

**OPERATION AND MAINTENANCE**  
**1XN FREQUENCY DIVERSITY**  
**DR 6/11-135A AND 135EC**  
**TEST EQUIPMENT AND ACCESSORIES**

The test equipment required for the operation and maintenance of the DR 6/11-135 Digital Radio System is listed in Table A.

Table B lists the test cables, adapters, and miscellaneous test access equipment required to connect the test equipment to the station equipment under test.

Table C lists the tools that are required to gain access to specified test points on equipment under test.

*Note:* Each piece of equipment required for a procedure is keyed with an item number (e.g., A1 = Table A, item 1—digital multimeter). The letter identifies the table; the number identifies the equipment in the table.

Always follow the manufacturer's setup and/or operation procedure when using a piece of test equipment, accessory, or tool.

*Note:* For all tests, be sure that the pads being used are in good condition, are the correct wattage, and are accurate. Faulty pads will cause errors in measurements and tests.

*This practice is reissued to update the test equipment tables. The practice is used in binders 421-102-001, 421-102-080, 421-102-090, 421-102-100, 421-103-001, 421-103-080, 421-103-090, and 421-103-100.*

**ISSUING ORGANIZATION**

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TABLE A TEST EQUIPMENT REQUIREMENTS							
ITEM NO.	RECOMMENDED EQUIPMENT	REQUIREMENTS	APPLICATION	TERMINAL BAY	REGENERATOR BAY	RADIO BAY	
						DR6	DR11
A1	KS22861, L1 digital multimeter		Voltage and resistance measurements	X	X	X	X
A2	Hewlett-Packard counter/timer 5314A	100 MHz	Error counting and oscillator frequency measurements	X	X		
A3	Hewlett-Packard microwave frequency counter HP5342A, Option 001	Range: 55 to 85 MHz, 1 megohm/25 pf 5.9 to 11.7 GHz, 50 ohms ----- Sensitivity: 55 to 85 MHz, -20 dBm 5.9 to 11.7 MHz, -20 dBm ----- Resolution: 1 Hz to 10 KHz in decade steps ----- Stability: $\pm 1.5$ parts in $10^{-6}$ ( $-20^{\circ}$ to $50^{\circ}$ C) ----- Display: 10-digit LED	RF frequency measurements			X	X
A4	Hewlett-Packard power meter 435B or 436A	Frequency range: 55 to 85 MHz (75 ohms) 5.9 to 11.7 GHz, (50 ohms) ----- Power range: -25.0 to +20 dBm ----- Accuracy: $\pm 2.0\%$	Power measurements	X	X	X	X
A5	Hewlett-Packard 8481A RF power sensor		RF power measurements			X	X
A6	Hewlett-Packard 8483A IF power sensor		IF power measurements	X	X	X	X
A7	AT&T 202A propagation distortion simulator test set (SE PDS)		Adaptive slope equalizer testing	X	X	X	X
A8	AT&T AMR47 transversal equalizer patch circuit pack (2)		Transversal equalizer testing	X	X		
A9	ANRITSU* ME453M or Hewlett-Packard link analyzer 3711A/3791B/3712A/3793B	100Hz sweep option 03 (ANRITSU) or 100Hz sweep option 005, 007, and 021 (H-P)	IF-to-IF amplitude and delay distortion measurements and stress testing (S/I)	X	X	X	X
A10	AT&T ED-8C621-30,G1 202B 3-tone generator test set		Radio transmitter alignment			X	X

See footnotes at end of table.

Table A

TABLE A (Contd) TEST EQUIPMENT REQUIREMENTS							
ITEM NO.	RECOMMENDED EQUIPMENT	REQUIREMENTS	APPLICATION	TERMINAL BAY	REGENERATOR BAY	RADIO BAY	
						DR6	DR11
A11	Hewlett-Packard 8559A Spectrum analyzer plug-in (RF) Hewlett-Packard 853A Spectrum analyzer display	Stability: <25 KHz, 10 minutes after a 2 hour warm-up with temperature change <200 KHz/°C Range: 5.9 to 11.7 GHz, 50 ohms Gain compression: <0.5 dB for -10 dBm input Response: ±1.8 dB max. Sensitivity: -90 dBm	Radio transmitter alignment			X	X
A12	AT&T ED-8C621-30, G2 202C 3-tone generator and RF to IF down-converter test set		Radio transmitter alignment			X	X
A13	SIEMENS† DLZ 102-6 Dummy Load w/6 ft. test cable		Testing TWT power supplies			X	X
A14	Hewlett-Packard 8498A Attenuator (Options 030 and 890)	30 dB, 25 W	High power RF measurements			X	X
A15	AT&T 64R Unequal split pad		S/I testing	X	X		
A16	AT&T 19H Pad	30 dB	Receiver IF adjustments			X	X
A17	AT&T 19H Pad	20 dB	Transmitter fade simulator			X	X
A18	Midwest Microwave 263M Attenuator (2)	20 dB	Down-converter testing			X	X
A19	AT&T 207A Propagation Distortion Simulator test set (TE PDS)		Transversal equalizer testing			X	X
A20	AT&T 64K 6-dB split pad		Transmitter slope adjust			X	X
A21	ED54693-30, G5 Adjustable IF attenuator (2)		IF combiner test			X	X
A22	AT&T 63A Pad	1.0 dB	IF loopback test (interconnect cable ≤ 50 feet)	X	X	X	X
A23	AT&T 63A Pad	10.6 dB	IF loopback test (interconnect cable >50 feet)	X	X	X	X
A24	ED54785-30, G2 Card extender		Circuit pack testing			X	X
A25	AT&T 924A Card extender		FASTECH‡ circuit pack testing (2 pin rows)	X	X	X	X
A26	AT&T 928A Card extender		FASTECH circuit pack testing (3 pin rows)	X	X		
A27	AT&T 2671A Transformer		DADE measurements			X	X

\* Registered trademark of Anritsu Corporation.

† Registered trademark of Siemens Aktiengesellschaft.

‡ Registered trademark of AT&T.

Table A (Contd)

TABLE B TEST CABLES, ADAPTERS, AND MISCELLANEOUS TEST ACCESS EQUIPMENT							
ITEM NO.	RECOMMENDED EQUIPMENT	DESCRIPTION	APPLICATION	TERMINAL BAY	REGENERATOR BAY	RADIO BAY	
						DR6	DR11
B1	730B cable (2) with KS-19332,L2 (BNC) and 440A plug	Cable assembly, 6-foot coaxial cable equipped with a BNC plug and 440A plug	General use	X	X	X	X
B2	KS-19224,L2 cable (3) with 560B jack and KS-20864,L2 jack	Cable assembly, 6-inch coaxial cable equipped with 560B jack and SMB jack	General use	X	X	X	X
B3	KS-19224,L2 cable (2) with SEAELECTRO* 51-128-0249-99 connectors	Cable assembly, 7-inch coaxial cable equipped with locking right angle jacks	DADE procedure for space diversity receiver			X	X
B4	ED-50225-20,G-201 with 440A plugs	Cable assembly, 50 feet 731B coaxial cable equipped with 440A plugs	Loopback testing with transversal equalizer	X	X		
B5	KS-19224,L2 cable (2) with 358B plug and KS-20864,L3 jack	Cable assembly, 12-inch coaxial cable equipped with 358B plug and KS-20864,L3 jack	IF power measurements			X	X
B6	GMCA-290-1 with SMA connectors	Cable assembly, 5-feet RF cable equipped with SMA jacks	RF frequency testing			X	X
B7	Adams Russell FC15 cable 1538-8223-533 (2)	Cable assembly, 1-foot coaxial cable equipped with C1505 connectors	Down-converter testing			X	X
B8	KS-19224,L2 cable (2) with KS-20863,L11 connector KS-20864,L13 connector	Cable assembly, 2-feet coaxial cable equipped with KS-20863,L11 plug and KS-20864,L13 locking snap-on jack	IF combiner tests			X	X
B9	AT&T 187A Adaptor	358 plug to 558 jack	General use	X	X	X	
B10	AT&T 188A Adaptor	477 plug to 558 jack	General use	X	X	X	
B11	AT&T 189A Adaptor	358 plug to 440 plug	General use	X	X	X	
B12	SEAELECTRO 51-174-6800 adaptor	SMB plug to BNC plug	General use	X	X		
See footnotes at end of table.							

Table B

TABLE B (Contd) TEST CABLES, ADAPTERS, AND MISCELLANEOUS TEST ACCESS EQUIPMENT							
ITEM NO.	RECOMMENDED EQUIPMENT	DESCRIPTION	APPLICATION	TERMINAL BAY	REGENERATOR BAY	RADIO BAY	
						DR6	DR11
B13	SEALLECTRO 51-175-6801 adapter	BNC jack to SMB plug	General use	X	X	X	
B14	AT&T 203A adapter	75-ohm N jack to 477D jack	General use			X	X
B15	AT&T 442A IF termination		System testing	X	X	X	X
B16	Omni Spectra Adapter Part No. 3080-2240-00	N jack to SMA jack	General use			X	X
B17	Omni Spectra Adapter Part No. 3082-2241-00	N jack to SMA plug	General use			X	X
B18	WECO† 730B cable with WECO 440A plugs	Cable assembly, 5 feet coaxial cable equipped with WECO 440 type plugs	General use	X	X		
B19	KS-19224, L2 cable (2) with KS-20864, L13 connectors	Cable assembly, 2-foot coaxial cable with two locking SMB jacks	Connection to propagation distortion simulator			X	X
B20	KS-19224, L2 cable with KS-20864, L13 connectors	Cable assembly, 5-foot coaxial cable with two locking SMB jacks	IF frequency (clock) checks	X	X		
B21	SEALLECTRO 51-175-6701	N jack to SMB jack	IF power test	X	X	X	X
B22	SEALLECTRO 51-172-0000	SMB plug to SMB plug	IF power test	X	X	X	X
B23	KS-19224, L2 cable	Cable assembly, 36-foot coaxial cable with SMB jack and SMB plug	Receive switch alignment (DADE)	X	X		
B24	KS-19224, L2 cable	Cable assembly, 18-foot coaxial cable with two 440B plugs.	Loopback testing			X	X
B25	AT&T 3842 adapter	N plug to N plug	RF power test			X	X
B26	POMONA‡ 3841 adapter	N jack to N jack	RF power test			X	X

\* Registered trademark of Sealectro Corporation.

† Registered trademark of AT&T.

‡ Registered trademark of ITT Corp.

Table B (Contd)

TABLE C TOOLS							
ITEM NO.	RECOMMENDED EQUIPMENT	DESCRIPTION	APPLICATION	TERMINAL BAY	REGENERATOR BAY	RADIO BAY	
						DR6	DR11
C1	P49R560 socket wrench	10-inch, waveguide U-joint	Assembly and disassembly of waveguide apparatus			X	X
C2	Snap-On OX1 8 combination wrench	1/4 X 1/4				X	X
C3	Snap-On OX1 10 combination wrench	5/16 X 5/16	SMA connector assembly and disassembly			X	X
C4	SEAELECTRO torque wrench 50-000-6854 200	(SMA) 8 ± 0.5 inch-lbs.	SMA connector tightening			X	X
C5	KS-6854,L1 screwdriver		General use	X	X	X	X
C6	Screwdriver	2-inch	General use			X	X
C7	Screwdriver	3-inch	General use			X	X
C8	Screwdriver	4-inch	General use	X	X	X	X
C9	KS-20116,L1 adjustment tool		Unit adjustments			X	X
C10	KS-19099,L3 extractor		Plug-in removal	X	X	X	X
C11	Screwdriver	10-inch	TWT amplifier assembly removal			X	X
C12	SEAELECTRO torque wrench 50-000-6854-210	(N) 25 ± 0.5 inch-lbs.	TWT amplifier N-type connector tightening			X	
C13	STANLEY* 86-852 wrench	Open end (7 mm)	TWT amplifier and power supply replacement			X	X

\* Registered trademark of the Stanley Works.

Table C