

g - EXTRA WIDE BAND AUDIO IN

This input is the single ended extra wide band audio input. It has a nominal impedance between 2k Ohms and 5k Ohms and a 3 dB bandwidth of 1 Hz to 40 kHz. The input is adjustable from 0.1 Vrms to 1.5 Vrms and set to .6 Vrms.



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Pin - Signal Name

h - WIDE BAND AUDIO IN

This input is the single ended wide band audio input. It has a nominal impedance between 2k Ohms and 5k Ohms and a 3 dB bandwidth of 1 Hz to 27.5 kHz. The input is adjustable from .1 Vrms to 1.5 Vrms and set to .6 Vrms.

i - GUARD AUDIO INHIBIT

When this input is pulled to ground, the guard receiver audio is disabled.

j - AUDIO HI OUT

This is the high side differential audio output. It can drive a 150 Ohm load to 100 mW and a 600 Ohm load to 25 mW. 3 dB bandwidth is 300 Hz to 3 kHz.

k - AUDIO LO OUT

This is the low side differential audio output. It can drive a 150 Ohm load to 100 mW and a 600 Ohm load to 25 mW. 3 dB bandwidth is 300 Hz to 3 kHz.

m - AUDIO GND

This ground is for shielding the audio outputs.

n - EXTRA WB MAIN RX AUDIO

This output is the single ended extra wide band audio output. It is capable of driving a 2k Ohm impedance and has a 3 dB bandwidth of 1 Hz to 40 kHz. The output is adjustable from .1 Vrms to 1.5 Vrms and set to .6 Vrms.

p - MAIN SQUELCH DISABLE

When this input is pulled to ground, the main squelch conditions are overridden.

q - WIDE BAND MN RX AUDIO OUT

This output is the single ended audio output. It is capable of driving a 2k Ohm impedance and has a bandwidth of 1 Hz to 27.5 kHz.

r - DF ENABLE

Grounding this input enables the DF audio output. DF function only available when using the main receiver. Digital channels do not have DF capability.

s - DF AUDIO

This output produces an output proportional to the AM signal. The output has a 3 dB bandwidth of 1Hz to 10 kHz. The output will drive a 2k Ohm impedance. The output is adjustable from. 1 Vrms to 1.5 Vrms and set to .1.4 Vrms (4Vp-p).



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Pin - Signal Name

t – RESERVED SPARE B

This pin is used to transfer information to the MTM guard.

u - HOMING SIGNAL STRENGTH

This output produces an output based on the signal strength that varies between 0 and 8 VDC, and is capable of driving a 2k Ohm load. This signal has a 3 dB bandwidth between DC and 50 Hz.

v - MN RX 180 ENABLE

Grounding this input causes 180 degrees of phase shift in the main received audio.

w - WIDE BAND GUARD RX AUDIO OUT

This output is the single ended wide band guard audio output. It is capable of driving a 2k Ohm impedance and has a 3 dB bandwidth of 1 Hz to 27.5 kHz. The output is adjustable from .1 Vrms to 1.5 Vrms and set to .6 Vrms.

x - GD RX 180 ENABLE

Grounding this input causes 180 degrees of phase shift in the guard received audio.

y - GUARD RX AUDIO

This output is the single ended guard audio output. It is capable of driving a 2k Ohm impedance and has a 3 dB bandwidth of 1 Hz to 3kHz. The output is adjustable from .1 Vrms to 1.5 Vrms and set to .6 Vrms.

z - TX 180 ENABLE

Grounding this input causes 180 degrees of phase shift in the transmitted audio. This phase shift may be required when using an external encryption device.

AA, BB, CC, DD – 28 VDC PWR

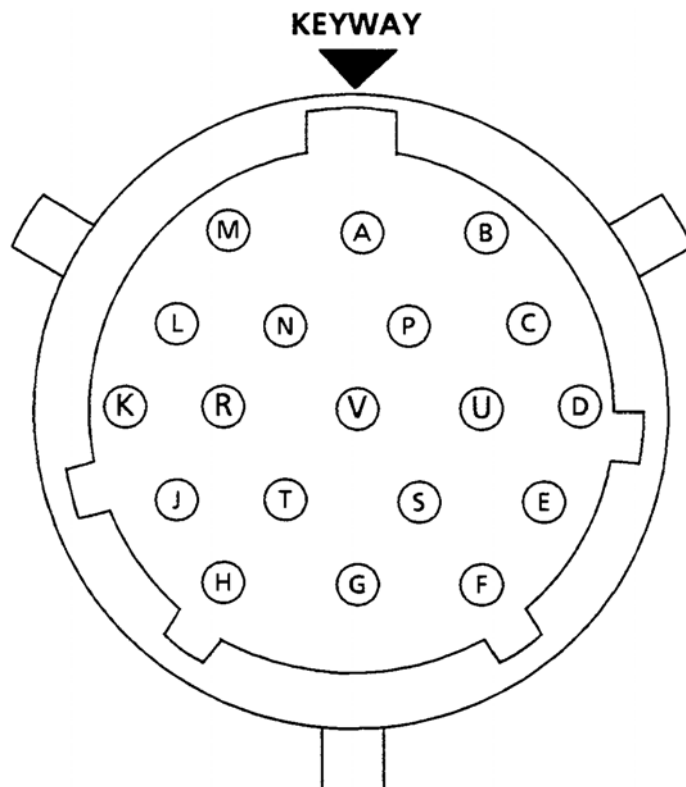
Input Aircraft power pins.

EE, FF, GG, HH – PWR GND

Input Aircraft power ground pins.



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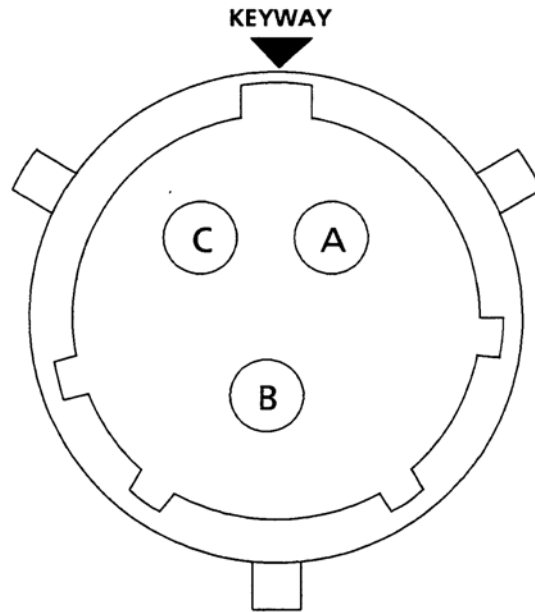
PIN	SIGNAL NAME	PIN	SIGNAL NAME
A	RX DATA H	L	S0
B	RX DATA L	M	GROUND
C	TX DATA H	N	
D	TX DATA L	P	GROUND
E	GROUND	R	
F		S	S3
G		T	NC
H	GROUND	U	NC
J	NC	V	
K	NC		

Figure 4-8. FC-50 / FC-550 / FC-5000 Connector J1



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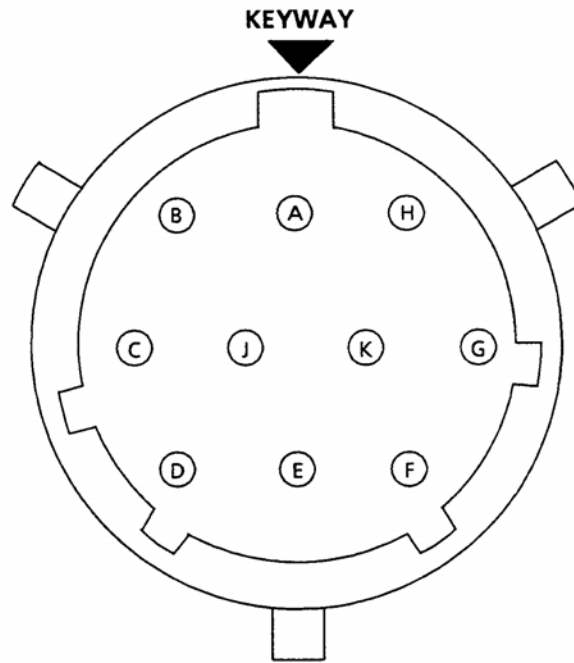


PIN	SIGNAL NAME
A	28 VDC
B	DC RTN
C	GND

Figure 4-9. FC-50 / FC-550 / FC-5000 Connector J2



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NOTE: FC-50 Connector J3 connects to AT-50/AT-51 antennas. These pins provide proprietary channeling information to the antenna.

PIN	SIGNAL NAME	PIN	SIGNAL NAME
A	Proprietary	F	Proprietary
B	Proprietary	G	Proprietary
C	Proprietary	H	Proprietary
D	Proprietary	J	Proprietary
E	Proprietary	K	Proprietary

Figure 4-10. FC-50 / FC-550 / FC-5000 Connector J3



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Remove this page and insert 152-140131 Sheet 1 of 17 (Figure 4-11a)



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Remove this page and insert 152-140131 Sheet 2 of 17 (Figure 4-11b)



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Remove this page and insert 152-140131 Sheet 3 of 17 (Figure 4-11c)



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Remove this page and insert 152-140131 Sheet 4 of 17 (Figure 4-11d)



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Remove this page and insert 152-140131 Sheet 5 of 17 (Figure 4-11e)



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Remove this page and insert 152-140131 Sheet 6 of 17 (Figure 4-11f)



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