

ARCHIVED REPORT

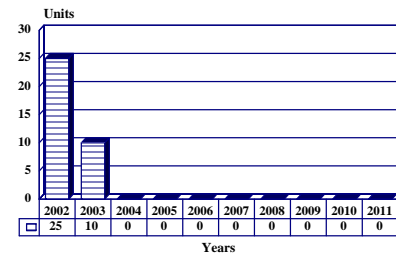
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PRC-77(V) - Archived 07/2003

Outlook

- JTRS scheduled to replace most US radios
- No new orders anticipated
- Barring any unforeseen activity, this report will be archived in the near future

10 Year Unit Production Forecast
2002 - 2011



Orientation

Description. Man-portable, short-range VHF FM receiver/transmitter.

Sponsor
US Army

Communications - Electronics Command (CECOM)
Fort Monmouth, New Jersey (NJ)
USA

Contractors

NAPCO International Inc
Defense Electronics Division
1600 2nd Street South
Hopkins, Minnesota (MN) 55343
USA
Tel: +1 612 931 2400
Fax: +1 612 931 2402
Web site: www.napcointer.com
E-mail: napco@napcointer.com
(Current US manufacturer)

Status. In production and operational service.

Total Produced. Roughly 515,000 were produced through 2001.

Application. Combat net radios for manpack use. VRC-64 and GRC-160 are vehicular radios with key components in common with PRC-77(V).

Price Range. Depending upon quantity and manufacturer, the average unit price for the complete PRC-77(V) system ranged from US\$1,000 to US\$2,500 in the early to mid-1980s. The current price is difficult to ascertain due to the limited release of sales information, although it is still believed to be a relatively low-cost system.

Technical Data

	<u>Metric</u>	<u>US</u>
Dimensions		
RT-841		
Size	10 x 27.3 x 27.3 cm	4 x 10.75 x 10.75 in
Weight, with Battery	7.6 kg	16.8 lb

	<u>Metric</u>	<u>US</u>
Dimensions		
Frequency Range	Low Band	30 - 52.95 MHz
	High Band	53 - 75.95 MHz
Distance Range (variable)	8 km	5 mi
Mode	FM (Voice)	
Channels	920	
Channel Spacing	50 kHz	
RT-841		
Power Supply	12.5 +/- 2.5 V DC, dry battery BA-398/U, BA-4386/U, BA-55984, or Ni-Cad	
Power Output	1.3 - 4 W	
Temperature		
Operating	-40°C to +65.5°C	-40°F to 150°F
Storage	-62°C to +71°C	-80°F to 160°F

Design Features. The PRC-77 was designed to replace the PRC-25 during the late 1960s. It is a solid-state, modular, man-portable radio that operates on the FM band between 30 and 75.95 MHz. The base model is equipped with 920 channels, with any two channels ready for presetting to provide rapid channel switching when needed. Remote operation is possible up to two miles away via the GRA-39 remote-control group. Automatic retransmission is accomplished through the use of an MK-456/GRC kit. The radio is rugged – designed to withstand extreme temperatures – and waterproof. Unit range is approximately five miles, but

varies with antenna configuration and operating conditions.

The RT-841/PRC-77 receiver/transmitter is the basic unit of this radio set, and is also the main component of two lightweight vehicle-mounted radios: the VRC-64 and the GRC-160. Accessories include the ST-138/PRC-25 cotton-duck backpack; CW-503/PRC-25 canvas carrying case; AT-892/PRC-25 one-section, three-foot folding whip antenna; AT-271A/PRC six-section, folding whip antenna; AB-591/PRC-25 antenna base; and H-189/GR handset.

Variants/Upgrades

PRC-1077. The Transworld Communications PRC-1077, an updated version of the PRC-77, entered production in 1984. The PRC-1077 is completely compatible with the PRC-77, and uses the same case, battery pack, connectors, and antennas. Improvements include lower battery drain, 10-channel memory, continuous coverage across the 30 to 88 MHz band, and selectable power outputs of 100 MW, 2 W, and 5 W.

PRC-77A/25. This Iranian clone made by the Communications Industries Group (Tehran) includes a digital synthesizer, and incorporates silicon semiconductor technology. It provides simplex communications over 1,840 channels. Range is up to 8 kilometers.

PRC-77A/GY. Telemit Electronic GmbH (Munich) manufactures a PRC-77 clone that first entered production in 1971 and was then updated in 1984 with the PRC-77A/GY. The latter features a new circuit design concept that includes CMOS integrated circuits, a digital synthesizer, and a new AF module.

KY-189. NAPCO manufactures the KY-189 secure intelligence handset, a self-contained COMSEC device that can be connected directly to the radio set, replacing the standard handset. Using the handset's 15-character

keypad, the user can scramble transmissions between KY-189-equipped PRC-77/VRC-12 radio sets (as well as SINGARS, PRC-1077, GRC-160, and VRC-64 systems). The handset also contains a small LED screen for displaying unit ID and date/time of each call on the net.

ESL-700. The Finnish company Elesco offers the ESL-700 encryption device for the PRC-77 radio. The ESL-700 encryption device is attached to the side of the transceiver and is connected to the EOL-711 fill gun. The EOL-710 programmer is attached to the fill gun to update/program the encryption device. The ESL-700 has an encryption rate of 16 bits per second and a synchronization time of less than 0.4 second.

Vehicular Variants. The VRC-64 vehicular version of the PRC-77 radio uses the RT-841 transceiver, AS-1729/VRC antenna, OA3633/GRC amplifier/power supply group, MT-1029/VRC mount, and CX-4720 cable assembly. NAPCO also offers a special Top Hat 50 W amplifier for the VRC-64. The GRC-160 is another vehicular radio whose main component is the RT-841 transmitter.

PRC-770. This is an upgrade to the PRC-77(V) that doubles the number of channels available in the RT-841 transceiver, from 920 channels at 50 kHz spacing to 1,840 channels at 25 kHz spacing. This is

accomplished using a kit. Radios converted to this configuration remain fully compatible with non-converted PRC-77(V)s.

Program Review

Background. The PRC-77 was developed and fielded during the Vietnam War as a replacement for the PRC-25. RCA Corporation, the first in a long list of PRC-77 manufacturers, received a US\$2.7 million contract for 2,050 sets beginning in 1966. Follow-on producers – both foreign and domestic – include Electrospace Corporation (selected as second-source producer in 1968), E-Systems (Memcor Division), the Bristol Electronics Corporation, C&G Associates, Cincinnati Electronics, and Hamilton Watch Company. Lucas AUL of Garden City, New York (formerly Lucas Hazleton), acquired US\$22 million in PRC-77-related contracts from Sentinel Electronics in 1989. US\$4 million worth of contracts to Lucas followed in 1992.

Contracts for equipment related to the PRC-77(V) continued to be awarded through the 1990s. Telex Communications Inc of Lincoln, Nebraska, won a US\$6.6 million award in February 1993 for 30,557 AS-1729 antennas. This was followed by a US\$5.9 million option in November 1994 for 25,000 antennas (completed in March 1996). Unicor was awarded a US\$5.9 million contract for 15,747 interconnecting boxes for the PRC-77 in March 1993.

NAPCO International Inc (Hopkins, Minnesota) acquired the rights and tooling from Cincinnati Electronics PRC-77 operations in 1989, and remains the sole US manufacturer. NAPCO also supplies the RT-841 transceiver used in the PRC-77(V), as well as the upgraded PRC-770.

In 1997, the Swedish Ministry of Defense announced an expected contract to upgrade/modify its in-service PRC-77(V)s to improve their performance and reliability. Prototypes were delivered in 1998, and production (if approved) was expected to extend into 2001. The current status of the contract is unknown.

Beyond this recent upgrade contract, the future of the PRC-77 does not look too bright. Currently, the US military is in the process of developing the Joint Tactical Radio System (JTRS), a program intended to standardize radio communications throughout all branches of the US military. Once JTRS enters production, many of the current US radios will be phased out. JTRS is expected to become operational circa 2006.

Funding

No recent PRC-77-specific funding has been identified.

Recent Contracts

None identified since the following:

<u>Contractor</u>	<u>Award (\$ millions)</u>	<u>Date/Description</u>
Telex	5.9	Nov 1994 – Modification to an FFP to exercise an option for 25,000 AS-1729 antennas for VRC-12 and PRC-77 radios. Completed March 1996. (DAAB07-93-C-G502)
NAPCO	1.2	Jun 1998 – NAPCO's Defense Electronics Division awarded contract by undisclosed country for upgrade of communication capability with improved PRC-77 radios.

Timetable

<u>Month</u>	<u>Year</u>	<u>Major Development</u>
	1966	RCA selected to develop and produce the PRC-77(V)
	1968	Electrospace Corporation selected as second-source producer
	1973	Agreement with South Korea for US\$3.2 million in sets to be assembled in Korea
	1980	Cincinnati Electronics delivers the 25,000th set; 12,000 had been delivered to overseas armies, mostly in kit form for local assembly
	1985	US Marine Corps successfully test a PRC-77 for the radio relay segment of its RPV program
	1989	Lucas Aerospace acquires Sentinel Electronics and its PRC-77(V) operations; NAPCO acquires Cincinnati Electronics PRC-77(V) rights and tooling
Thru	1990s	Production continues
Early	2000s	PRC-77(V) may remain in US service

Worldwide Distribution

Users of US-produced and internationally produced versions of the PRC-77(V) number over 60 countries, including **Brazil, Colombia, Cyprus, Egypt, Gabon, Germany, Honduras, Iran, Jordan, the Republic of Korea, Lebanon, Mali, Norway, Paraguay, Saudi Arabia, Spain, Sudan, Surinam, Sweden, Thailand, Tunisia,** and the **US** (Army and Marine Corps).

Forecast Rationale

The PRC-77 has served as the main man-portable 2 W solid-state VHF radio for the US military since the mid-1960s. The competitiveness of the PRC-77 was maintained through continuous upgrades. Now that the PRC-77 has been in service for over three decades, its basic technology and architecture can no longer compete with more modern systems. In fact, by the 1990s, the Single Channel Ground and Airborne Radio System (SINCGARS) began replacing the PRC-77.

The need for compatible communication systems, combined with the increased use of reserved forces, prevented the PRC-77 from being routed through the traditional “hand-me-down” process of passing aged equipment on to National Guard and Reserve units. In 1997, the National Guard Bureau issued a bulletin informing units designated to receive SINCGARS to

cancel any PRC-77 requisitions that were outstanding on backorder.

In recent years, the US military has embarked on a new program, the Joint Tactical Radio System (JTRS), to standardize radio communications throughout the services. The JTRS will be a programmable software-based radio capable of using various waveforms. Once JTRS becomes operational, circa 2006, most current US radios will be phased out of service. The antiquated technology of the PRC-77 and the development of JTRS leave little hope for future PRC-77 orders. There may be some residual production to supply the international market, but little, if any, is expected. Barring any unforeseen activity, this report will be archived in the near future.

Ten-Year Outlook

ESTIMATED CALENDAR YEAR PRODUCTION

Designation	Application	Thru 01	High Confidence Level			Good Confidence Level			Speculative			Total 02-11	
			02	03	04	05	06	07	08	09	10		11
PRC-77(V)	TACTICAL COMMUNICATIONS (VARIOUS)	515000	25	10	0	0	0	0	0	0	0	0	35