

# TW7000 Series HF Transceivers section 5

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### Features

1.6 to 30 MHz (100 kHz - Rx)	Multi-mode capability
125W PEP/100W Average	Multi-Protocol Remote Control
Up to 1000 Preset Channels	Internal BITE
Embedded Voice Encryption Option	
MIL-STD-188-141B ALE Option	
Multiple Models- receivers, transmitters, and remote units	



### Introduction

Datron's TW7000 series is a 1.6-30 MHz commercial HF transceiver family designed to provide long distance voice and data transmission capability over HF. A complete line of Datron accessories including RF amplifiers, antenna tuners, power supplies, and audio equipment are available to complement the core TW7000 transceivers and form systems with RF power levels up to 5000W. High-speed modems, rugged computer subsystems, and application software packages help configure even the most complex network data system.

All models in the TW7000 family are designed for use in a wide variety of commercial applications ranging from complete embassy systems to airport systems. The RF output power is conservatively rated at 125W, PEP, and 100W, average, in a continuous mode. Full protection is provided against reverse polarity, over-voltage, and antenna mismatch. The radio now includes as standard a DSP-based voice enhancement module that enhances the received voice quality. Automatic BITE capability, with fault detection down to the module level is standard in all TW7000s and allows even unskilled operators to easily repair the radio at the field level. MIL-STD-188-141B compliant automatic link establishment (ALE), high-level voice encryption, and special STANAG-compatible data filters are examples of optional plug-in modules that can easily be added to the standard transceiver. A variety of remote control options including extended front panel control; full-function, long-range remote control; and computer control are offered for use with any of the transceivers.

## TW7000 Series Transceivers

All models of the TW7000 are supplied with an operator's manual. The technical manual must be ordered separately.

### 1. Transceivers with full-function front panels

- a. TW7000
- b. TW7000PP

#### TW7000

A SSB/FSK synthesized 1.6-30 MHz transceiver, (receive 100 kHz-30 MHz), 12 Vdc, 125W PEP/100W average (three programmable levels), USB, LSB, CW, and AME modes are standard. Features simplex and semi-duplex, continuous coverage, 10 Hz steps, and keypad programmable, nonvolatile storage on 256 channels (expandable to 1000).

Transmit/receive fast switching for ARQ operation is standard. It comes standard with an RS232 serial interface, factory set to 9600 baud. Complete with antenna tuner interface (100-channel memory) and high power amplifier interface. The radio includes C991829 dc power cable, antenna port mating connector, and operator manual.

*Note: Unless otherwise indicated, all power levels listed are average power values.*

#### TW7000PP

Same as the TW7000 but includes connection points for operation with the RT5830 pre/post-selector.

*Note: The TW7000 is not field- upgradeable to a TW7000PP. See the TW7000SYS15 configuration diagram for details.*

### 2. Transceivers with blank or modified front panels

- a. TW7000E

#### TW7000E

A TW7000 designed for extended remote control use. The standard front panel is replaced with a blank front panel containing a line driver panel and connector for the remote unit cable. Used with TW7201E control head for remote operation up to 15m (50 ft.). Same functionality as the TW7000 except has "remote-only" operation. Order the C991830 control cable separately. Standard length is 5m. It includes C991829 dc power cable.

### 3. Receivers

- a. TW7000RX

#### TW7000RX

A receive-only version of the TW7000. Requires +12Vdc primary power input. It includes the dc power cable. Has full-function front panel.

### 4. Transmitters

- a. TW7000TX

#### TW7000TX

A transmit-only version of the TW7000. Requires +12Vdc primary power input. It includes the dc power cable. Has full-function front panel.

## TW7000 Internal Options

All of the options listed can be ordered either installed with the radio or added on later as a simple field upgrade to units already in use. Prices include factory installation at the time the radio is ordered. For field installation, contact your Datron Sales Representative. The options are all contained on individual PC assemblies and can be installed in the field using standard tools. Options listed below can all be embedded inside the TW7000 they include:

1. 7000ACH - 1000 memory channels
2. 7000ALE-141B - MIL-STD-188-141B ALE
3. 7000ALE- FED-STD-1045A ALE
4. 7000CW - CW filter
5. 7000CW1 – CW and Wideband filter
6. 7000ENCR - Digital voice encryption
7. 7000HS - 0.1ppm high stability reference
8. 7000NB - Noise blanker
9. 7000RCDR - Audio recorder interface
10. 7000RF - FSK modem for communication with TW7201F Remote Control Unit
11. 7000RI – DHSL High-speed modem for communication with TW7201I Remote Control Unit
12. 7000RS - COM1 port configuration option
13. TW7000AIRSELCALL - Interface to SELCAL encoder
14. 7000VEM - DSP-based voice enhancement module
15. 7000WB1 - Wideband data filter

#### 7000ACH

Increases the radio's preset (memory) channels to 1000 (standard is 256).

#### 7000ALE-141B

A MIL-STD-188-141B ALE (Automatic Link Establishment) module that provides a fully compliant system for ALE operations including high-speed scanning, sounding, link quality analysis, and send/receive "orderwire" AMD message capability. It provides selective calling as well as automatic "best available frequency" selection. Channel and ALE parameters can be programmed into the radios either from the front panel or using one of Datron's custom software programs (DatronLINK-2 or RC2).

## 7000ALE

A FED-STD-1045A ALE module that provides a fully compliant system for ALE operations including high-speed scanning, sounding, link quality analysis, and send/receive “orderwire” AMD message capability. It provides selective calling as well as automatic “best available frequency” selection. Channel and ALE parameters can be programmed into the radios either from the front panel or using one of Datron’s custom software programs (DatronLINK-2 or RC2).

## 7000CW

500 Hz narrowband filter for CW operation. It is installed on the 5 MHz IF subassembly in place of 7000WB1 data filter (when ordered).

## 7000CW1

500 Hz narrowband filter for CW operation and 3000 Hz (300-3300 kHz) wideband filter for data operation. With this option, the wideband filter is used for voice operation.

7000ENCR *\*THIS ITEM IS USML*

High-level digital encryption module for voice transmissions. It contains a three-tiered key system (system, network and local keys) with provision for up to 200 local encryption keys. Three levels of keys can be programmed into a smart module (701450) with the DSP9000 ciphering system. The DSP9000 includes the H-250 handset and can be used as an encryption unit with cable C992029 and adapter cable C991960. The keys are loaded into the radio from the smart module. The 7000ENCR is compatible with the DSP9000-HS encrypting handset. For more information on key management systems, contact your Datron Sales Representative.

## 7000HS

High-stability reference frequency option. Provides a reference frequency stability of 0.1 parts per million. It replaces the standard reference crystal oscillator with a precision OCXO (Oven-Controlled Crystal Oscillator). (Note: the standard frequency stability of the 7000 transceivers is 0.5 ppm)

## 7000NB

This is an impulse-type noise blanker that is designed to allow operation of the 7000-series transceivers in a high-noise environment, as in the presence of vehicle ignition noise. The noise blanker can be externally controlled from the front panel.

## 7000RCDR

Combines receive and transmit audio and routes them to the Accessory #2 connector on the radio’s rear panel. Typically used with a continuous recording device to monitor RX and TX communications.

## 7000RF

An FSK modem for the 7000-series radios that allows communication with the RT7201F external FSK remote control head. It permits control of the radio remotely from the RT7201F Control Console over an audio 2-wire pair (with the radio being the “master”). Used when long-range remote control is required. This option is standard in the “7000RF” models of the transceiver, which permits “remote-only” operation, but is optional in other TW7000 models, which are used if both remote and local control of the transceiver is desired. No HF Data communications are possible through the

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TW7201F control head.

7000RI

A DHSL high-speed modem for the 7000-series radios that allows communication with the TW7201I external DHSL remote control head. When installed, it permits reliable “real-time” remote control up to 2 km. This option is standard in the TW7000RI models of the transceiver, which permits “remote-only” operation, but is optional in other TW7000 models, which are used if both remote and local control of the transceiver is desired. HF Data communications are possible through the TW7201I control head.

7000RS

The 7000-series radios have two external COM ports, both of which are configured for RS232 operation. The 7000RS option allows configuring the COM1 port for RS422/423/485 interface standards depending on the user requirements for external control of the radio by a computer.

TW7000AIRSELCAL

This option permits the TW7000 radio to operate with a SELCAL encoder. It adds a secondary control line to the radio and allows the use of the ICAO-mandated Ground-to-air SELCAL 4-tone system. Once the calling sequence is sent, the radio returns to normal SSB mode.

7000VEM

This option is now included standard in all 7000-series radios. A DSP based audio processing module for the 7000-series radios that improves the quality of the received audio signals. It allows the operator to select one of two available signal enhancement modes, either adaptive peaking or spectral subtraction, designed to remove less coherent forms of noise and/or subtract extraneous signals from the received audio to improve the overall signal-to-noise ratio.

7000WB1

A 7000-series option that adds a second IF filter specially designed for the passage of data. This is a wide-band, 300 – 3300 Hz filter with tailored group delay characteristics (meets the requirements of STANAG 4285). The filter is selectable from the front panel of the radio (data mode). This option should be ordered if the radio is being used in a data system with a MIL-STD-188-110B data modem.

## TW7000 Transceiver Configurations

When ordering a transceiver with 7000ALE or 7000ALE-141B, use the following configured transceiver part numbers. Add additional options separately.

1. TW7000-1045ALE
2. TW7000-141BALE

TW7000-1045ALE

Standard transceiver with FED-STD-1045A ALE.

TW7000-141BALE

Standard transceiver with MIL-STD-188-141B ALE.

## TW7000 Remote Control Units

All functions of the TW7000 can be controlled remotely, either via an external computer or from one of three Datron Remote Control Units listed here. Full-function remote control options available for the TW7000 include an extended control unit (TW7201E) for short distance (up to 50 feet) operation, and remote control units (TW7201I or TW7201F) for longer range using either an integrated DHSL high-speed modem (2 km range) or an integrated FSK modem (long range) over a voice-grade 2-wire circuit. The TW7000 is also capable of full computer control from a PC. Both “remote-only” and “local-remote” configurations are available. The former configuration uses a radio with a blank front panel, while the latter uses a radio that has the normal full-function front panel to allow multiple control points. Remote control consoles include:

1. TW7201E
2. TW7201F
3. TW7201I

### TW7201E

The TW7201E is an extended front-panel control head for the transceiver. The front panel is removed from the radio and remotely located up to 15m (50 ft.). Used with TW7000E. Order C991830 control cable separately (standard length cable is 5m).

### TW7201F

Long-distance, full function, FSK Remote Control Unit (RCU). Supports all transceiver functions and options except data communications. Radio must have 7000RF option installed. Distance from the radio is limited by the signal loss in the cable (maximum signal loss is 20 dB). Powered from 110 VAC, 220 VAC or 10-30 Vdc. Supplied with 769004 110 VAC power cable. If 220 VAC operation is required order 769003 cable separately. If DC operation is required order C991829 cable separately. Order C992307 control cable separately to connect the RCU directly to the TW7000 transceiver. If the distance between the RCU and transceiver is greater than 33 ft, then specify the length. If the RCU-transceiver link traverses through building interconnect wiring, then order unterminated C992309 cable, qty-2, and specify the length from RCU and transceiver to customer-provided interconnection points if greater than 10 ft.

### TW7201I

High-speed, full-function, DHSL Remote Control Unit (RCU). Supports all transceiver functions and options. Radio must have 7000RI option installed. Includes two 9600 bps serial channels with one for voice and the other for data communications. Requires a direct, physical, 2-wire link limited to 2 km. Powered from 110 VAC, 220 VAC or 10-30 Vdc. Supplied with 769004 110VAC power cable. If 220 VAC operation is required order 769003 cable separately. If DC operation is required order C991829 cable separately. Order C992307 control cable separately to connect the RCU directly to the TW7000 transceiver. If the distance between the RCU and transceiver is greater than 33 ft, then specify the length.

If the RCU-transceiver link traverses through building interconnect wiring, then order unterminated C992309 cable, qty-2, and specify the length from RCU and transceiver to customer-provided interconnection points if greater than 10 ft.

## TW7000 Accessories

Datron offers a wide variety of accessory equipment for use with the TW7000. The most common system has the TW7000 configured for fixed station usage at RF power levels up to 5 kW. A complete line of both broadband and narrow-band antenna systems, power supplies, and data devices are also available to complement the base transceiver. The following pages summarize the Datron accessory equipment that can be used with the TW7000; diagrams show the RF, control, and power cables necessary for proper interconnections. Accessory equipment is listed below and encompasses the following categories:

1. RF Power Amplifiers
2. Power Supplies
3. Broadband Antennas
4. Narrowband Antennas
5. Automatic Antenna tuners
6. Audio Accessories
7. Mounting Kits
8. Miscellaneous Accessories
9. Data System Accessories

### 1. RF Power Amplifiers

All amplifiers are supplied less interface cables; the proper cables must be ordered separately. Amplifiers include:

- a. TW500D
- b. TW1000D

#### TW500D

The TW500D is a 500W HF Linear RF Amplifier designed for continuous duty use with an exciter unit operating in the 1.6 to 30 MHz frequency band to form a 500W high-power HF communication system. The TW500D interfaces seamlessly with Datron's 7000-series of synthesized HF transceivers; however, it can also be used with any transmitter or transceiver having a power output of at least 70W and a compatible control interface.

The amplifier is entirely solid state, broadband, and features a built-in ac/dc power supply that allows operation from either 110 VAC or 220 VAC. The standard product is configured for 220 VAC. If 110 VAC operation is required, specify when ordering. It is a completely self-contained unit, integrating RF amplifiers, harmonic filters, protective circuitry, and power supplies in a single chassis. The TW500D is housed in an anodized-aluminum 5U rack mount package suitable for standard 19" racks. Order TW500D-RMS 1U sliding rack mount shelf, C992216 control cable and C991539 RF cable separately.



## TW1000D

The TW1000D is a 1000W HF Linear RF Amplifier designed for continuous duty use with an exciter unit operating in the 1.6 to 30 MHz frequency band to form a 1kW high-power HF communication system. The TW1000D interfaces seamlessly with Datron's 7000-series of synthesized HF transceivers.

The amplifier is entirely solid state, broadband, and features a built-in ac/dc power supply that allows operation from 230VAC. It is a completely self-contained unit, integrating RF amplifiers, harmonic filters, protective circuitry, and power supplies in a single chassis. The TW1000D is housed in an anodized-aluminum 7U rack mount package suitable for standard 19" racks. Order TW1000D-RMS 1U sliding rack mount shelf, C992216 control cable and C991539 RF cable separately.

## 2. Power Supplies and Adapters

Ac to dc power supplies are available to power TW7000 equipment used in a fixed station configuration.

Power cables must be ordered separately. Datron also offers a line of power switches is for use in battery backup systems.

- a. PF3000-110
- b. PF3000-220
- c. TWPSC
- d. RAT1000P-110
- e. RAT1000P-220

### PF3000-110

Continuous duty, 12 Vdc, power supply designed to power the TW7000. Switch selectable for either 90-132 VAC or 180-264 VAC. Includes AC power cable with 110 VAC NEMA 5-15P plug and C991829 DC power cable. For rack-mounted systems order the PF3000RM rack mount.

### PF3000-220

Same as PF3000-110 except with 220 VAC NEMA 6-15P plug on power cord. For rack-mounted systems order the PF3000RM rack mount.

### TWPSC

Low current power supply adapter for transceiver. Provides automatic switching to backup DC power source if power supply or AC mains fail. It's a low current switch that provides backup for just the exciter (TW7000 @ 125W PEP); if system is used with an associated RF Power Amplifier, the amplifier is placed in bypass mode. Order backup DC power source and cables separately.

### RAT1000P-110

External 28 Vdc power supply for the RAT1000C antenna tuner. For 110 VAC systems. Used in 500W, 110 VAC, high power systems whenever a 12 Vdc radio is used or when the radio-to-tuner control cable run exceeds 50 feet if used with a 28 Vdc radio. Order C991933 (control + power cable between the radio and the RAT1000P-110) and C991552 (control + power cable between the RAT1000P-110 and the RAT1000C) separately. Specify C991552 length.

#### RAT1000P-220

Identical to RAT1000P-110 except with NEMA 6-15P 220 VAC plug on power cable. Used in 500W or 1000W, 220VAC, high power systems whenever a 12 Vdc radio is used or when the radio-to-tuner control cable run exceeds 50 feet if used with a 28 Vdc radio. Order C991933 (control + power cable between the radio and the RAT1000P-220) and C991552 (control + power cable between the RAT1000P-220 and the RAT1000C) separately. Specify C991552 length.

### 3. Broadband Antennas

Datron offers a complete line of broadband HF antennas for fixed station use where space for a proper installation is available.

*Note: the ABB-series of broadband antennas can be deployed in different configurations. The drawings in the Broadband Antenna Configuration Diagrams section illustrate 3 basic installation configurations - a delta loop, a rectangle, and a diamond. Both the ABB100 and the ABB1000 can be installed in this fashion. Please refer to this section below for more details.*

#### a. 125W Broadband Antennas

1. ABB100A
2. ABB100B
3. 701407

##### ABB100A

Broadband dipole antenna, 2-30 MHz, 125 W, 144 ft (43.9 m) when installed with a 48 foot center mast and 12 foot end masts in the Delta configuration. Standard length model provides better efficiency than shorter length model from 2-10 MHz. Supplied with 100 ft (30.5 m) RG213 coaxial cable and PL259 connector. Order AMX mast kit separately. The AMX mast kit is designed to install the antenna in the standard Delta configuration. For other configurations, contact your Datron Representative to determine the mast requirements. See the Broadband Antenna Configuration diagrams below.

##### ABB100B

Broadband dipole antenna, 2-30 MHz, 125 W, 112 ft (34.1 m) when installed with a 48 foot center mast and 12 foot end masts in the Delta configuration. Shorter length model for use where space is limited. Supplied with 100 ft (30.5 m) RG213 coaxial cable and PL259 connector. Order AMX mast kit separately. The AMX mast kit is designed to install the antenna in the standard Delta configuration. For other configurations, contact your Datron Representative to determine the mast requirements.

##### 701407

Broadband BWDS-90 folded dipole antenna, 1.8-54 MHz, 300W, 90 ft (27.4 m) when installed in flat top configuration. Shorter length model for use where space is limited. Supplied with BALUN, terminator, and SO239 connector. Order RF cable C991535 separately and specify length. Order AMX mast kit separately.

#### b. 1kW Broadband Antennas

1. ABB1000A
2. ABB1000B
3. 701408-1

##### ABB1000A

Broadband dipole antenna, 2-30 MHz, 1000 W, 144 ft (43.9 m) when installed with a 48 foot center mast and 12 foot end masts in the Delta configuration. Standard length model provides better efficiency than shorter length model from 2-10 MHz. Supplied with 100 ft (30.5 m) RG213 coaxial cable and PL239 connector. Order AMX mast kit separately. The AMX mast kit is designed to install the antenna in the standard Delta configuration. For other configurations, contact your Datron Representative to determine the mast requirements. See the Broadband Antenna Configuration diagrams below.

##### ABB1000B

Broadband dipole antenna, 2-30 MHz, 1000 W, 112 ft (34.1 m) when installed with a 48 foot center mast and 12 foot end masts in the Delta configuration. Shorter length model for use where space is limited. Supplied with 100 ft (30.5 m) RG213 coaxial cable and PL239 connector (antenna length is 34.1 m). Order AMX mast kit separately. The AMX mast kit is designed to install the antenna in the standard Delta configuration. For other configurations, contact your Datron Representative to determine the mast requirements.

##### 701408-1

Broadband BWDS-90N/H1 folded dipole antenna, 1.8-54 MHz, 1000W, 90 ft (27.4 m) when installed in flat top configuration. Shorter length model for use where space is limited. Supplied with BALUN, terminator, and type “N” connector. Order RF cable C991505 separately and specify length. Order AMX mast kit separately.

*Note: This antenna uses N-type RF connectors in order to match our TW500D and TW1000D amplifiers.*

#### c. Support Masts

1. AMX

##### AMX

Tactical, transportable antenna mast kit for ABB100, ABB1000, 701407 and 701408-series antennas with 72 ft (21.9 m) of mast sections (12 masts at 6 ft each). Includes mast base, Dacron rope guys, guy rings, guy stakes, guy hammer, raising halyard rope and pulley supplied in a canvas carrying bag.

## 4. Narrowband Antennas

Narrowband antennas, for mobile or fixed station configurations, are available from Datron. The narrowband antennas all require an antenna tuner as part of the complete system.

#### a. Mobile Narrowband Antennas

1. AWM
2. MAR-12

3. MAR-16

4. MAR-16T

AWM

Mobile whip antenna, 150W, 9 ft (2.7 m). Stainless steel whip with spring base and mobile mounting bracket. Requires antenna tuner.

MAR-12

Mobile whip antenna, 1000W, 12 ft (3.6 m). Three-section, heavy-duty fiberglass military whip with flexible spring base and mobile mounting bracket. Requires antenna tuner. More efficient than AWM antenna at lower frequencies. Can be tied down horizontally with 4277 tie-down kit to support NVIS (Near Vertical Incidence Skywave) communications.

MAR-16

Mobile whip antenna, 1000W, 16 ft (4.8 m). Four-section, heavy-duty fiberglass military whip with flexible spring base and mobile mounting bracket. Requires antenna tuner. More efficient than MAR-12 at lower frequencies. Can be tied down horizontally with 4277 tie-down kit to support NVIS (Near Vertical Incidence Skywave) communications.

MAR-16T

Identical to MAR-16 except with tilt whip adapter on flexible spring base. Allows locking antenna into four different positions (from vertical to horizontal) to support NVIS communications. Requires antenna tuner.

b. Fixed Station Narrowband Antennas

1. AW7

2. AW7-M

3. AW10

4. RA-PAS

5. SL3-17-DWC-1

AW7

Fixed-station whip antenna, 1000W, 23 ft (7 m). Side-fed, fiberglass whip with anodized aluminum mounting flange. For marine or fixed-station usage. Requires radial wires or good ground plane and antenna tuner.

AW7-M

Fixed-station whip antenna, 1000W, 23 ft (7 m). Side-fed, fiberglass whip with anodized aluminum mounting flange. Heavy duty version of the AW7 for marine or fixed-station usage. Requires radial wires or good ground plane and antenna tuner.

AW10

Fixed-station whip antenna, 5kW, 35 ft (10.6 m). Side-fed, two-section, heavy-duty, fiberglass whip with galvanized iron mounting flange. For marine or fixed-station usage. Requires radial wires or good ground plane and antenna tuner.

## RA-PAS

Fixed-station whip antenna, 1000W, 32 ft (9.7 m). Portable, Side-fed, eight-section military whip with 120-28 flange mounting base. Requires radial wires or good ground plane and antenna tuner.

## SL3-17-DWC-1

Fixed-station, half-loop, NVIS (Near Vertical Incidence Skywave) antenna, 150W PEP with RAT7000B-SL3-17-DWC tuner and 12 radial wires. Mounted on 6.58' x 1.2' ( 2m x 0.37m) base plate. If only the antenna is desired, then order part number SL3-17-DWC.

## 5. Automatic Antenna Tuners

Tuners are needed whenever a narrowband antenna is used in order to transform the variable complex antenna impedance of the antenna to 50 ohms at the transmitter output.

- a. AT7000B
- b. RAT7000B
- c. RAT7000B-SL3-17-DWC
- d. RAT1000C

## AT7000B

Automatic antenna tuner in water resistant case, 125W PEP. Operates with whips and long-wire antennas. Includes internal VSWR monitoring and rapid digital tuning capability. Offers 512 memory channels for scanning and silent tune applications. Supplied with a mobile mount, C991620 18" (0.46m) antenna lead, and ground strap. Order C991526 RF cable and C991938 control cable separately (specify cable lengths).

## RAT7000B

Automatic antenna tuner in ruggedized, immersible case, 125W PEP. Operates with most whips and long-wire antennas. Includes VSWR monitoring and rapid digital tuning capability. Offers 512 memory channels for scanning or silent tune applications. Supplied with mobile mount (w/o shocks), C991620 18" (0.46m) antenna lead, and ground strap. Order C991507 RF cable and C992200 control cable separately (specify cable lengths). Optional shock mounted tray available (RAT7000B-SM).

## RAT7000B-SL3-17-DWC

Automatic antenna tuner in ruggedized, immersible case, 125W. Operates with SL3-17-DWC NVIS (Near Vertical Incidence Skywave) antenna only. For fixed station use only. Includes VSWR monitoring and rapid digital tuning capability. Offers 512 memory channels for silent tune applications. Supplied with mobile mount (w/o shocks), C991620 18" (0.46 m) antenna lead, and ground strap. Order C991507 RF cable and C992200 control cable separately (specify cable lengths). Optional shock mounted tray available (RAT7000B-SM).

## RAT1000C

Automatic antenna tuner in ruggedized, immersible case, 1000W. 3-30 MHz for mobile applications, 2-30 MHz for fixed station applications. Requires +28 Vdc primary power. Operates with most whip and long-wire antennas. Includes 100 memory channels with VSWR monitoring and rapid digital tuning capability. Supplied with C991620 18" (0.46m) antenna

lead. Order C991906 and C991552 control cables and C991505 RF cable separately (specify cable lengths). Optional shock mounted tray available (RAT1000-SM).

*Note: If the RAT1000C is being used with an older version of radio, then the radio must have 701BC firmware or higher (radio) and 312C firmware or higher (ALE Card). If the radio doesn't have these revisions of firmware, then the P/N 701-312-UPD kit must be ordered for the radio.*

*Note: Since the TW7000 is a +12Vdc model radio, the RAT1000P-110 (RAT1000P-220) must be used in a 500W or 1000W system with the tuner to provide the +28Vdc for the tuner. See description of RAT1000P-110 (RAT1000P-220) and the system drawings for more detail.*

## 6. Audio Devices

For connection to the transceiver or remote control console and used for the transmission and reception of baseband audio signals. Supplied with connectors for TW7000.

- a. DM
- b. PM
- c. HP
- d. EP
- e. EPL
- f. KEY

DM

Dynamic desk microphone.

PM

Heavy-duty hand microphone.

HP

Headphones, twin.

EP

Headphones.

EPL

Lightweight headphones.

KEY

Morse key.

## 7. Mounting Kits

Datron offers a line of shock and rack mounting assemblies for Datron's TW7000 series and accessory equipment. The shock mounts isolate the equipment from high-impact shock and vibration. Rack mount kits allow mounting the equipment in standard 19 inch racks.

### a. Rack Assemblies

1. RACK7100
2. RACK7100-220
3. RACK7500
4. RACK7500-220

#### RACK7100

12U rack space - 19 in. (48 cm) W x 21 in. (53 cm) H, enclosed rack cabinet. It includes 110 VAC power strip with 8 NEMA 5-15R receptacles and NEMA 5-15P plug on power cable. Gray color. Custom shock mounts are available. It includes 050-00001 grounding kit. Contact your Datron Sales Representative for special needs (shock mounts, rear doors, etc.)

#### RACK7100-220

Identical to the RACK7100 except designed for 220 VAC systems. It includes 8 NEMA 6-20R receptacles in power strip and NEMA 6-15P power plug on main power cable. Contact your Datron Sales Representative for special needs (shock mounts, rear doors, etc.)

#### RACK7500

19U rack space - 19 in. (48 cm) W x 33 in. (84 cm) H, enclosed rack cabinet (19U rack height). It includes 110 VAC power strip with 8 NEMA 5-15R receptacles and NEMA 5-15P plug on power cable. Gray color. Custom shock mounts are available. It includes 050-00001 grounding kit. Contact your Datron Sales Representative for special needs (shock mounts, rear doors, etc.)

#### RACK7500-220

Identical to the RACK7500 except designed for 220 VAC systems. It includes 8 NEMA 6-20R receptacles in power strip and NEMA 6-15P power plug on main power cable. Contact your Datron Sales Representative for special needs (shock mounts, rear doors, etc.)

### b. Rack Mount Kits

1. TW7000RM
2. TW7000RMS
3. PF3000RM
4. TW7201RM
5. TW500D-RMS

## 6. TW1000D-RMS

TW7000RM

Rack mount for the TW7000 (without slides). Includes 050-00003 ground strap.

TW7000RMS

Rack mount (with slides). Rack mount complete with slides for extending the transceiver to the front of the rack cabinet. Includes 050-00002 ground strap.

PF3000RM

Rack mount for PF3000 Power supplies.

TW7201RM

Rack mount for TW7201F/TW7201I remote control units.

TW500D-RMS

Sliding rack mount shelf for TW500D amplifier.

TW1000D-RMS

Sliding rack mount shelf for TW1000D amplifier.

899115

Cable Retractor. One is suggested with each RMS type rack mount.

870002

Velcro Cable Ties. Four are suggested per 899115 retractor.

## c. Mobile Mounts

1. TW7000SM

2. TW7201MM

TW7000SM

Shock mount. Mobile shock mount for the TW7000-series radios.

TW7201MM

Mobile mount for TW7201-series remote control units.

## 8. Miscellaneous Accessories

### a. Pre/Post-Selector Equipment

1. TW5830



## TW5830

Pre/Post-selector that provides filtering to permit operation of co-located HF receivers and transmitters on frequencies separated by as little as 10%. The TW5830 is housed in a 1U rack mount package and is gray color. Supplied with 110VAC power cord with NEMA 5-15P plug. The TW5830 will not operate with a standard TW7000 radio, but must be interfaced with the TW7000PP version of transceiver. See the TW7000SYS15 system diagram located at the end of this section for additional details.

## TW5830-220

Identical to the TW5830 except with 220 VAC NEMA 6-15P plug on power cable.

## b. Customizable Equipment

1. 701419 (ACU-1000 core)
2. 701420 (ACU-T core)

## 701419 - ACU-1000 Modular Interconnection System

The ACU-1000 provides interconnections between different communications systems. The ACU-1000 can simultaneously cross-band two or more different radio networks, and connect a radio network to a telephone line. It consists of a basic chassis module with up to 12 separate interface modules and is designed for fixed station or mobile command center usage. Requires C992432 cable (ACU to TW7000). Contact your Datron Sales Representative for system details.

## 701420 - ACU-T Tactical Interconnection System

Tactical version of the ACU-1000 designed for rapid deployment situations. Runs off of +12 Vdc primary power. Requires C992432 cable (ACU to TW7000). Contact your Datron Sales Representative for system details.

## Internal option modules for 701419 and 701420

- 701421 PSTN Module (phone patch)
- 701422 DSP-2 Module (one per radio)
- 701423 Local Telephone Option

## c. Remote Audio Equipment

1. REM1045A
2. REM1045A-RM
3. REM1045A-220
4. REM1045A-RM-220

## REM1045A

A remote audio interface device with built-in speaker and audio connector, which provides real-time audio and PTT from the remote site to the local (radio) site. Supplied with 110 VAC power cable. 2-wire control between device at remote site and device at local (radio) site.

#### REM1045A-RM

Rack mountable remote audio interface device with built-in speaker and audio connector that provides real-time audio and PTT from the remote site to the local (radio) site. Supplied with 110VAC power cable. 2-wire control between device at remote site and device at local (radio) site.

#### REM1045A-220

Identical to the REM1045A except with 220 VAC NEMA 6-15P plug on power cable.

#### REM1045A-RM-220

Identical to the REM1045A-RM except with 220 VAC NEMA 6-15P plug on power cable

### d. AC and RFI Surge Suppressers and AC Power Line Conditioners

#### 1. AC Surge Suppressors

Surge suppressers are used to eliminate short duration-high voltage spikes which could damage equipment. They do not protect you from voltage sags, brownouts, etc. For voltage stabilization, see the AC Line Conditioning section below. For more information, contact your Datron Sales Representative.

#### ACLP120-15

AC Surge suppresser, 120 VAC. Contains two NEMA 5-15R receptacles for connection of equipment and 5-15P plug on power cord. Surge let-through voltage: 600 Vp to 20 kA.

#### ACLP240-15SP

AC surge suppresser, 240 VAC. For Single Phase circuits. Contains two NEMA 6-15R receptacles for connection of equipment and 6-15P plug on power cord. Surge let-through voltage: 1000 Vp to 20 kA.

Note: If a 240 VAC dual-phase surge suppresser is required, contact your Datron Representative.

#### 2. RFI Surge Suppressers

It is recommended that RFI coaxial surge suppressers be mounted as close as possible to the antenna and be connected to a good earth ground in order to divert lightning and RFI surges as far away from the radio equipment as possible.

#### CLP-N

Coaxial lightning protector with N-type connectors for use between the RT7000 radio and ABB100AN antenna, RA500D and RA1000D amplifiers and ABB1000AN antenna, or TW500D and TW1000D amplifiers and ABB1000AN antenna. It includes an additional 19 ft (5.8 m) of RG213 coaxial cable.

#### CLP-U

Coaxial lightning protector with UHF-type connector (SO-239) for use between the TW7000 radio and ABB100A antenna. It includes an additional 19 ft (5.8 m) of RG213 coaxial cable.

#### 3. AC Line Conditioning

AC line conditioning is used to try to maintain a stable voltage at the input of power supplies. They are mostly effective against “brownouts”, voltage sags, and fluctuations (when generators are switched in). They do not protect from short duration spikes. For more information, contact your Datron Sales Representative.

Power line conditioners are both voltage and frequency sensitive. Specify the following when ordering:

- Nominal ac line voltage (i.e., 220, 240, 120, etc.).
- Type of line voltage (i.e., single or dual phase, etc.).
- Frequency of ac line (i.e., 50 or 60 Hz, etc.)
- Maximum capacity (in Amps or VA).
- AC plug model (i.e., CEE-7/16, etc.) if non-NEMA type is required.

#### e. Other Miscellaneous Accessories

1. TW7000IOX Breakout Box
2. 701579 Vehicle Installation Kit

##### TW7000IOX

A 4:1 breakout box for the accessory connectors that allows multiple accessory equipment to be used with the same radio accessory connectors.

##### 701579

Installation kit for single vehicle.

## 9. Data System Accessories

Datron offers a complete line of modems, software packages, and other complementary data accessories to use with the TW7000. Listed here are some common data additions to TW7000 systems using either Datron’s 5300 high-speed HF modem or its MIL-STD-188-110B modem.

#### a. Rugged Notebook Computer

1. DT9500

##### DT9500

Ultra rugged, lightweight, Panasonic Toughbook notebook computer designed for applications that require superior performance, quality and durability. The DT9500 offers the processing power, video display, and necessary accessories to meet the demanding requirements encountered in the field. The terminal can operate from either ac or dc input primary power or its internal battery pack. It is constructed of a strong magnesium alloy and is able to meet the stringent environmental requirements of MIL-STD-810G for operation in harsh environments. See the Data Communication Products section of this Product Catalog for more information. Order cable C991964 for serial connection to TW7000 ACC1.

#### b. MIL- STD-188-110B Data Equipment

1. E110A Modem (for standard desktop PC’s with PCI bus)

## 2. DT310A integrated notebook PC/modem

### E110A

High-speed HF modem utilizing MIL-STD-188-110B compliant waveforms to provide reliable, fast, and accurate data transmission up to 9600 bps. The E110A, in conjunction with DatronLINK-2 HF Email and Network Management Software, incorporates ARQ (Automatic Repeat Request) and FEC (Forward Error Correction) protocols to ensure error free data communications. The modem consists of a ¾ size PCI card for use in a desktop computer.

The E110A can be used with either of two software programs with Datron's TW7000 HF radio. The E110A modem can be used with the basic software that is provided with the modem or with Datron's proprietary DatronLINK-2 HF Email and Network Management Software. The basic software application provides the ability to exchange messages and transfer files. DatronLINK-2 provides email, fax, file transfer and chat messaging along with radio programming and network management capability. See the DatronLINK-2 section below and in the Data Communication Products section of this Product Catalog for more information.

Order cable C992370 (computer to modem) and cable C992377 (TW7000 to modem) separately. Additionally, the radio must have the 7000WB1 wideband filter option. DatronLINK-2 can be used with or without ALE. If ALE is required, then order 7000ALE or 7000ALE-141B.

### DT310A

Rugged notebook computer with MIL-STD-188-110B E110A modem housed in an integrated expansion chassis and next generation DatronLINK-2 HF Email and Network Management Software. The DT310A is designed for tactical use in harsh environments. It combines the versatility of a rugged Getac notebook computer with the functionality of the E110A modem in a single package. See the E110A and DatronLINK-2 sections here and in the Data Communication Products section of this Product Catalog for more information.

Order cables C992369 (RT7000 to modem) and C992370 (computer to modem) separately. Additionally, the radio must have the 7000WB1 wideband filter option. DatronLINK-2 can be used with or without ALE. If ALE is required, then order 7000ALE or 7000ALE-141B ALE.

## c. Software Applications for Data Communication

1. DatronLINK-2
2. RC2-NG

### DatronLINK-2

DatronLINK-2 is the successor to Datron's highly popular DatronLINK HF Email and Network Management Software. It includes all of the functionality of DatronLINK with additional features. The application provides the ability to exchange E-mail, faxes, files and keyboard chat messages and allows the user to configure and manage the radio network. Automatic message relaying and alternate path selection, transparent to the user, help ensure that messages get through reliably.

Additional features include ARQ chat, which is significantly faster than AMD chat, fixed frequency operation, and a tactical mode of operation. Fixed frequency operation provides the ability to transfer files and exchange ARQ chat messages without ALE on a pre-assigned channel. The tactical mode of operation allows the user to stop a file transfer in mid-stream and switch to voice operation. When the voice operation is completed, the file transfer resumes from the point it left off.

DatronLINK-2 is the central control point of a radio-messaging network. It provides a fast and easy way to program the radio with ALE parameters (frequencies, call signs, scan groups, sounding, etc.) and works in conjunction with ALE to selectively and automatically link with another station using the best available channel. Additionally, it incorporates ARQ (Automatic Repeat Request) and FEC (Forward Error Correction) protocols to ensure error-free data communications up to 9600 bps with the E110A modem

DatronLINK-2 can be used with or without ALE (fixed frequency operation only). If ALE operation is required, then order 7000ALE or 7000ALE-141B separately. With the RT7000 radio, the 7000WB1 option is required.

DatronLINK-2 can be used with Microsoft Outlook, Outlook Express and other POP/SMTP email clients. It runs on Microsoft Windows XP, Service Pack 3 or higher and is supplied with a USB HASP security key. A serial port is required on the computer. Order part number DatronLINK-2. See the E110A section above for the required cables.

For compatibility with an existing DatronLINK station, the existing station must have its operating system upgraded to Microsoft Windows XP, Service Pack 3 or higher, and DatronLINK must be replaced by DatronLINK-2.

**RC2-NG**

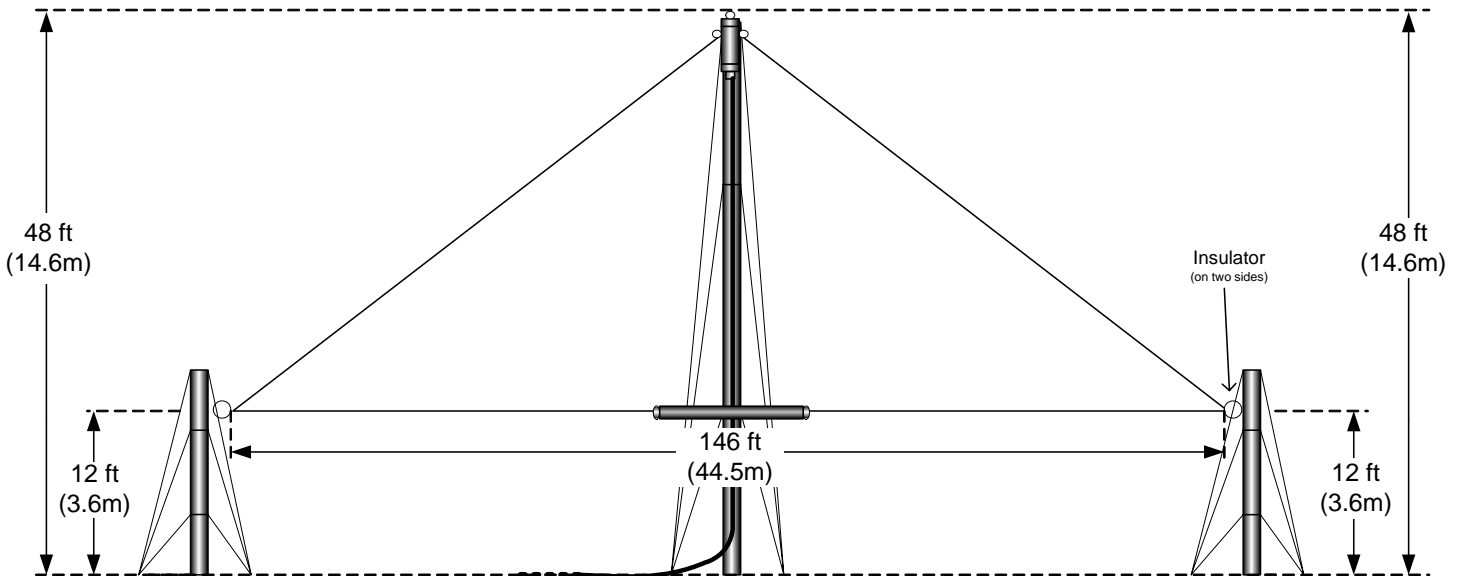
RC2-NG radio control software provides a fast and easy way to set RT7000 radio operating parameters (mode, power, squelch, etc.) and ALE (Automatic Link Establishment) settings (frequencies, call signs, scan groups, sounding, etc.).

RC2-NG is user-friendly and provides the ability to initiate ALE Voice Calls and Chat links. It runs on a standard desktop or notebook computer with Win XP or Win 7. For the RT7000 radio, the 7000ALE or 7000ALE-141B option is required. For connection to ACC1, order cable C991964. For connection to ACC2, order cable C991963.

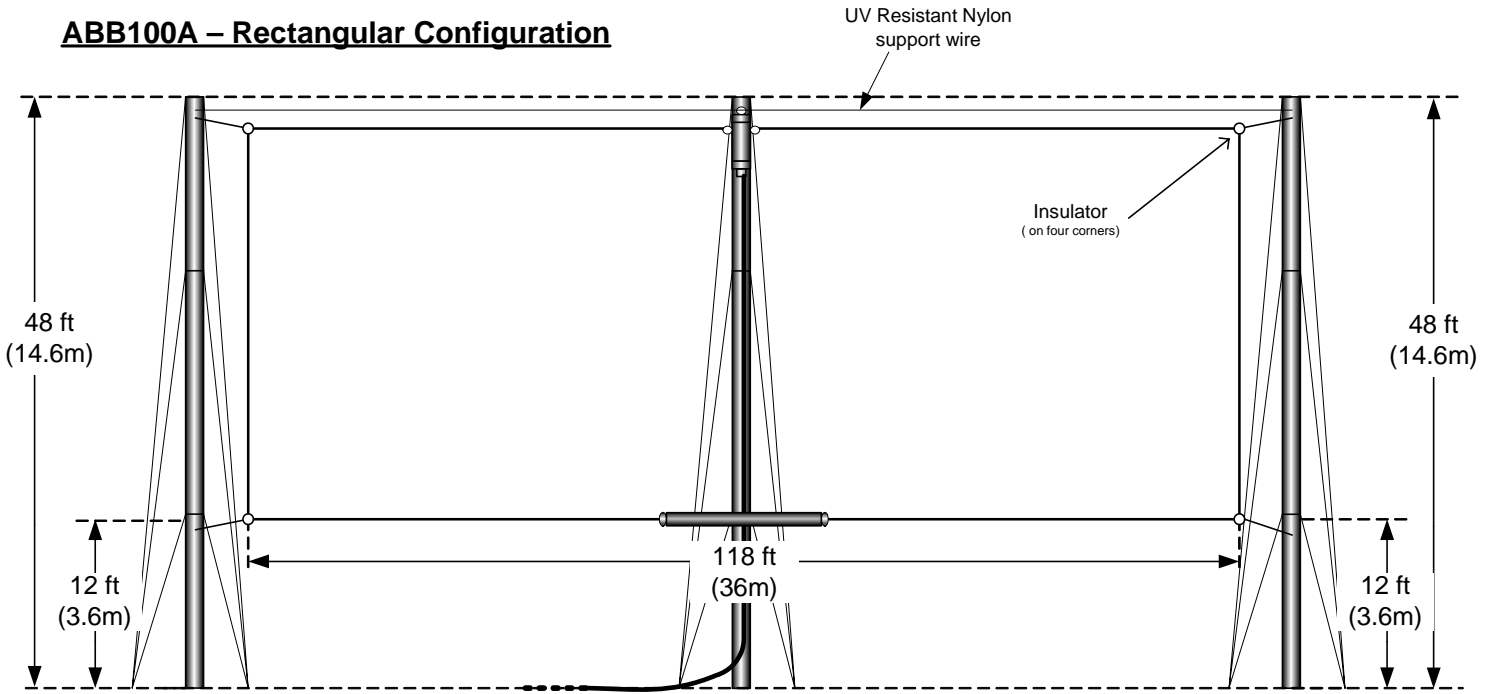
**Broadband Antenna Configuration Diagrams**

The 3 diagrams shown below illustrate a few of the best ways to configure the ABB-series of broadband antennas. The drawings illustrate 3 basic installation configurations - a delta loop, a rectangle, and a diamond. Both the ABB100 and the ABB1000 can be installed in this fashion.

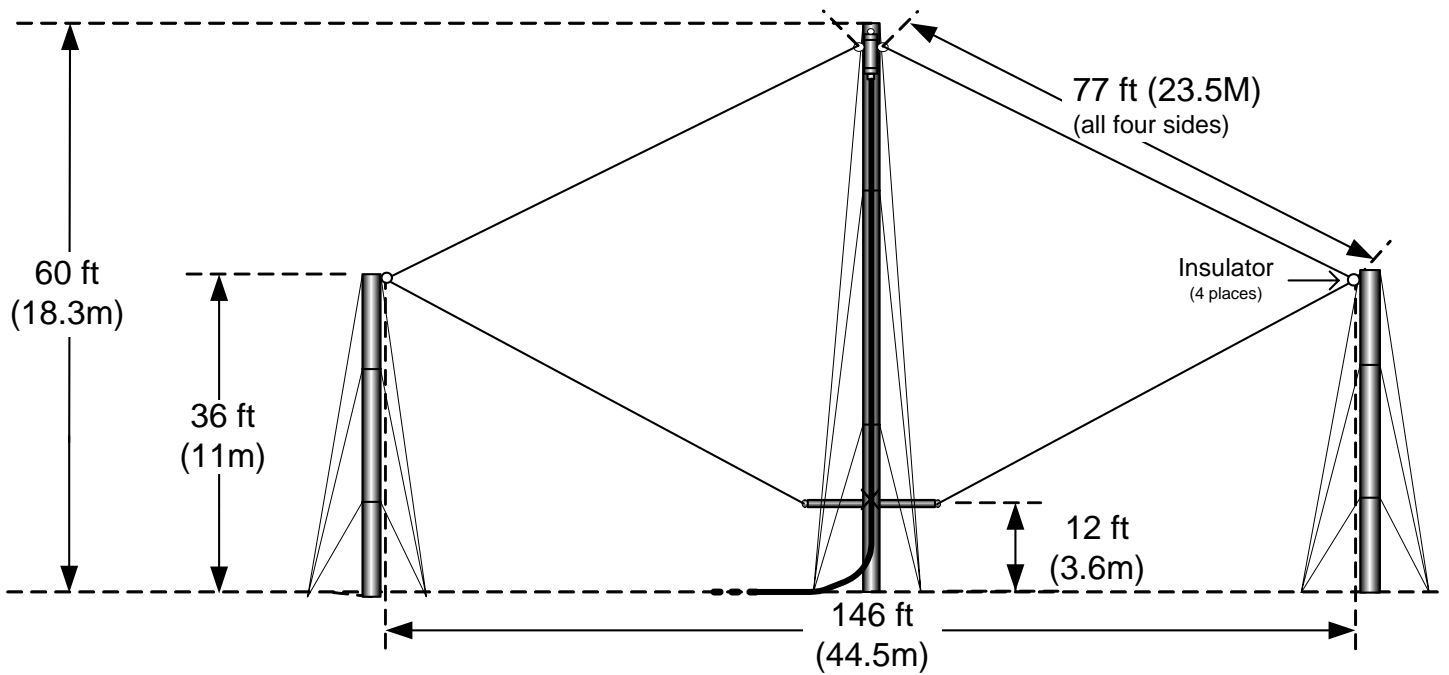
**ABB100A – Delta Configuration**



**ABB100A – Rectangular Configuration**

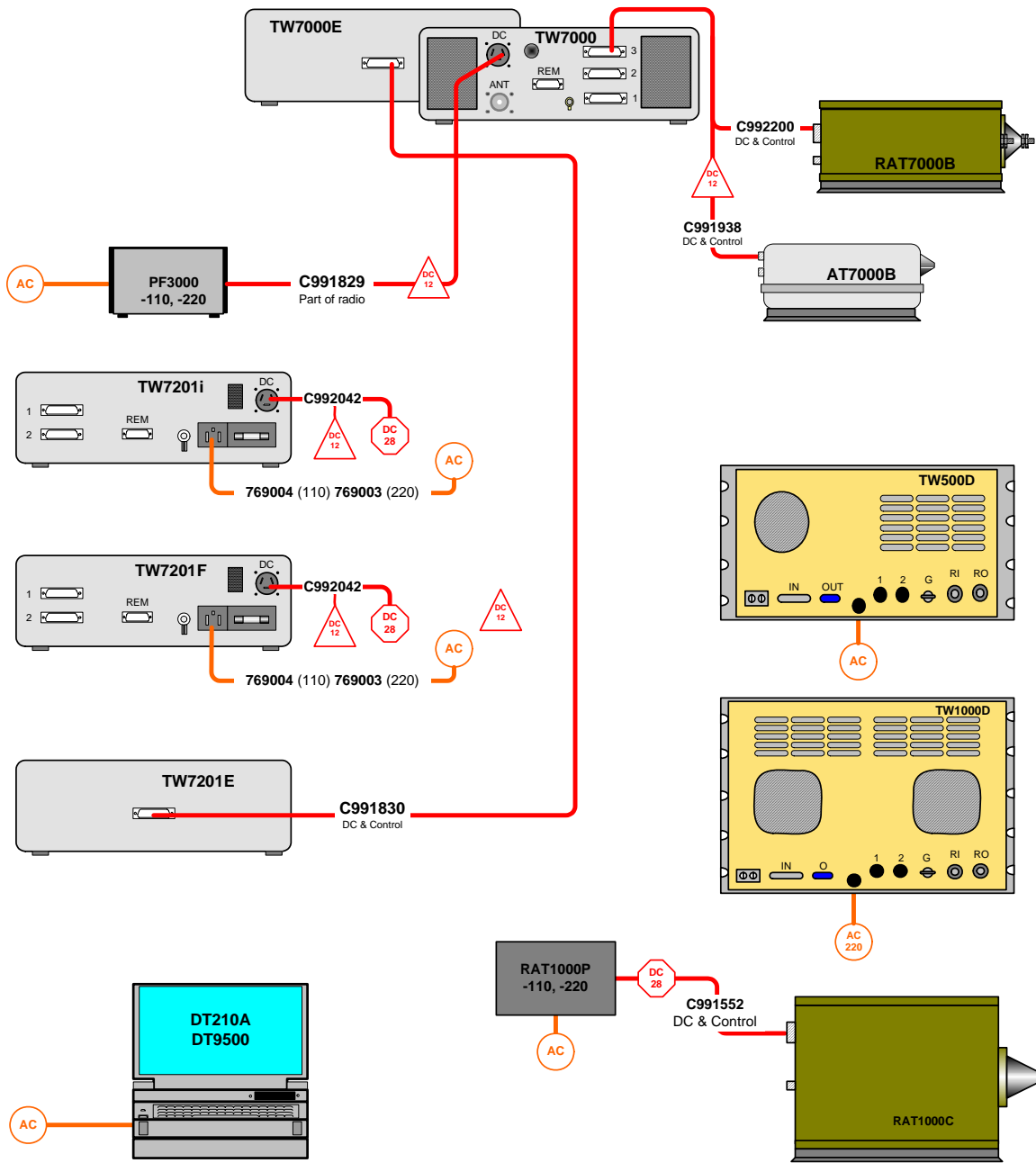


**ABB100A – Diamond Configuration**



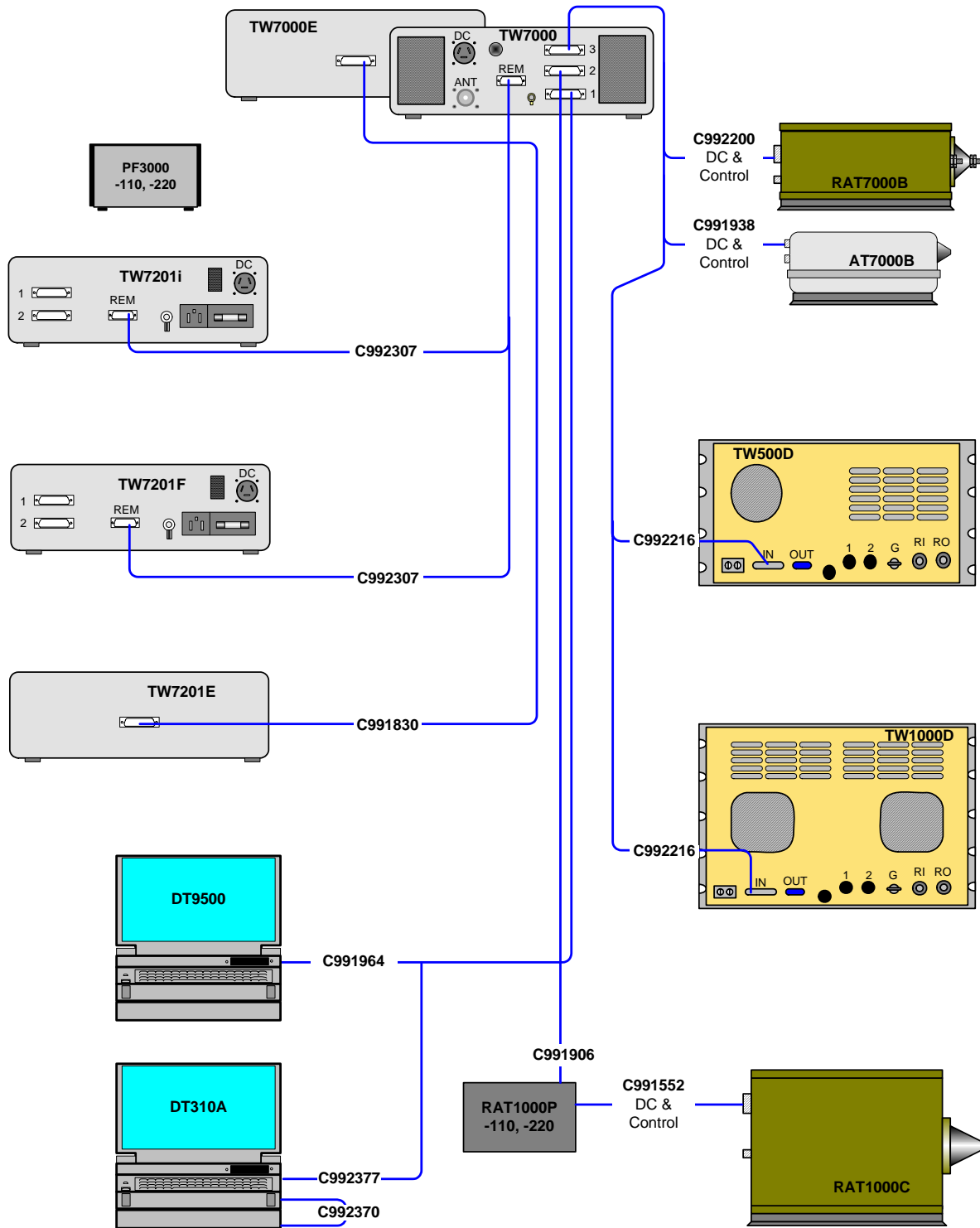
### Accessory Wiring Diagrams

Interconnect diagrams for connection of major accessory items to the TW7000 are shown on the following pages. These three diagrams illustrate the primary power, control, and RF cabling that is used to connect these accessory items to the transceiver.



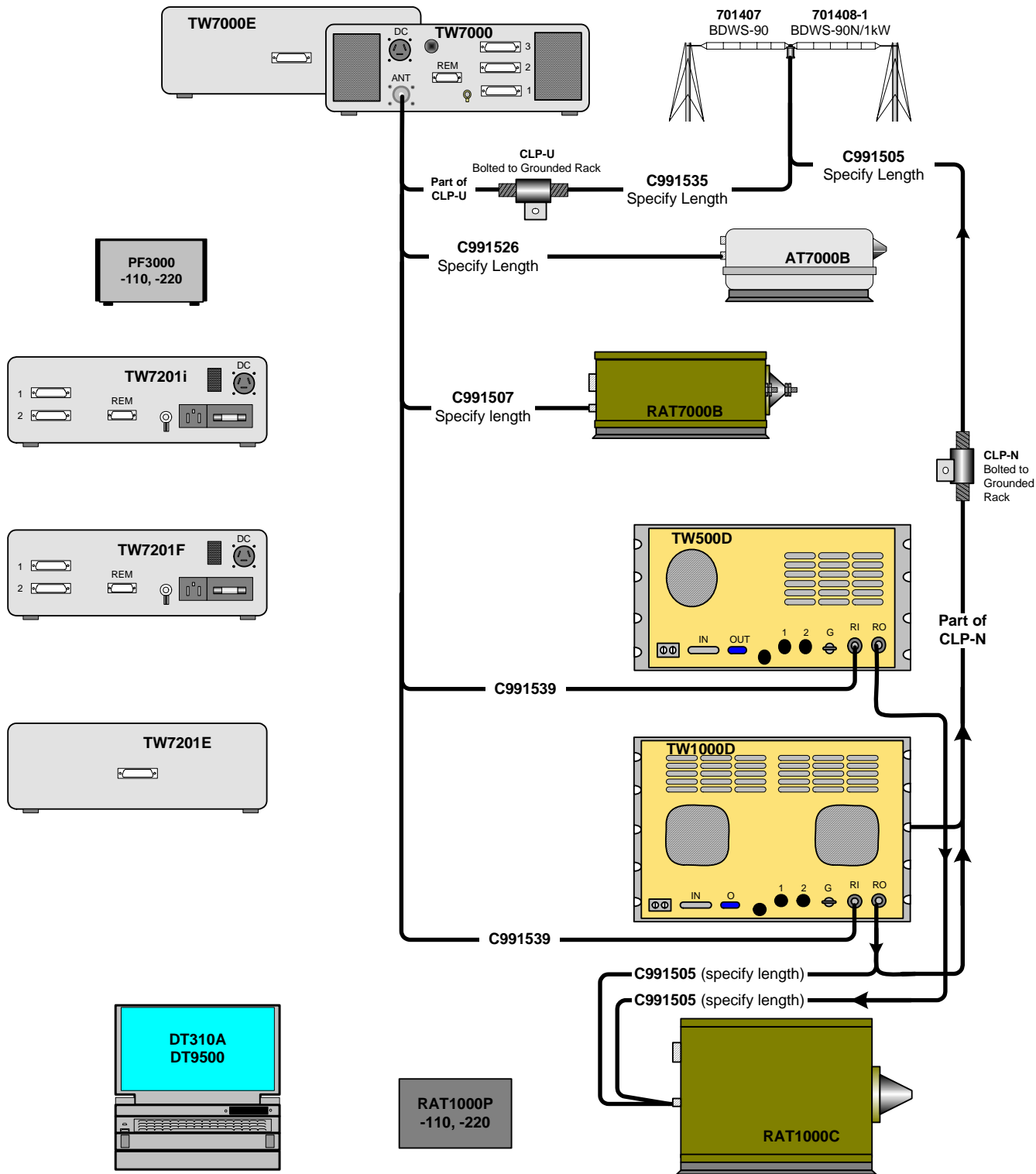
AC Nominal 110-220 Vac (depending on configuration)    
 DC 12 Nominal +12 Vdc    
 DC 28 Nominal +28 Vdc

### TW-Series – DC & AC Power Cabling



TW-Series – Control Cabling





TW-Series – RF Cabling  
Section 5-25

## Rack Equipment Configurations

The following table shows the rack heights for various TW7000 equipment. Rack heights are given in “U” units, where one “U” unit is equal to 1.75 inches. Blank rack panels are also available to complete the rack if the equipment doesn’t use the full height. These panels are gray for the TW7000 equipment. They have part numbers RP1G through RP9G, with the digit indicating the rack height.

Equipment	Rack height (in "U" units)
TW7000 (all models, w/TW7000RM or RMS)	3U
TW7201 (all models w/TW7201RM)	3U
TW500D	5U
TW500D W/TW500D-RMS (standard configuration)	6U
TW1000D	7U
TW1000D W/TW1000D-RMS (standard configuration)	8U
PF3000 (w/PF3000RM)	2U
ACU-1000	3U
REM1045A-RM (& -220)	2U
RAT1000P (w/RAT1000PRM-G)	3U
DUALPSRM	3U

## TW7000 Standard Spare Equipment

Datron offers spares to support all of its 7000-series equipment. Standard spares are broken down into three complementary kits: MK, MRK, PSK. These kits are unique and do not include parts which are supplied as part of another kit.

- a. Module kit
- b. Module repair kit
- c. Part spares kit

### Module Kit (MK)

A module kit contains one complete set of all replaceable printed circuit subassemblies in the product. These are the items that allow the equipment to be repaired by identifying and replacing modules in order to minimize down time. In general, a technician should be able to replace one of these subassemblies using common tools. The number of module kits required depends on the maintenance plan for the equipment. Typically, 2 module kits are held at each field service repair site – 1 for replacements and the other for backup while the defective module is returned to the factory or main service depot for repair.

### Module Repair Kit (MRK)

A module repair kit contains all of the spare piece parts necessary to service the printed circuit assemblies in the product. It is designed to support up to 10 pieces of the product for 3 to 5 years. If the maintenance plan is to return all subassemblies to the factory for repair, then the MRKs are not required for equipment support.

### Part Spares Kit (PSK)

A part spares kit contains the spare parts (except for basic hardware and wire) necessary to service the product with the exception of the printed circuit assemblies. It therefore contains those spares not contained in the MRK (e.g., chassis parts and front panel components). It is designed to support up to 10 pieces of the product for 3 to 5 years.

### Surface Mount Repair Kit (7000-SMRK)

Surface Mount Repair Kit for the 7000-series radio consisting of various surface mount components.

DWC Product P/N	Module Kit (-MK)	Module Repair Kit (-MRK)	Parts Spare Kit (-PSK)	Surface Mount Repair Kit
TW/RA1000D	>		>	
TW/RA500D	>		>	
RAT1000C	>	>	>	
AT7000B	>	>	>	
TW7000	>	>	>	7000-SMRK

TW7000E	Use TW7000	Use TW7000	Use TW7000	7000-SMRK
TW7000RF	Use TW7000	Use TW7000	Use TW7000	7000-SMRK
TW7000RI	Use TW7000	Use TW7000	Use TW7000	7000-SMRK
TW7000RX	>	>	Use TW7000	7000-SMRK
TW7000TX	Use TW7000	Use TW7000	Use TW7000	7000-SMRK
TW7201F	>	>		
TW7201I	>			

Notes:

1. To order an individual spares kit, add the appropriate suffix (i.e., -MK, -MRK, -PSK) to the product part number.
2. When MK (Module Kits) and MRK (Module Repair Kits) are not listed, they are not available and are not required.
3. System spares do not include spare handsets, microphones, antennas or other accessories that may be required for long-term support of the system.

## TW7000 Maintenance Equipment

Datron offers a number of maintenance kits to assist the repair technician in troubleshooting equipment.

- a. 7000EXT
- b. TW7000TK
- c. SMTRK

7000EXT

Extender board kit, includes boards and card puller.

TW7000TK

Basic tool repair kit with carrying case. Includes adapters, extension cables, and specialized tools to service the TW7000.

SMTRK

Surface mount technology repair kit consisting of a rework station, various soldering iron tips, solder and solder wick for a wide range of surface mount repair capability. Available for 110 VAC, 50-60 Hz or 220 VAC, 50 Hz. Specify ac operating voltage when ordering.

## TW7000 Manuals

The following table summarizes the manuals available for the TW7000 transceivers and major accessories.

DWC Equipment P/N	Operator (-MSOP) (supplied with unit)	Technical (-MS) (order separately)	Operator/Technical (-MS) (supplied with unit)
ABB1000			>
ABB100			>
AMX			>
TW/RA1000D			>
TW/RA500D			>
RAT1000C			>
AT7000B			>
TW7000	>	>	
TW7201F			>
TW7201I			>

*Note: for special system documentation, contact your Datron Sales Representative.*

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