caused by the receipt of a complete data character or by a data transmission error. Typically, a data transmission error is the result of noise on the tip and ring leads of the station set typically causing a framing error. When the UART has detected a transmission error (block **701**), display **126** is cleared (block **702**), and the message status block state is set to "idle" (block **703**). Control is then returned to the INPUT INTERRUPT routine.

When UART status register indicates that a complete data character has been received, microprocessor **121** reads the character in the UART receive buffer register and stores the character in the data input array of the message status block (block **704**). The data input array of the message status block is a segment of data memory **123** in which are stored the characters of the data message received from the central office transmitter. Based on the state of the message status block (block **705**), microprocessor **121** calls one of four subroutines: namely, IDLE (block **706**), RECEIVE MESSAGE TYPE (block **707**), RECEIVE CHARACTER COUNT (block **708**), and RECEIVE DATA (block **709**).

When the message status block is in the "idle" state, no action is required, and control is immediately returned to the CHARACTER READY routine.

When the state of the status block is "type", the RECEIVE MESSAGE TYPE subroutine is called which is depicted in FIG. **8**. Microprocessor **121** interprets the message type character to determine whether the data message is to be displayed (block **801**). Recognizing that the message is not to be displayed, microprocessor **121** clears display **126** (block **802**) and sets the message status block state to "idle" (block **803**). Control is then returned to the CHARACTER READY routine. Recognizing that the message is to be displayed, microprocessor **121** stores the message type character in the check sum accumulator of the message status block for subsequent check sum calculations (block **804**) and sets the state of the message status block to "character count" (block **805**). After which, control is once again returned to the CHARACTER READY routine.

When the second character of the data message is received by the UART, microprocessor **121** calls the RECEIVE CHARACTER COUNT subroutine which is depicted in FIG. **9**. Under control of this subroutine, microprocessor **121** performs several operations. First, the character is entered in the character count accumulator of the message status block to indicate the number of subsequent data characters to be received (block **901**). Second, the character is added to the check sum accumulator in the message status block for transmission error detection (block **902**). Next, microprocessor **121** sets the state of the message status block to "data" (block **903**). Lastly, the input array pointer of the message status block is initialized for use in storing subsequently received data characters (block **904**). After this, control is once again returned to the CHARACTER READY routine.

Upon receiving the third character from UART **125**, microprocessor **121** calls the RECEIVE DATA subroutine which is depicted in FIG. **10**. Under control of this subroutine, microprocessor **121** first adds the received character to the check sum accumulator (block **1001**) and decrements the character count accumulator of the message status block (block **1002**). The character count accumulator is decremented each time a data character is received to determine the end of the data message (block **1003**). The end of a data message is reached when the character count equals zero with the receipt of a check sum character. Otherwise, when the end of a data message has not been reached, microprocessor **121** unpacks the binary coded decimal character to form two digits of the calling station directory number (DN) (block **1004**) and stores them in the data input array of the message status block using the array pointer (block **1005**). The input array pointer is then incremented to a data memory location for the subsequent storage of the next digits of the directory number (block **1006**). Again, control is returned to the CHARACTER READY routine.

The RECEIVE DATA subroutine is repeatedly called by the microprocessor until all the characters of a complete data message have been stored in the data input array of the message status block. As mentioned, the subroutine is repeatedly called until the character count of the message status block equals zero (block **1003**) at which time the contents of the check sum accumulator is examined (block **1007**). When the contents of the check sum accumulator equals zero, microprocessor **121** converts the characters stored in the data input array to a format suitable for display (block **1008**) and enters the converted format message in the output array of the message status block (block **1009**). The state of the message status block is then set to "idle" (block **1010**), and control is, once again, returned to the CHARACTER READY routine.

When the contents of the check sum accumulator is other than zero, this normally indicates that a character has been changed in transmission due to noise or the like. Thus, an appropriate error message is entered into the data output array (block **1011**), and the state of the message status block is once again set to "idle" (block **1010**) to prepare the receiver for the receipt of the next data message. Likewise, control is then returned to the CHARACTER READY routine.

After having received a data message from the central office and storing it in the data output array of the message status block, microprocessor **121** under the control of a base level update display program uses the data output array to display the data message in display **126**. The BASE LEVEL UPDATE-DISPLAY program is depicted in FIG. **11** and is repeatedly used by the microprocessor to update display **126** whenever none of the input interrupt routines are called. Microprocessor **121** uses the update-display program to retrieve, for example, the digits of the calling station directory number stored in the data output array of the message status block and to display the digits in the appropriate location of the display. This operation is repeated at a rate such that all the digits of the directory number "appear" to be simultaneously present in the display as is the case with any well-known pocket calculator. Microprocessor **121** accomplishes this operation by first initializing the array output pointer of the message status block to point to the first character of the data output array. Guided by the output array pointer, microprocessor **121** retrieves the first character of the data message from the data output array (block **1101**). Again using the output pointer, microprocessor **121** then writes the character into the display as previously described (block **1102**) and increments the output array pointer for the next character of the data message (block **1103**). This operation is repeated until all the characters of the (n) character display have been addressed. This is the case when the output array pointer equals the number of characters (n) of the display (block