T2 SYSTEM LOCAP CABLES
DESCRIPTION, USE, AND REEL LENGTHS

CONTENTS PAGE

1. GENERAL

1.01 This section covers the description, use, and reel lengths of air core LCAT (formerly CA-3240) and waterproof LLAW (formerly CA-6074) T2 LOCAP (ie, low capacitance, 39 and 46 nF/mile, respectively) dual expanded plastic-insulated conductor (DEPIC) cables.

1.02 This section is issued to include air core and waterproof T2 LOCAP cable information in a single section. Portions of this information were formerly contained in Sections 626-759-143 and 626-200-122. Whenever this section is reissued, the reasons for reissue will be listed in this paragraph.

1.03 A detailed description, selection, and use of plastic sheaths and outer protections are covered in Sections 626-020-020 and 626-759-025, respectively.

1.04 Splicing information for LOCAP cables is contained in Section 640-010-005.

1.05 Information on LOCAP matching wire armored CA-6074 is given in Section 626-759-250.

2. DESCRIPTION

2.01 Waterproof and air core LOCAP cables consist of mated 22-gauge conductors insulated with DEPIC insulation. The conductors are annealed copper.

2.02 LOCAP cable pairs are formed by taking successive lengths of insulated conductors and twisting them together to form a ***mated*** pair. This practice provides a good match of the dimensions and materials of the two wires and, thus, results in excellent transmission characteristics. However, since the successive wire lengths have the same color insulation, such mated pairs do not have the familiar tip-ring wire identification. Tip-ring identification is not required for the T2 digital line; however, tip-ring identification ***is*** required for the maintenance pairs.

2.03 The core makeup and pair identification of LOCAP waterproof and air core cables are the same. Each cable is constructed with mated pairs for T2 digital transmission and several PIC color-coded auxiliary pairs for maintenance functions such as order wire, fault locate, etc. Figure 1 shows the colors of insulation, arrangement of units, color of unit binders, and the location of interstitial pairs.

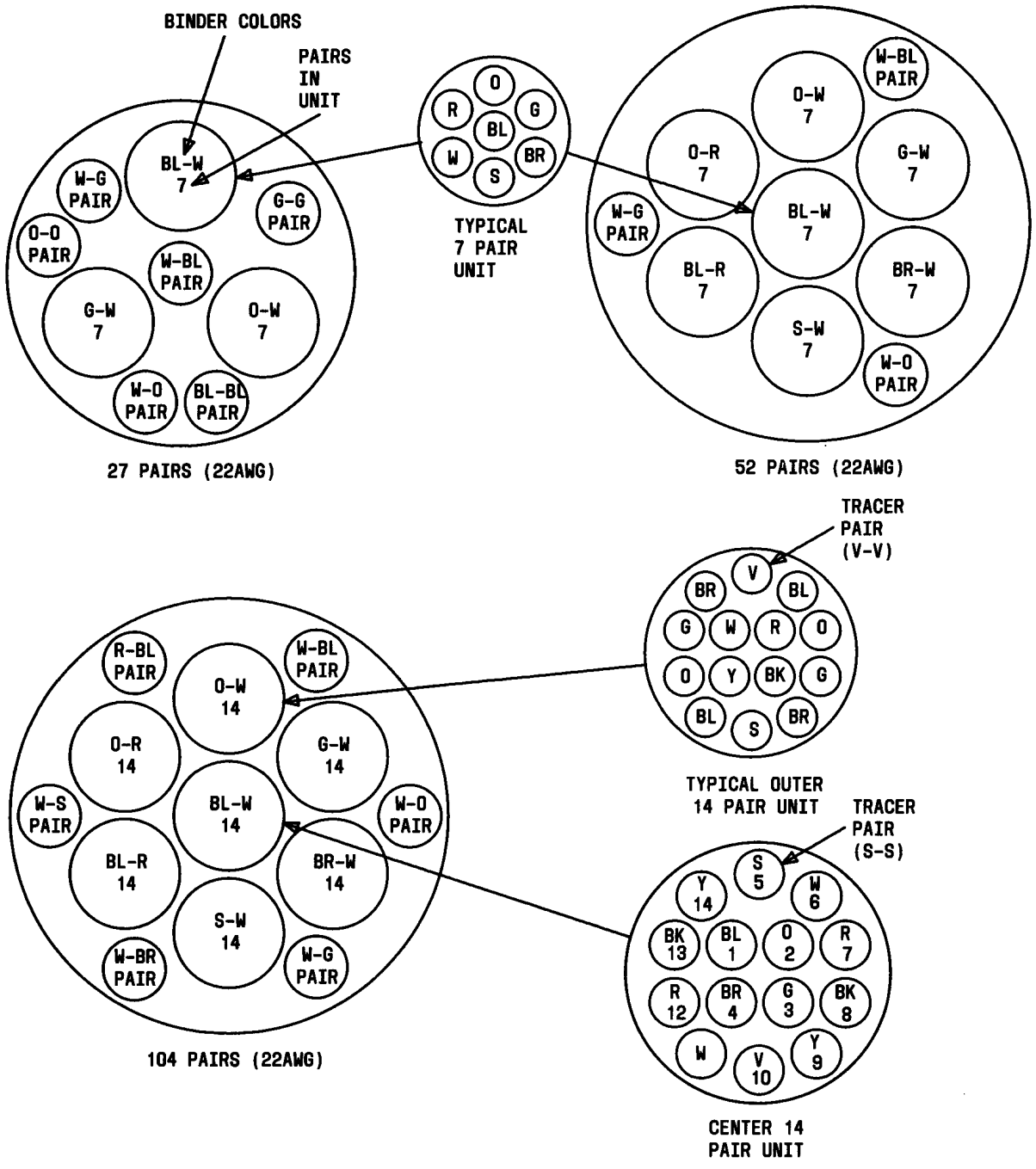
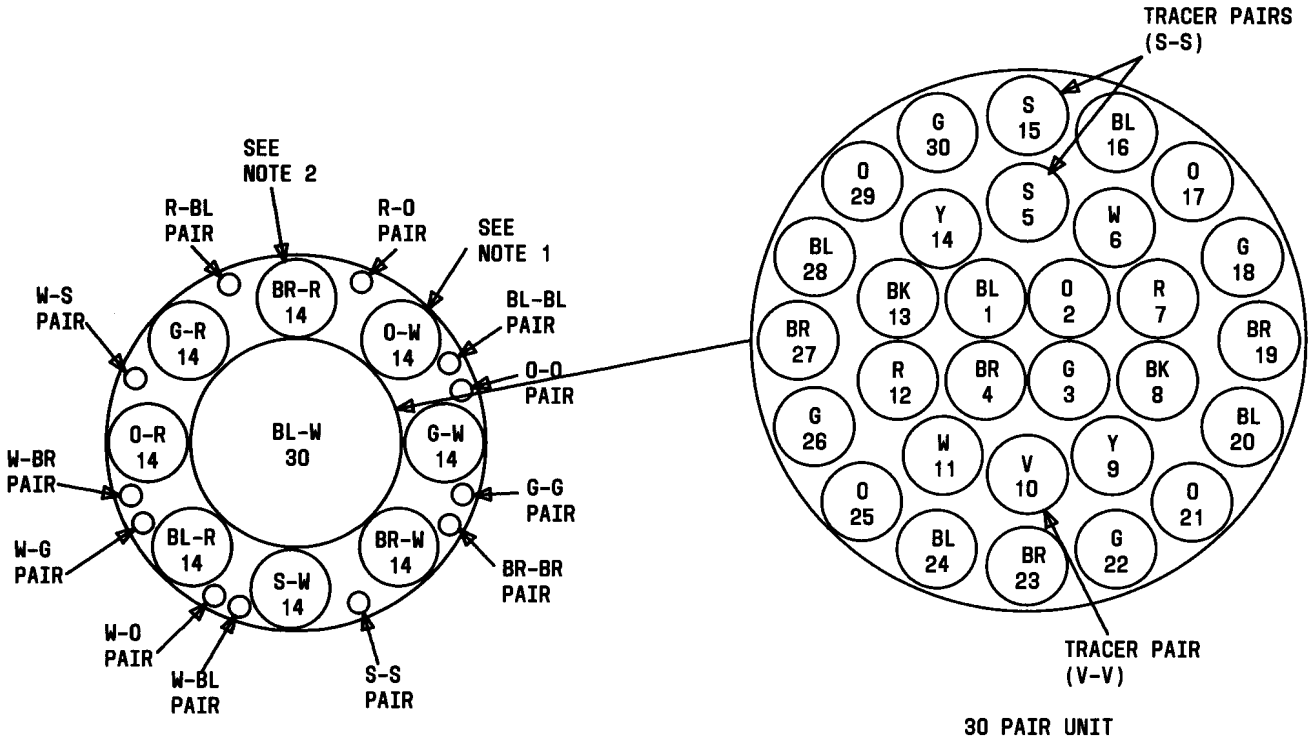
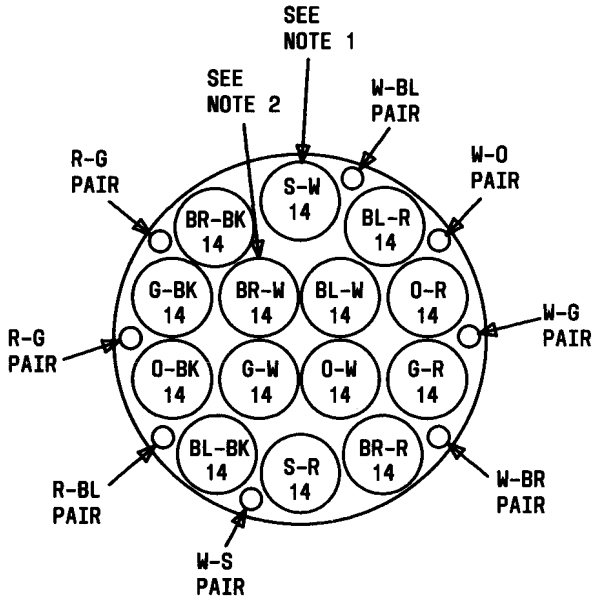


Fig. 1—Air Core and Waterproof T2 LOCAP Cable Lay-Ups (Sheet 1 or 2)





NOTES:
1. FOR THE O-W, BR-W, BL-R, AND G-R UNITS OF THE 154-PAIR AND THE OUTER UNITS OF THE 204-PAIR CABLES, SEE TYPICAL OUTER UNIT OF 104-PAIR CABLE LAYUP.
2. FOR THE G-W, S-W, O-R, AND BR-R UNITS OF THE 154-PAIR AND THE INNER UNITS OF THE 204-PAIR CABLES, SEE TYPICAL CENTER UNIT OF 104-PAIR CABLE LAYUP.

- KEY -

BL = BLUE	R = RED
O = ORANGE	BK = BLACK
G = GREEN	Y = YELLOW
BR = BROWN	W = WHITE
S = SLATE	V = VIOLET

Fig. 1—Air Core and Waterproof T2 LOCAP Cable Lay-Ups (Sheet 2 of 2)

2.04 ***27- and 52-Pair Core Makeups:*** The color coding of the mated pairs and the color-coded unit binders enable each pair in a cable to be readily identified as to pair number. The 27- and 52-pair cables (Fig. 1) are constructed with seven pair units made with color-coded mated pairs using the five standard ring colors (blue, orange, green, brown, and slate) and the first two tip colors (white and red). All seven pair units have the same color-code. Each seven pair unit is successively identified with color-coded binders (bl-w, o-w, etc). To provide mated pairs for 24 T2 digital systems, the 27-pair cables have 3 additional mated pairs in the outer interstices between the units. In addition, both the 27- and 52-pair cables have three color-coded auxiliary pairs (w-bl, w-o, and w-g) in the interstices.

2.05 ***104-Pair Core Makeup:*** The 104-pair cables (Fig. 1) are constructed with 14-pair units made with color-coded mated pairs. Since there are only a total of ten standard tip and ring colors, four pair colors are repeated once in the outer layer of each 14-pair unit. The like-colored pairs in each unit are distinguished from each other with the use of a tracer pair (slate or violet). In addition, the 14-pair units have two different color codings (one for the center unit and one for the outer units as shown in Fig. 1). For the center unit, the pair sequence can easily be remembered by noting that the first ten pairs are in standard order, starting with the ring colors. The last four pairs are the first four tip colors repeated. In the outer units, the sequence of the tip and ring colors are reversed (ie, the first ten pairs are in standard order starting with the tip colors). The last four pairs are the first four ring colors repeated. Each 14-pair unit is successively identified with color-coded binders. In addition, the 104-pair cables have six color-coded auxiliary pairs located in the outer interstices.

2.06 ***154-Pair Core Makeup:*** The 154-pair cables (Fig. 1) are constructed with one 30-pair center unit, eight 14-pair outer units, and 12 color-coded auxiliary pairs. The color code of the 14-pair units alternates. Only every other unit is similar to the outer unit of the 104-pair cable. The 30-pair center unit is similar to the 14-pair units except that an additional layer of 16 pairs is used to complete the 30-pair count.

2.07 ***204-Pair Core Makeup:*** The 204-pair cables (Fig. 1) are constructed with four 14-pair center units, followed by a layer of ten 14-pair outer units, and 8 color-coded auxiliary pairs. The 14-pair center and outer units are similar to the center and outer units of the 104-pair cable, respectively.

2.08 ***Sheaths and Outer Protections:*** Available sheath and outer protections are listed in the reel length Tables in Part 5.

3. USE

3.01 LOCAP cables are designed specifically to provide a low-loss, low-crosstalk facility for T2 digital lines. The air core and waterproof designs use the same insulated conductors, pairs, and cores to reduce factory inventories and costs. Designed this way, the capacitance and loss of the waterproof design are higher than those of the air core design because of the effect of the filling compound. The higher loss of waterproof cables results in maximum T2 repeater sections of 13,700 feet as compared to 15,000 feet for the air core LOCAP cables.

4. ELECTRICAL CHARACTERISTICS

4.01 The electrical characteristics of LOCAP cables are given in Tables A and B.

TABLE A

LCA AIR CORE LOCAP CABLE
ELECTRICAL CHARACTERISTICS

PARAMETER	VALUE (APPROX.)
DC Resistance	86.5 ohms per mile at 68° F
Mutual Capacitance	39 nF per mile
Impedance at 3.15 MHz	178 ohms
Attenuation at 3.15 MHz	21.5 dB per mile at 75° F average and 23.1 dB per mile at 75° F maximum
Far-end Crosstalk (dB per 1000 ft, at 31.5 MHz)	Power sums −38 dB Min. — worst pair Pair to Pair −0.1 Percent Point −41 dB Min.
Dielectric Strength	Between each conductor and sheath −10,000 Volts dc Between Conductors −4000 Volts dc
Resistance Unbalance	3.0% Max.
Capacitance Unbalance (pF per 1000 feet)	50 pF Av; 135 pF Max.

TABLE B

LLA WATERPROOF LOCAP CABLE
ELECTRICAL CHARACTERISTICS

PARAMETER	VALUE (APPROX)
DC Resistance	86.5 ohms per mile at 68° F
Mutual Capacitance	46 nF per mile
Impedance at 3.15 MHz	165 ohms
Attenuation at 3.15 MHz	23.4 dB per mile — at 75° F average and 25.4 dB per mile at 75° F maximum
Far-End Crosstalk (dB per 1000 ft, at 3.15 MHz)	Power sums — 38 dB min. — worst pair Pair to Pair — 0.1 Percent Point −41 dB Min.
Dielectric Strength	Between each conductor and sheath — 10,000 Volts dc Between Conductors −4000 Volts dc
Resistance Unbalance	3.0% Max.
Capacitance Unbalance (pF per 1000 feet)	60 pF Av; 150 pF Max.

5. PHYSICAL CHARACTERISTICS

DEFINITIONS

5.01 ***Code Designations:*** When ordering letter-coded cables, use applicable letter code. For example, an ARPAP sheath LOCAP air core letter-coded cable with 104 pairs of 22 gauge is ordered as LCAT-104. When any outer protection is required on the cable, add the respective letter code after the pair size; eg, LCAT-104 UM (unsoldered mechanical protection).

5.02 ***Maximum Reel Lengths:*** These are the longest lengths of T2 LOCAP cable with the various sheaths and outer protection that can be obtained on the size reels indicated in Tables C and D.

REEL LENGTH DATA

5.03 Tables C and D cover the approximate weights and diameters, maximum reel lengths, and reel numbers for air core and waterproof T2 LOCAP cable.

TABLE C

22-GAUGE AIR CORE T2 LOCAP CABLE
LCAT (ARPAP SHEATH AND ARPAP SHEATH UM AND BT)

SHEATH AND OUTER PROTECTION	NO. OF PAIRS	OUTSIDE DIAMETER (INCHES)	WEIGHT PER FT. (POUNDS)	MAXIMUM REEL LENGTH (FEET)	REEL SIZE
ARPAP	27	1.27	0.42	5200	420
	52	1.59	0.67	2600	420
	104	2.17	1.17	2600	487
	154	2.60	1.60	1730	487
	204	2.90	1.99	1280	487
ARPAP-UM (UM-Type protection)	27	1.43	0.70	2600	419
	52	1.85	1.08	2600	420
	104	2.44	1.73	2600	487
	154	2.91	2.34	1720	487
	204	3.20	2.82	1280	487
ARPAP-BT (Buried tape armor)	27	1.68	1.74	2600	420
	52	2.04	2.32	2600	487
	104	2.62	3.35	2600	487
	154	3.05	4.20	1730	487
	204	3.35	4.85	1280	487

TABLE D

22-GAUGE WATERPROOF T2 LOCAP CABLE
LLAW (ASP SHEATH AND ASP SHEATH UM)

SHEATH AND OUTER PROTECTION	NO. OF PAIRS	OUTSIDE DIAMETER (INCHES)	WEIGHT PER FT. (POUNDS)	MAXIMUM REEL LENGTH (FEET)	REEL SIZE
ASP	27 52 104	1.10 1.40 2.00	0.47 0.77 1.49	5200 2600 2600	419 420 420
	154 204	2.39 2.73	2.20 2.95	1730 1280	420 420
ASP-UM (UM-Type protection)	27 52 104	1.30 1.56 2.16	0.70 1.08 1.98	5200 2600 2600	420 420 487
	154 204	2.69 3.04	2.87 3.73	1720 1270	487 487