STATION CARRIER EQUIPMENT

PURPOSE: The purpose of this addendum is to summarize the characteristics of currently available station carrier equipment.

ADDITION:

1. GENERAL

1.1 Station carrier is available in single channel and multichannel systems and arranged in distributed (individual channels) and grouped housings. The distributed multichannel station carrier is in predominant use by REA borrowers in rural areas. This type makes maximum use of existing cable facilities, including small distribution cables. Distributed one channel station carrier is also in frequent use by rural telcos, but in smaller quantities. Grouped applications of single and multichannel station carrier are becoming more popular. Where distribution facilities are available from a common field location such as SAI points in SAVE designs, grouped application is more economical to install and maintain. One channel systems provide one party ringing, and multichannel systems provide one party and multiparty ringing. Many types also provide options for other services such as key systems and PABX operation.

1.2 Station carrier repeaters and subscriber terminals are generally powered over the carrier system cable pairs. This limits the power available at the subscriber terminal; and strict limits are generally imposed on subscriber drop length and ringers. Even with these imposed limitations, station carrier serves to complement other forms of pair gain systems and remote switching units. The flexibility of application within these defined limits has made station carrier the most widely used pair gain equipment in service today.

1.3 The following paragraphs summarize some of the key generalized characteristics of currently available station carrier equipment. Refer to REA TE&CM Section 911 for details on station carrier application.

2. EQUIPMENT CHARACTERISTICS

2.1 System Categories: The major categories of station carrier are one channel and multichannel types. There are grouped and distributed application systems of both one channel and multichannel station carrier.

2.1.1 One Channel Station Carrier is an add-on or second line type of subscriber carrier. It is a non-repeatered system and is applied to a physical circuit to derive two circuits over one cable pair. Distributed one channel carrier is seldom planned into a telephone system; it is used primarily for cable relief as the need occurs. The central office end may be installed in quantities of one or several shelves at a time; but subscriber channels are usually installed on an as-needed basis. One channel

systems provide one party service using straight line ringers (not frequency selective). Subscriber channels are arranged for grouped or distributed housing applications. Grouped housings provide for about 20 to 50 channels with subscriber cable drops limited to about 200 ohms from that location. Distributed (one channel per housing) inside mounted types generally limit the subscriber drop to about 25 ohms; outside mounted types generally provide for about 200 ohm drops.

2.1.2 Multichannel Station Carrier systems provide for 6 to 13 channels over one cable pair. Multichannel types are arranged as grouped and distributed systems. Distributed station carrier has been widely used because it allows maximum utilization of existing cable plant. The subscriber terminals of a system are individually located near the subscriber served. This minimizes the need for distribution cable pairs to reduce or eliminate the need for feeder and distribution cable reinforcement. The current trend seems to be toward increased use of grouped systems. Grouped equipment costs are lower and maintenance is somewhat easier with all channels of a system at one location. One party and multiparty systems are available. Multiparty ringing systems generally serve up to four subscribers per channel using frequency selective ringers. Systems designed for one party ringing generally require the use of straight line ringers.

2.2 Power: Station carrier has evolved into highly power efficient systems. The use of local ac power is avoided for almost all applications. Except for extended length systems, all multichannel and some grouped types of single channel station carrier have eliminated the need for batteries at field locations. While this design imposes limitations on certain applications, loop limits, ringers, etc., this design philosophy increases application flexibility and serves to reduce installation and maintenance costs. Station carrier provides for a minimum of 20 mA loop current if the telephone set is 200 ohms or less.

2.3 Carrier Frequency Considerations: Revisions of REA station carrier equipment specifications have generally led to increased compatibility within cables. (Note: Station carrier was previously covered in REA Specification PE-62. All subscriber carrier is now covered in REA Specification PE-64 with station carrier in subpart PE-64b.) A specific standard for station carrier frequencies and levels provided for full utilization of cable pairs; the mixing of all types of station carrier within the cable; and a high degree of mixing PCM carrier and station carrier within the cable.

2.3.1 All multichannel station carrier utilize compandors to reduce noise and improve mixing with PCM carrier as required by REA Specification PE-64b. While not required by PE-64b, some one channel station carrier also utilize compandors to reduce noise and increase potential application.

2.3.2 Recently, several eight channel station carrier systems have become available. Some of these systems are arranged for higher density grouped application at lower cost; and other systems provide flexibility in both grouped and distributed applications. These systems use the lower cost double sideband amplitude modulation (DSB AM), or some variation of this.

2.3.3 Using DSB AM, the REA frequency standard has provided for a maximum of seven channels--until recently. The REA Specification PE-64b (effective April 15, 1980), provides for a Primary and Alternate frequency standard. This accommodates both the existing equipment and the new eight channel equipment. The adoption of primary and alternate frequency standards do allow for some minor conflicts in the "universal" application of station carrier. Most existing station carrier will meet both the primary and alternate frequency standard. On occasion where conflicting systems are placed in the same cable, one or possibly two channels of one of types may have to be deleted.

2.3.4 More specific application information is covered in REA TE&CM 911. REA also plans to include listing subcategories and footnotes in the REA List of Materials (REA Bulletin 344-2).

2.4 Maintenance Features: To speed the location of troubles in station carrier systems, some equipment has built-in maintenance test features. These test features are generally standard in the latest model equipment, and can be added to some of the earlier equipment. The following is a brief summary of some of the maintenance features available. These features vary with equipment. Rely on the manufacturer's information for completeness and accuracy.

2.4.1 Some features are built into each system and others require a special plug-in module shared by systems at the central office. By sending a modulated tone toward the subscriber channel, provide off-hook and looping of the demodulated tone at the subscriber terminal, and monitoring the returned carrier and voice levels, much of the station carrier electronics can be tested from the central office location. Channel busy lamps and system fault conditions (ground leak) are features of some equipment also. One equipment type provides a continuous test of carrier and voice levels during the channel idle condition.

2.4.2 To some degree, these maintenance tests can be done from a remote location utilizing a remote wire chief's test set. Because of costs, there has been limited interest in this capability. As costs change, interest may change.

2.4.3 There is a limited ability to test the subscriber voice drop on low density subscriber systems. As the number of channels (or circuits) per subscriber location increases, the feasibility of such test capability increases.